G3 Regional Water Co-operative Inc.

2018 Annual Water System Monitoring Report

MWSB

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Executive Summary

The annual water system report provides status of system operations and monitoring results for the Coop Board and other parties with an interest in the system (i.e. Water Use Licensing Section, Manitoba Conservation and Water Stewardship). The primary purpose is to ensure annual reviews of the system status, and potential problems are identified and rectified before becoming a significant issue.

The G3 Regional Water Co-operative water supply system was commissioned in February 2010 with the Rural Municipality (RM) of Gilbert Plains, Town of Gilbert Plains and Town of Grandview as partners. A reverse osmosis (RO) treatment system was selected to provide 28 L/s based on a 20 year projected design period. Raw water is supplied by a production well with a 34 L/s pumping capacity. In 2010, a back-up well was developed to provide additional water supply protection and the existing RM of Gilbert Plains well was abandoned and sealed.

The G3 system is in compliance with both the *Water Rights Act* and *Drinking Water Safety Act (DWSA)*. Raw water is described as being hard and high in iron and manganese concentrations. Also the water supply contains high levels of ammonia that must be removed to prevent chlorine disinfection issues. The treatment system is meeting health-based maximum acceptable concentrations and aesthetic objectives of the Guidelines for Canadian Drinking Water Quality (GCDWQ). Treated water quality results confirm that ammonia is being satisfactorily removed during the treatment process.

Under the *DWSA* regulations, the G3 system is required to develop a Public Annual Report by March 31st of each operating year, an Emergency Response Plan and Compliance plan. Since the operation is in compliance with water quality standards, the Co-op can meet compliance plan requirements by filing a signed "Statement of Compliance" form to the Office of Drinking Water. Also, an infrastructure assessment must be completed by a professional engineer once every five years with the next one due in March 2021.

Two groundwater monitoring wells are equipped with pressure transducers for continuous water level monitoring. Monitoring well MW09-02 is located 400 metres north and MW98-16 is approximately 1500 metres west of the production wells. Pumping activities appear to have no significant impact on water levels. Changes in levels appear to be related to seasonal impacts.

In order to effectively respond to complaints regarding groundwater interference on surrounding private wells from G3 pumping activities, it is recommended that the Co-op Board adopt by resolution, a Groundwater Interference Policy as provided in Appendix G and forward to Water Use Licensing Branch as required under the *Water Rights Act*. In addition, it is recommended that a Source Water Protection Plan be implemented as provided in Section 7.0.

1.0 Introduction

The Manitoba Water Services Board (MWSB) assumed lead role in developing a regional water supply system for the RM of Gilbert Plains and the Towns of Gilbert Plains and Grandview. After consultation with the Municipal Corporations, the G3 Regional Water Co-operative Inc. (Co-op) was formed in 2009. The Board of Directors is comprised of equal representation from three municipal corporations with MWSB as an ex officio member. The Co-op owns the water system and has requested the MWSB to operate the system on their behalf. Recent municipal amalgamations have resulted in two entities – the Municipality of Gilbert Plains (formerly RM and Town of Gilbert Plains) and the Municipality of Grandview).

The annual water system report provides status of system operations and monitoring results for the Coop Board and other parties with an interest in the system (i.e. Water Use Licensing Section, Manitoba Water Stewardship). The primary purpose is to ensure annual reviews of the system status, and potential problems are identified and rectified before becoming a significant issue. Through continued aquifer monitoring, these annual reports will serve as a database to evaluate the potential to increase withdrawal rates if required for future demands.

2.0 Water System Overview

2.1 Regional Supply System

The G3 WTP is located in the NW corner of the former RM of Gilbert Plains on municipal right-ofway (ROW) west of the NW 26-26-23W. The WTP supplies treated water to the RM of Gilbert Plains, Town of Gilbert Plains, Town of Grandview and Municipality of Dauphin. The G3 system shown in Appendix A is comprised of two wells, raw water pipeline, water treatment plant (WTP) and Distribution pipelines to both Towns and Rural Municipalities.

Two 300 mm production wells are located approximately 1 km north of the WTP in ROW west of the NW35-26-23W. Although one well can fully supply the system, a fully equipped and redundant back-up well is required to ensure that supply can be maintained at all times. In case of power failure, emergency genset power at the WTP can operate one well and treatment equipment. The supply wells are occasionally alternated to maintain functionality. An existing 200 mm well adjacent to the WTP was sealed due to artesian conditions and leakage around the well casing. The location of production and monitoring wells are provided in Appendix B.

