

March 9, 2023

Transmitted by email: [jennifer.winsor@gov.mb.ca](mailto:jennifer.winsor@gov.mb.ca)

Attention: Jennifer Winsor  
**Manitoba Environment, Climate and Parks**  
Environmental Stewardship Division  
Environmental Approvals Branch

Phone: (204) 945-7012

Dear Jennifer Winsor:

**Re: True North Foods NoA (File No. 2412.10)**

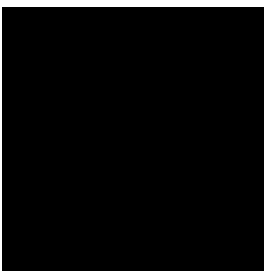
On behalf of True North Foods, this letter is to update you on outstanding issues related to the above captioned NoA. The actions taken and results reported are those requested in your director's letter of February 16, 2022, attached. The timing of our response involved both field work, in-house storage / aging of samples and subsequent analysis and reporting, hence the time delay.

Attached please find the report prepared by DGH Engineering Ltd responding to the Required Analyses 1 through 4 identified in the director's letter.

Please let us know if you have any questions or ongoing concerns.

Respectfully submitted,

**DGH ENGINEERING LTD.**



Per: Charles Liu, P.Eng.

cc: True North Foods ([calvin@truenorthfoods.ca](mailto:calvin@truenorthfoods.ca))

**Analysis report to Manitoba Environment, Climate and Parks (MECP)**  
(DGH Engineering Ltd., March 9, 2023)

The analyses required by MECP were undertaken by DGH Engineering based on annual wastewater pumping records and blood shipping records. Three wastewater analysis reports were provided by True North Foods. A wastewater sample and a fresh blood sample was collected and stored in the DGH shop to simulate the storage period. The samples were aged for 6 months and then evaluated to estimate of the effluent quality for the proposed alteration.

The blood collection rate was measured and recorded on site as 22.7 m<sup>3</sup> per week. The annual blood collection is thus calculated to be 1,180 m<sup>3</sup>. The wastewater volume from August 27, 2020 to September 5, 2021 was recorded as 35,800 m<sup>3</sup>, which is equivalent to an annual wastewater generation of 34,900 m<sup>3</sup>. The total annual effluent from the storage pond, including blood, is therefore predicted to be 36,000 m<sup>3</sup>. The ratio of blood to wastewater is to be approximately 3%.

The blood will not be directly applied on land. The NoA proposal is to mix the blood into the wastewater and store it in the existing covered wastewater storage. The concentration of the blood will be diluted 1:30. The estimated nutrient content of the effluent due to the proposed alteration is shown in Table 1.

**Table 1. Nitrogen and Phosphorus in True North Foods Wastewater**

	Stored wastewater (lb/1000 gal)	fresh blood (lb/1000 gal)	estimated for blood/wastewater combination (lb/1000 gal)
Total N	10.48	298	19.9
Ammonium-N	2.35	19	4.7*
Organic N	8.13	279	15.2*
Total P	0.07	8.3	0.34

\*assumed 20% of organic N annually converted to ammonium N.

**MECP Required analysis 1: An analysis of all potential environmental effects resulting from the land application of blood waste, including impacts to groundwater, surface water, soil, air pollution (odour), etc.**

The recycling of stored slaughterhouse wastewater on cropland is similar to the application of livestock manure on cropland. It is an economical and environmentally sustainable method for the utilization of the nutrients in the wastewater.

All agronomic crops remove nutrients, primarily nitrogen (N) and phosphorus (P) from the soil. Supplemental nutrients normally in the form of inorganic chemical fertilizers, or livestock manures, are therefore necessary to replenish the soil nutrient levels.

The blood/wastewater effluent from True North Foods will be utilized in an identical manner to manure. The rate of land application will be based on target yields with the blood/wastewater to be applied at rates not to exceed the expected crop nitrogen requirements. This practice will be in full compliance with the terms of the existing license for waste water application and no changes are therefore required to the existing terms of the license in this regard.

The primary change in the current land application practice under the proposed NoA will be a reduction in liquid application rate. To date the nutrient concentration of the wastewater effluent was so low that the application rate was limited by hydraulic factors. The application rates achieved varied from 22,500 gallons/acre to 40,600 gallons/acre, equivalent 1" to 2" of liquid, and the corresponding nitrogen application rates varied from 14 lb/acre to 95 lb/acre.

Notwithstanding these high liquid application rates, the nutrient supply was still less than crop needs and supplemental nitrogen was necessary to meet target nitrogen fertilizer requirements and crop yields. With the application of the proposed blood/wastewater combination effluent, the available nitrogen will be approximately doubled. The target nitrogen application will be met and the hydraulic application rate will be significantly reduced.

The nitrogen in the proposed effluent will be in the form of organic nitrogen or ammonium nitrogen. Due to the anoxic storage condition, the nitrification process in the storage will be minimal. Nitrate or nitrite will only be present in trace amounts in the effluent. Organic nitrogen in the effluent will be retained in the soil as organic matter and ammonium nitrogen will react with the soil particles as positively charged ions and adsorbed in the soil. Both organic nitrogen and ammonium nitrogen do not move with soil water. No adverse effects on groundwater can be anticipated from the additional nitrogen from the blood added to the wastewater.

The estimated phosphorous (P) in the blood/wastewater effluent is very low and varies from 1 to 4% of the phosphorus in typical livestock manure. For this reason, the effluent application will be based only on the crop demand for nitrogen. The phosphorous content is so low that significant additional P in the form of chemical fertilizer will need to be applied to meet crop P requirements in all situations. The phosphorus in the effluent will

bind with the soil and be retained within top of 24" soil layer. No adverse impacts on groundwater are anticipated from the phosphorus in the blood added to the wastewater.

