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From: Ulyanov, Oleg <Oleg.Ulyanov@diageo.com>
Sent: December 17, 2019 3:10 PM
To: Winsor, Jennifer (SD) <Jennifer.Winsor@gov.mb.ca>
Subject: RO project

Good afternoon Jennifer,

As per our conversation last week, I am sending you the attached file with the projected concentration and volume of RO reject water. Calculations are based on our well water analysis from sample taken in January 2019 (attached). If the RO will operate at 75% recovery than the reject will be approx. 4 times more concentrated than the well water inlet to RO.

I'd like to add a few notes:

- 1) Actual pH of the well water 7.45, we test it in the lab here daily. SUEZ lab shows pH 8.4 because the test has been done in the lab in USA a couple days later. That means that actual pH of the reject will be a little lower than projected 8.05.
- 2) Our plan is to use Iron filter upstream from RO and this means there should be almost no iron present in the reject.
- 3) Estimated average daily permeate water production rate will be 400 m³/day and discharge from RO (reject) approx. 133.3 m³/day. Our current non-contact well water average discharge rate (data for July, August, October and November 2019 is attached) 797 m³/day.
That means that most of the time reject will be diluted with existing discharge at approx. 1:6 rate.

Please, let me know if you need more information or have more questions or concerns.

Thank you,
Oleg Ulyanov,
Chief Power Engineer/Environment Manager
Diageo Canada
19107 Seagram Road, Gimli, MB
ROC 1B0
phone: 204-642-1645
cell: 204-227-9288

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GLOBAL SUPPLY

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Notice of Alteration Request

Jennifer Winsor, P. Eng.
Environmental Engineer
Environmental Approvals Branch
Manitoba Conservation and Climate
1007 Century Street
Winnipeg, MB R3H 0W4
Ph: 204-945-7012
Fax: 204-945-5229

August 10, 2020

Dear Ms. Winsor,

RE: Diageo Canada Inc. (Diageo) - Gimli Plant- Environment Act License No. 778R – Notice of Alteration – RO reject water

This letter is submitted to Manitoba Conservation and Climate as a Description of Alteration regarding the future installation of the Reverse Osmosis Water Treatment plant and on-site handling of its discharge of the reject water.

Currently we are in the process of looking for a replacement to our ageing boilers and production water pretreatment plant (50 years old) with modern, more efficient and environmentally friendly technology that would allow us to comply with today's regulations and policies regarding reduction of environmental impact and water conservation.

By submitting this NoA we are requesting permission to add reject water from our future RO system to existing Non-Contact Cooling Water stream as per our current NoA file 5037.00.

Thank you.

Regards,

Oleg Ulyanov
Chief Power Engineer and Environment Manager
Diageo Canada
19107 Seagram Road
Gimli, Manitoba R0C 1B0

cc: Craig Dryburgh, Site Director (Diageo Canada - Gimli)
Leilanie Schmietenkop, Risk Manager (Diageo Canada - Gimli)
Murray Stewart, Distillation Manager (Diageo Canada - Gimli)

NOTICE OF ALTERATION REQUEST

May 19, 2020

Director, Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg MB R3H 0W4

Subject: Notice of Alteration Request – Diageo Gimli Plant

This notice of Request for Alteration is submitted to Manitoba Sustainable Development on behalf of Diageo Canada Inc. (Diageo) Gimli Plant. This request is for an alteration to the clear water flow rate and quality via the addition of reject water from a reverse osmosis (RO) system. All equipment associated with the alteration will be located on land currently owned and operated by Diageo.

1. Background

Diageo Canada Inc. (Diageo) currently uses well water (ground water) in its Gimli Plant. Ground water is pumped into the distillery and diverted to two paths: one path is called clear water, and the other path is to a dealkalizer. The clear water is subjected only to a temperature change when it passes through shell and tube heat exchangers, and is discharged directly to Lake Winnipeg. In the dealkalization process, hardness associated with alkalinity is removed from the groundwater. Water from the dealkalizers then passes through the degasser (decarbonator) to remove carbon dioxide.

This water is collected in the Clearwell and pumped to two branches:

- 1) To Demineralizer, UV light, Carbon filter -production water system;
- 2) To Softeners - Boilers Make-Up water system.

The softeners further reduce hardness of the water. Demineralization removes all inorganic salts from the water.

Wastewater produced during regeneration cycles of Dealkalizers, Softeners and Demineralizer is sent to sewer and on to the Rural Municipality of Gimli (RMG) Wastewater Treatment Plant (WWTP).