2.2 Treatment System

The treatment system is comprised of two parallel RO membrane filtration skids, a manganese greensand bypass filter and forced air de-gasifier for carbon dioxide (CO_2) removal and pH adjustment. The treatment system was designed with a membrane by-pass to produce a hardness of approximately 100 mg/L (as CaCO₃). Since membranes are capable of removing significant

amount of hardness ions, a percentage of the raw water by-passes the membrane system and is filtered through a 2.1 m diameter manganese greensand pressure filter. Water passing through the pressure filter is blended with membrane permeate to produce the desired water hardness. The membranes reject approximately 20% concentrate to Sulfur Spring Creek which is permitted by Environment Act Licence No. 2853.

Antiscalant is injected in the membrane raw water supply to sequester dissolved minerals and prevent RO membrane fouling. Since membranes remove dissolved minerals, stabilization (pH adjustment) is required to produce a non-corrosive treated water supply. A forced air de-gasifier was designed and installed to stabilize membrane permeate. The de-gasifier removes a significant portion of dissolved CO₂ therefore, minimizing sodium hydroxide chemical usage.

The raw water supply contains ammonia which interferes with chlorine disinfection capability unless removed in the treatment system. Failure to remove ammonia will result in phantom free chlorine readings in the treated water supply. Ammonia is removed through membrane treatment but not typically through a manganese greensand filter. Potassium permanganate is now used instead of previously used sodium hypochlorite as a pre-filter oxidant. There have been no issues with elevated ammonia since the change took place. Sodium hypochlorite is provided to maintain an adequate chlorine residual concentration in the reservoir and distribution.

Treated water is stored in a 1.2 ML 3 cell reinforced concrete reservoir. The reservoir is equipped with ultrasonic level control and monitored with a SCADA system. The SCADA system also has the capability of monitoring and controlling reservoir levels located in the Town of Grandview and Town of Gilbert Plains.

3.0 Water Consumption

The treatment system was designed for peak flows with additional capacity for future expansion. Currently, only one membrane skid is required to meet average demand and therefore the lead skid is alternated daily. However, higher peak demands require both skids to operate together as well. The system design and current operating flow rates are provided in Table 3.1. Figure 3.1 provides a graphic representation of the flow through the treatment system.

	Design Flow (L/s)		Current (L/s)							
		2010	2011	2012	2013	2014	2015	2016	2017	2018
Raw	34	17	16	15	17	19	19	20	20	19
Skid 1	11									
Permeate		12	12	10	12	1/	1/	15	1/1 0	12.9
Skid 2	11	12	12	10	12	14	14	13	14.0	13.0
Permeate										
Concentrate 1	3	2	2	2	2	2	2	2	2 5	2 5
Concentrate 2	3	3	3	3	3	5	5	5	5.5	5.5
By-Pass	6	2	2	2	2	2	2	2	1.7	1.7

Table 3.1 Design an	d Current Operat	ting Flow Rates
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Figure 3.1 Treatment System Flow Diagram Typical Single Skid Values

3.1 Raw Water Demand

Raw water withdrawals and pumping rates are presented in Table 3.2. The Water Licensing Branch - Annual Water Use Report for 2018 is provided in Appendix C.

	Unit		Withdrawal								
		2010	2011	2012	2013	2014	2015	2016	2017	2018	
Total Demand	m ³	(Feb 25- Jan 1) 246,787	272,000	275,300	279,503	302,421	296,563	317,625	311,794	300,668	
Average Day Demand	L/d	796,000	745,000	754,300	765,762	828,551	812,501	870,206	854,230	823,748	
Pumping Rate	L/s	17	16	15	17	19	19	20	20	19	
Avg. Operating Hours/day	hr/day	13	15	15	15	16.5	16	16	16	16	

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3.2 Treated Water Demand

Table 3.3 summarizes the treated water demand for the RMs, and both towns. Peak days were observed on October 2^{nd} for the RM of Gilbert Plains with a consumption of 611 m³, March 26^{th} for the Town of Gilbert Plains with a consumption of 510 m³, March 21^{st} for the Town of Grandview with a consumption of 803 m³ and October 2^{nd} for the RM of Dauphin with a consumption of 473 m³.