The proposed effluent application method will continue to be by soil injection. Injection will minimize nutrient loss by eliminating run off. No adverse impacts on surface water can be anticipated from the additional nitrogen and phosphorus in the blood added to the wastewater. The reduced hydraulic loading will further reduce risk of runoff.

Similar to manure, the proposed application of blood/wastewater effluent will increase soil organic matter, contribute to reducing soil bulk density and soil compaction. It will also increase soil aggregate stability, water infiltration and retention, all of which are desirable properties that enhance agricultural crop production and minimize the environmental impacts.

Copper and zinc accumulation is at times a concern with long term manure application to crop land. The fresh blood sample from True North Foods shop was tested for copper and zinc content. Copper was reported below detection level (BDL) while a zinc concentration of 4.0 ppm was reported. Samples tested in all of the three previous years reported the copper and the zinc concentration to be 0.00 lb/1000 imp gallons. The concentration of zinc in the proposed blood/wastewater effluent is estimated to be 0.01 lb/1000 imp gallons. At this concentration, the zinc application rate is predicted to be 0.053 lb/acre in the case of a hydraulic application of 30,000 Imperial gallons per acre. This small amount of zinc does not even meet the crop growing needs. For example, Barley removes 0.14 lb zinc/ac at a yield 80 bu/ac; corn removes 0.21 lb zinc/ac at a yield of 100 bu/ac; and potatoes remove 0.33 lb zinc/ac at a yield of 400 cwt/ac. The proposed blood/wastewater effluent will not contain any copper and the low zinc application will be readily removed by crops. No copper or zinc accumulation is expected from the proposal to add blood to the wastewater applied to croplands.

On May 16, 2022, the land application of the stored wastewater was observed in progress. The application utilized a closed system where the wastewater was pumped from the wet well at the storage and transported two miles through an 8" hose connected to the inlet of an in-line booster pump. The outlet of the in-line booster pump was connected to a 6" flexible drag hose which was in turn connected to an applicator tool carried by a farm tractor. The applicator injected the wastewater approximately 4" to 6" below the soil surface. In the whole application process, the wastewater was not exposed to the air. No odour was detected during or after to this application process.

As outlined previously the proposed ratio of blood to wastewater will be approximately 1 : 30. A composite sample of one part fresh blood to 25 parts of wastewater from the storage was mixed and stored to monitor the odour of the sample over a period of six months. In the first four months, the odour level of the sample rose, and then started to drop after five months of storage. After six months the odour level of the stored blood/wastewater sample had dropped significantly. If swine manure is given an odour rating of 10, the blood/wastewater sample after six months was considered to have a rating of 3. Providing that the current closed pipeline transportation system and direct subsurface injection continues as prescribed, no odoriferous issues can be expected.

No potential adverse environmental impacts exist with the NoA proposal to direct the existing blood produced in the plant to the existing wastewater storage at True North Foods.

**MECP Required analysis 2: An analysis of all potential effects resulting from the land application of blood waste to animal and human health.**

Presently the blood is collected at the commencement of the meat harvesting process, with a minor (incidental) amount escaping onto the floor. This incidental blood, which is the main impurity in the slaughterhouse wastewater, is collected during the washing of the floor, tools and work stations. Due to this incidental blood, the current effluent from True North Foods wastewater storage displays a pinkish colour.

In the proposed NoA, at times blood will be discharged into the wastewater storage. The proposed alteration increases the quantity of the blood in the wastewater but does not change the quality and nature of the wastewater since it currently does contain some blood.

In live cattle, blood is sterile. Blood has historically been added to pet food as a protein source. Organic fertilizer made from slaughterhouse blood, known as "blood meal", is used as high-quality nitrogen fertilizer in gardens, and greenhouses.

Blood is collected in a dedicated secure closed system. From the time the blood enters the collection systems it is never exposed to open air. The blood / wastewater storage is covered and the blood/wastewater effluent is transported out of storage in closed system that injects the effluent directly into the soil four to six inches below the surface of agricultural crop land, where it provides a benefit to crop production.

No threat to human or animal health is created by the proposal to add additional blood to the wastewater.

**MECP Required analysis 3: A detailed description of any and all mitigation measures proposed to address any potential environmental effects resulting from the land application of blood waste.**

As indicated in the preceding discussion, no potential adverse effects on animal or human health, the environment, or otherwise can be identified.

The major impact of this change will be the increase in available organic nitrogen delivered to the land application site for agricultural crop production. This change will reduce the amount of chemical inorganic fertilizer used for crop production on the receiving croplands. Chemical nitrogen fertilizers predominately manufactured from natural gas. Thus the proposed use of effluent for crop production on land immediately adjacent to the source therefore has significant environmental benefits, including a reduction in greenhouse gas emissions.

No mitigation measures are required on implementation of the proposed measures.

**MECP Required analysis 4: Alternative blood management options which have been investigated for the development.**

True North Foods is currently selling all of the blood collected to a market of the United States, where there are various commercial and industrial uses. True North Foods will keep selling the blood to the USA after this proposed Notice of alteration is approved by Manitoba Environment, Climate and Parks. They will also continue to seek any opportunities to sell the blood in Canada. This proposed NoA is being requested to provide a contingency during periods where the market for blood may be temporarily unavailable, is insufficient to match the blood production from the abattoir or is at economic conditions which make shipping blood unaffordable. In the past such a contingency has been available by delivery of blood to a certified land fill, which alternative has been increasingly difficult to access locally. We believe that the alteration proposed in our Notice of Alteration is highly superior to ongoing reliance on landfill in every respect including environmental safety and sustainability.

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