2. Description of Changes

In this document, "Reject" means all discharge not within the recovery percentage of the RO units that is then mixed with cooling water.

The addition of a RO system to the existing system will replace several of the Diageo in-plant processes including:

- The two Dealkalizers
- The Degasser (Decarbonator)
- Clearwell

May 19, 2020

Subject: Notice of Alteration Request – Diageo Gimli Plant

Diageo is requesting permission to send the reject from the RO system to Lake Winnipeg. Two RO operating scenarios are considered: one at 75% recovery and the other at 85% recovery. The demineralizer and the softeners will remain in use.

Diageo has prepared three scenarios for review:

- Scenario 1 uses a minimum Non-contact Cooling Water flow rate of 600 m³/day to the lake;
- Scenario 2 uses an average Non-contact Cooling Water flow rate of 900 m³/day to the lake; and
- Scenario 3 uses a maximum Non-contact Cooling Water flow rate of 1,400 m³/day to the lake.

These three scenarios are combined with the RO reject to show the potential new discharge flows to Lake Winnipeg for minimum, average, and maximum days, and are illustrated on Figure 1. The anticipated (combined with the existing Non-Contact Cooling Water stream) maximum flow rate is 1,580 m³/day.

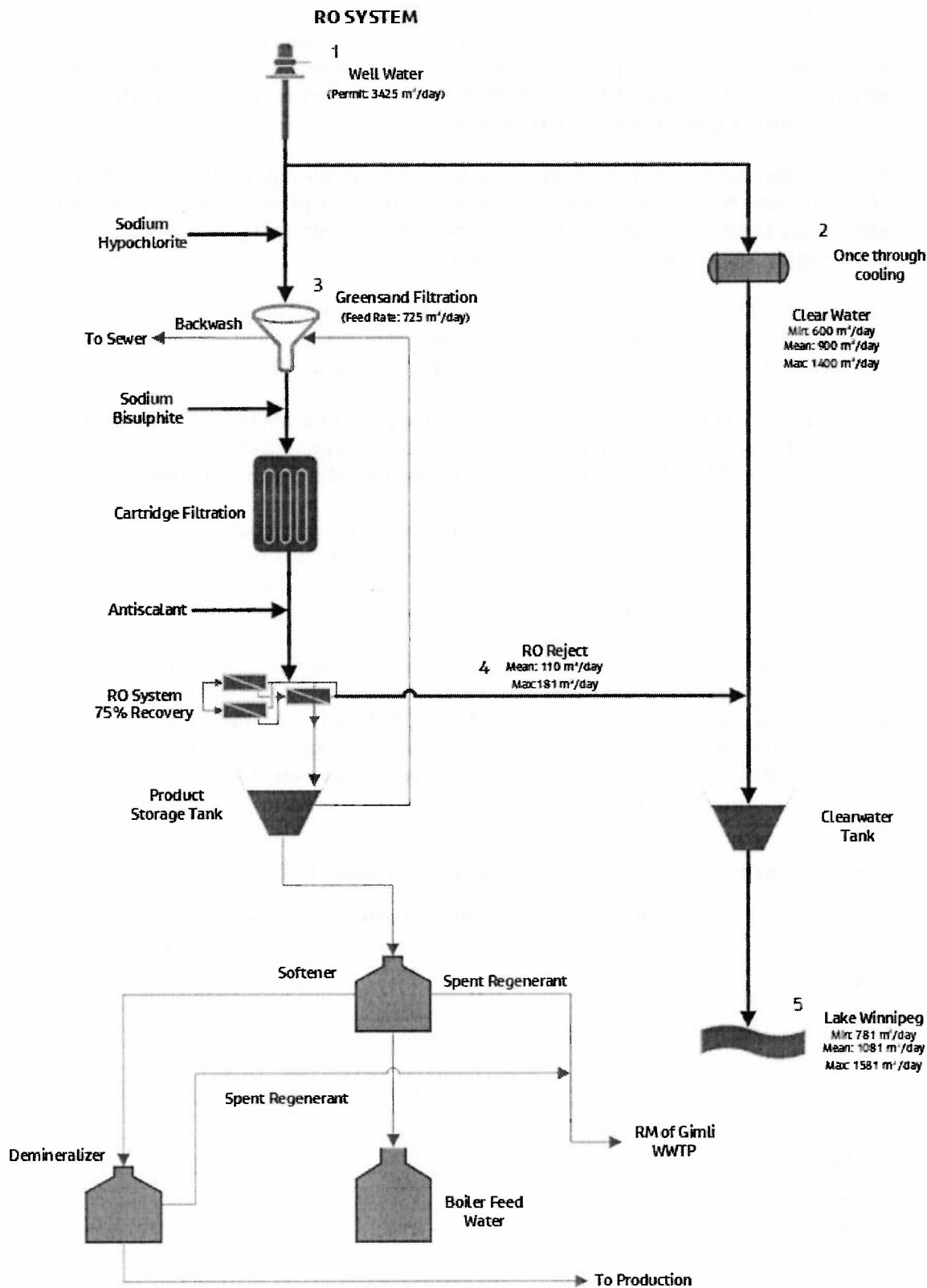


Figure 1: Process Flow Diagram of Proposed RO System

With the implementation of the proposed RO units into the system and the potential additional RO reject to the lake discharge stream of 180 m³/day, the water discharge (previously described as

non-contact cooling water discharge) is expected to increase. The anticipated maximum daily flow rate is approximately 1,580 m³/day. As such, Diageo is requesting permission to increase the flow rate to Lake Winnipeg from the current maximum daily flow rate of 1,400 m³/day to 1,600 m³/day, and not to exceed this rate of flow for more than seven (7) consecutive days. No changes are requested for the groundwater withdrawal limits.

The water pH ranges from 7.45 of the raw water to 8.05 for the reject with 75% recovery and 7.45 of the raw water to 8.27 for the reject with 85% recovery. The pH to the lake is expected to report within these ranges, depending on the recovery of the RO system. The temperature is anticipated to lower slightly with the addition of the RO reject.