	Unit	RM of Gilbert Plains								
		2013	2014	2015	2016	2017	2018			
Total Demand	m ³	48,744	53,683	ID	64,114	61,469	53 <i>,</i> 928			
Number of Connections		183	183	183	187	190	194			
Average Day	L/d	133,500	147,077	ID	175,655	168,409	147,749			
Average Day	L/s	1.85	2.04	ID	2.44	2.34	2.05			
Average Day	L/conn/day	730	804	ID	939	886	762			
Peak Day	L/d	274,000	ID	ID	599,000	508,000	383,500			
Peak Day Factor		2.05	ID	ID	3.41	3.02	2.60			
Peak Day	L/s	3.81	ID	ID	8.32	7.06	5.33			
Peak Day	L/conn/day	1497	ID	ID	3203	2674	1977			

Table 3.3.1 - Treated Water Consumption RM of Gilbert Plains

	Unit	Town of Gilbert Plains						
		2013	2014	2015	2016	2017	2018	
Total Demand	m ³	62,766	63,794	ID	58,727	56,900	58,499	
Number of Connections		398	398	398	398	398	398	
Average Day	L/d	172,000	174,778	ID	160,896	155,890	160,271	
Average Day	L/s	2.39	2.43	ID	2.23	2.17	2.23	
Average Day	L/conn/day	432	439	ID	404	392	403	
Peak Day	L/d	286,000	ID	ID	394,000	314,000	510,000	
Peak Day Factor		1.66	ID	ID	2.45	2.01	3.18	
Peak Day	L/s	3.97	ID	ID	5.47	4.36	7.08	
Peak Day	L/conn/day	719	ID	ID	990	789	1281	

Table 3.3.2 - Treated Water Consumption Town of Gilbert Plains

Table 3.3.3 - Treated Water Consumption Town of Grandview

	Unit	Town of Grandview							
		2013	2014	2015	2016	2017	2018		
Total Demand	m ³	97,461	110,294	ID	105,244	100,793	94,476		
Number of Connections		465	469	451	467	471	462		
Average Day	L/d	267,000	302,175	ID	288,340	276,145	258,838		
Average Day	L/s	3.71	4.20	ID	4.00	3.84	3.59		
Average Day	L/conn/day	574	644	ID	617	586	560		
Peak Day	L/d	501,000	ID	ID	665,000	485,000	803,000		
Peak Day Factor		1.88	ID	ID	2.31	1.76	3.1		
Peak Day	L/s	6.96	ID	ID	9.24	6.74	11.15		
Peak Day	L/conn/day	1077	ID	ID	1424	1030	1738		

Table 3.3.4 -	Treated	Water	Consum	otion	RM of	[:] Daui	ohin
	neated		consum				

	Unit	RM of I	Dauphin
		October 2017	2018
Total Demand	m ³	2669	19,255
Number of Connections		84	188
Average Day	L/d	7312	52,752
Average Day	L/s	0.10	0.73
Average Day	L/conn/day	87	281
Peak Day	L/d	80,700	472,600
Peak Day Factor		11.04	8.96
Peak Day	L/s	1.12	6.56
Peak Day	L/conn/day	961	2514

	Unit		Totals							
		2013	2014	2015	2016	2017	2018			
Total Demand	m ³	208,971	227,771	ID	228,085	221,831	226,042			
Number of Connections		1046	1050	1032	1052	1143	1242			
Average Day	L/d	572,500	624,030	ID	624,890	607,756	619,293			
Average Day	L/s	7.95	8.67	ID	8.68	8.44	8.60			
Average Day	L/conn/day	547	594	ID	594	532	499			
Peak Day	L/d	1,061,000	ID	ID	1,201,000	1,023,000	1,114,000			
Peak Day Factor		1.85	ID	ID	1.92	1.68	1.80			
Peak Day	L/s	14.74	ID	ID	16.68	14.21	15.47			
Peak Day	L/conn/day	1014	ID	ID	1142	895	897			

Note: ID indicates 'Insufficient Data'

The difference between raw and treated water consumption during the operating period from January 2018 to December 2018 is approximately 74,626 m³. This difference is mainly due to membrane concentrate discharge to Sulphur Spring Creek and in-plant water use such as filter backwash, clean-in-place system, sink and washroom.

4.0 Regulatory Requirements

4.1 Water Rights Act

Water Rights Act Licence No. 2010-107 (Appendix D) stipulates the following conditions:

- (a) The maximum rate at which water may be diverted shall not exceed 34 L/s
- (b) The total quantity of water diverted in any one year shall not exceed 315 cubic decametres
- (c) Water shall not be diverted during any period when water levels measured in the aquifer as measured at:
- i. 2010 well more than 39.9 m beneath the surface of the ground
- ii. 2009 well more than 41.1 m beneath the surface of the ground.

Raw water consumption data as presented in Table 3.3 indicate that conditions (a) and (b) have not been exceeded. Aquifer monitoring levels are discussed later in section 5.4 and indicate water levels are above the minimum levels required in condition (c).