Antiscalant will be added to the RO inlet on a continuous basis. The antiscalant type used with the RO system is Hypersperse MDC704i (NSF approved for Drinking Water Treatment) at a dosage range of 1.5 to 5 ppm (typically a dosage of 2.5 ppm will be used).

Sodium Bisulfite Betzdearborn DCL32 (NSF approved) will be added to the Greensand Filter Plus discharge for dechlorination purpose at a dosage approx. 4 ppm (well below maximum allowable 15 mg/L as per NSF/ANSI 60 Official Listing of Drinking Water Treatment Chemicals).

Table 1 illustrates the current water quality, the anticipated water quality of the RO reject, and the expected water quality of new discharge to Lake Winnipeg at 75% recovery. These values are based on data from July, August, October, and November of 2019 and model results from an RO system supplier, and result in an approximate 36% increase in ion concentrations in the water discharge.

Table 2 illustrates the same water quality data as Table 1, however it shows the expected water quality of new discharge to Lake Winnipeg with an 85% recovery. The values are based on the same date from July, August, October, and November of 2019 and model results from the RO system supplier and result in an approximate 69% increase in ion concentrations in the water discharge. An average RO Reject flow rate of 110 m³/day was used to determine the RO reject water quality, however a maximum flow rate of 181 m³/day is expected based on 725 m³/day entering the RO system.

Table 1: Average Water Discharge Quality to Lake Winnipeg (75% recovery)

Ion/Chemical	Well Water (1)	RO Reject Water (4)	Reject mixed with Clear Water (5)	Units
Calcium	44	176	59.95	ppm
Magnesium	63.4	253.6	86.39	ppm
Sodium	22.4	89.6	30.52	ppm
Potassium	5.65	22.6	7.70	ppm
Iron	0.08	0.32	0.11	ppm
Manganese	0.01	0.04	0.01	ppm
Barium	0.13	0.52	0.18	ppm
Strontium	0.53	2.12	0.72	ppm
Aluminum	0	0	0	ppm
Chloride	2.8	93.47	13.76	ppm
Sulphate	31.3	125.2	42.65	ppm
Bicarbonate	433	1732	589.98	ppm
Nitrate	0	0	0	ppm

Ion/Chemical	Well Water (1)	RO Reject Water (4)	Reject mixed with Clear Water (5)	Units
Fluoride	0.5	2	0.68	ppm
Silica	5.94	23.76	8.09	ppm
Phosphate	0	0	0	ppm
TDS	609.74	2521.23	840.74	ppm
pH	7.45	8.05	7.45-8.05	
Antiscalant (MDC704i) At maximum dosage	0	10.57	3.60	ppm

Table 2: Average Water Discharge Quality to Lake Winnipeg (85% recovery)

Ion/Chemical	Well Water (1)	RO Reject Water (4)	Reject mixed with Clear Water (5)	Units
Calcium	44	293.33	74.15	ppm
Magnesium	63.4	422.67	106.84	ppm
Sodium	22.4	149.33	37.74	ppm
Potassium	5.65	37.67	9.52	ppm
Iron	0.08	0.53	0.13	ppm
Manganese	0.01	0.07	0.02	ppm
Barium	0.13	0.87	0.22	ppm
Strontium	0.53	3.53	0.89	ppm
Aluminum	0	0	0.00	ppm
Chloride	2.8	155.78	21.29	ppm
Sulphate	31.3	208.67	52.75	ppm
Bicarbonate	433	2886.67	729.52	ppm
Nitrate	0	0	0.00	ppm
Fluoride	0.5	3.33	0.84	ppm
Silica	5.94	39.60	10.01	ppm
Phosphate	0	0	0.00	ppm
TDS	609.74	4202.05	1,043.86	ppm
pH	7.45	8.27	7.45-8.27	
Antiscalant (MDC704i) At maximum dosage	0	17.16	2.26	ppm

3. Environmental Effects

3.1 Respecting Solid Wastes

The proposed alteration will have no effect on the generation of solid waste, as no additional solid waste is generated.

3.2 Respecting Dangerous Goods or Hazardous Waste

The proposed alteration will not release dangerous goods or hazardous waste into the lake.

3.3 Respecting Wastewater Pre-Treatment

The proposed alteration is anticipated to have a beneficial effect on the wastewater sent to the RMG's WWTP by reducing the total waste with the removal of acidic discharge water from Dealkalizers regeneration cycles and eventual removal of the Demineralizer and therefore, of the acidic regeneration water. Additional filter backwash is expected to be discharged to the sewer from the proposed Greensand Plus filtration, which will be intermittent and is not expected to exceed 10% of the throughput flow of the filters. This additional waste will not have impacts to the RM of Gimli's WWTP.

3.4 Respecting Non-Contact Cooling Water

The proposed alteration will add flow to the existing conditions, increasing the flow rate to Lake Winnipeg. The increase of flow rate is not expected to have negative environmental effects to the lake. The ion concentrations are expected to increase by 36-69% (depending on the RO system recovery), and the daily mass increases in ions/chemicals to the lake are summarized in Table 3. The pH is expected to change with the pH fluctuating within the range of 7.45 to 8.27 as mentioned previously. The temperature will drop slightly with the addition of the RO reject stream, which will result in a slight beneficial benefit to the environment. Diageo would like to ask for permission to increase daily maximum flow rate for the Clear Water to the Lake from 1,400 m³/day to 1,600 m³/day.

Table 3: Average Mass Increase in Ions/Chemicals to Lake Winnipeg

Ion/Chemical	Mass Loading Increase to Lake (at 75% recovery)	Mass Loading Increase to Lake (at 85% recovery)	Unit
Calcium	19.273	32.121	kg/d
Magnesium	27.770	46.284	kg/d
Sodium	9.812	16.352	kg/d
Potassium	2.475	4.125	kg/d
Iron	0.035	0.058	kg/d
Manganese	0.004	0.008	kg/d
Barium	0.057	0.095	kg/d
Strontium	0.232	0.387	kg/d
Aluminum	0	0	kg/d
Chloride	10.235	17.059	kg/d
Sulphate	13.71	22.850	kg/d
Bicarbonate	189.661	316.102	kg/d
Nitrate	0	0	kg/d
Fluoride	0.219	0.365	kg/d
Silica	2.602	4.336	kg/d
Phosphate	0	0	kg/d
TDS	276.085	460.142	kg/d
Antiscalant (MDC704i) At maximum dosage	1.157	1.879	kg/d

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3.5 Respecting Sludge Management

The proposed alteration will not impact sludge production as the wastewater will continue to be treated at the RMG's WWTP.

3.6 Respecting Waste Stillage and Liquid Wastes Disposal

The proposed alteration will include the requirement for additional water to be directed to the Non-Contact Cooling Water receiving tank and thereon, to Lake Winnipeg. The additional water disposal is the Reverse Osmosis units reject water valued at a maximum of 180 m³/day if the machine(s) will run at 75% recovery rate. The proposed new direction for the RO reject will not have an environmental impact on the lake water for both the surrounding lake ecosystems and human health.

All liquid waste will continue to be directed to the RMG's WWTP as per Environment Act License 778R.

3.7 Respecting Air Emissions

The proposed alteration is anticipated to a negligible effect on air emissions from the plant.

4. Closure

We trust that this submission meets your needs. Should you have any further questions regarding this request, please do not hesitate to contact the undersigned.

Regards,

Oleg Ulyanov,
Chief Power Engineer/Environment Manager
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