4.2 Drinking Water Safety Act

The Drinking Water Safety Regulation and Drinking Water Quality Standards Regulation under the Drinking Water Safety Act were proclaimed in February 2007 to ensure public water systems

provide safe drinking water. These regulations outline: water quality standards; bacteriological and microbial standards; operating licences requirements; disinfection testing and recording; and reporting requirements.

4.2.1 Operating Licence

Operating Licence PWS-11-476 provided in Appendix D outlines terms and conditions under which the water system must be operated to remain in compliance with the *Drinking Water Safety Act* and its supporting regulations.

4.2.2 Water Quality

The Guidelines for Canadian Drinking Water Quality (GCDWQ) provide health-based maximum acceptable concentrations and aesthetic objects for various chemical and physical parameters. Health-Based parameters such as arsenic and nitrates are regulated in Manitoba while parameters such as hardness and iron are not considered a health issue but these aesthetic elements can make water undesirable for various reasons.

Raw Water Quality

The raw water quality characteristics are provided in Table 4.1. The raw water supply is considered hard with high concentrations of iron and manganese. There are no significant health concerns. Hardness or "hard water" is mainly the result of high concentrations of calcium and magnesium in water. It is undesirable as it causes scale to develop in water heaters, pipes and leaves undesirable scum on bathroom fixtures. Also, extra soap is needed to clean or wash with hard water. Iron and manganese can cause stains on laundry and plumbing fixtures and will cause objectionable colour in water. Iron and manganese can also promote the growth of bacteria in distribution systems causing offensive tastes and odours.

G3 Water Co-operative Inc. Groundwater Monitoring Report

Table 4.1 - Raw Water Quality

Parameter	MW 98-16	PW 03-01		PW	/ 09-01		PW 10-02	GC	DWQ
	24/09/02	24/11/09	08/02/10	22/06/10	05/08/10	24/07/13	29/07/10	MAC	AO/OG
		_							
Total Alkalinity (as CaCO3)	375	371	385	367	383	377	378		
Bicarbonate (HCO3)	458	452	470	448	467	460	461		
Carbonate(CO3)	<20	<5	<0.60	<5	<0.60	<12	<0.6		
Hydroxide(OH)	<10	<5	<0.40	<5	<0.40	<6.8	<0.4		
Calcium (Ca)	119		146			117	108		
Chloride (Cl)	<10	<9	14.9	13.8	250	6.13	6.09		≤ 250
Iron (Fe)	1.49	2.58	3.93	3.96	3.47	3.86	3		≤ 0.3
Manganese (Mn)	0.431	0.276	0.175	0.177	0.160	0.167	0.146		≤ 0.05
Potassium (K)	5.18		8.78		7.42	6.87	6.23		
Sodium (Na)	5.36	14.2	66.8	57.9	48.4	37.3	52.9		≤ 200
Sulphate (SO4)	136	118	347	343	260	206	199		≤ 500
Fluoride (F)	0.3	0.44	0.32	0.4	0.12	0.24	0.22	1.5	
Hardness (as CaCO3)	494	410	600	537	541	478	501		≤ 500
Nitrate-Nitrite	<0.01	<0.2	<0.050	<0.2	<0.050	<0.0051	<0.0071	10	
Ammonia (NH3)					1.23	0.86	0.758		
Total Carbon					101	2.6			
Total Inorganic Carbon					98.5	97.7			
Total Organic Carbon					2.4	2.3			
Sodium Adsorption Ratio			1.19				0.52		
Conductivity (umhos/cm)	870	879	1270	1320	1130	979	982		
Total Dissolved Solids					846	669			≤ 500
Langelier Index (4 C)					0.49	0.63	0.97		
Langelier Index (60 C)					1.3	1.4	1.7		
Colour (TCU)			5		10	42.3	<5		≤ 15
Turbidity (NTU	39	32	44.3	36	35.9	32.1	36.1		
pH (pH units)	7.24	7.24	7.80	7.26	7.56	7.75	8.06		6.5 – 8.5
Arsenic (As)		0.00819		0.00611	0.0112	0.00779	0.00512	0.01	
Boron (B)		0.115		0.224	0.163	0.167	0.106	5	
Barium (Ba)		0.0382		0.0267	0.0198	0.0227	0.0181	1	
Cadmium (Cd)		<0.0002		<0.0002	<0.00000	<0.00001	< 0.000001	0.005	
Chromium (Cr)		<0.001		<0.001	<0.001	<0.001	0.0018	0.05	
Copper (Cu)		<0.0004		0.00318	<0.00020	<0.0002	0.00069		≤ 1.0
Lead (Pb)		< 0.0001		0.00019	<0.00009	<0.00009	<0.00009	0.01	
Antimony (Sb)		<0.001		<0.001	<0.0002	<0.0002	<0.0002	0.006	
Selenium (Se)		< 0.001		<0.001	<0.001	<0.0010	<0.001	0.01	
Uranium (U)		0.00043		0.00025	0.00019	<0.0002	0.00017	0.02	
Zinc (Zn)		<0.005		0.0215	0.0401	<0.002	<0.002		≤ 5.0

AO= Aesthetic Objective

MAC= Maximum Acceptable Concentration

OG= Operational Guideline

Hardness levels greater than 200 are considered poor but tolerable, while hardness levels greater than 500 are generally considered unacceptable

Treated Water Quality

Treatment is dependent on the raw water source and water quality characteristics in order to meet treated water quality standards. More stringent requirements are placed on surface water sources and groundwater sources under direct influence (GUDI) of surface water. The G3 supply is considered a secure groundwater source (Non-GUDI). A reverse osmosis (RO) membrane treatment system will remove significant amounts of dissolved minerals which will soften the supply and reduce iron and manganese to acceptable concentrations. Treated water quality results are provided in Table 4.2. The G3 Regional Water Co-operative is in compliance with both health-based maximum acceptable concentrations and aesthetic objectives outline in the GCDWQ.

Table 4.2 - Treated Water Quality

Parameter		PW 09-01		GC	DWQ
	10/02/10	05/08/10	24/07/13	MAC	AO/OG
Total Alkalinity (as CaCO ₃)	94.2	68.7	79		
Bicarbonate (HCO ₃)	110	83.8	96		
Carbonate(CO ₃)	2.62	<0.60	<12		
Hydroxide(OH)	<0.40	<0.40	<6.8		
Calcium (Ca)	25.1	18.3	22.6		
Chloride (Cl)	9.2	4.87	4.39		≤ 250
Iron (Fe)	0.057	<0.020	0.015		≤ 0.3
Manganese (Mn)	0.0164	0.0006	0.0012		≤ 0.05
Potassium (K)	4.38	1.25	1.58		
Sodium (Na)	33.5	15.8	11.7		≤ 200
Sulphate (SO ₄)	54.3	36.7	38.9		≤ 500
Fluoride (F)	<0.10	0.97	0.044	1.5	
Hardness (as CaCO₃)	98.4	74.6	89.2		≤ 500
Nitrate-Nitrite	<0.050	<0.050	0.0075	10	
Ammonia (NH₃)		<0.050	<0.010		
Total Carbon		17.5	2		
Total Inorganic Carbon		16.8	19		
Total Organic Carbon		<1.0	2.1		
THMs (mg/L)		0.0035			
Sodium Adsorption Ratio	1.47				
Conductivity (umhos/cm)	338	227	238		
Total Dissolved Solids		165	140		≤ 500
Langelier Index (4 C)	0.22	-0.47	-0.56		
Langelier Index (60 C)	0.99	0.3	0.22		
Colour (TCU)	<5.0	<5.0	<5.0		≤ 15
Turbidity (NTU)	0.49	0.25	0.39		
pH (pH units)	8.49	8.04	7.81		6.5 – 8.5
Arsenic (As)		0.00418	0.0019	0.01	
Boron (B)		0.125	0.137	5	
Barium (Ba)		0.00231	0.00287	1	
Cadmium (Cd)		<0.00001	<0.000010	0.005	
Chromium (Cr)		< 0.001	<0.0010	0.05	
Copper (Cu)		0.00155	0.00552		≤ 1.0
Lead (Pb)		<0.00009	<0.000090	0.01	
Antimony (Sb)		< 0.0002	<0.00020	0.006	
Selenium (Se)		< 0.001	< 0.0010	0.01	
Uranium (U)		< 0.0001	<0.00010	0.02	
Zinc (Zn)		< 0.005	<0.0020		≤ 5.0
AO= Aesthetic Objective					

MAC= Maximum Acceptable Concentration

OG= Operational Guideline

Hardness levels greater than 200 are considered poor but tolerable, while hardness levels greater than 500 are generally considered unacceptable

4.2.3 Reporting

The Drinking Water Safety Act regulations require public water systems to produce various types of reports such as: the submission of scheduled test results; events of non-compliance or emergencies; Compliance Plans; Emergency Response Plans; Annual Public Reports; and Public Water System Assessment Reports.

The Office of Drinking Water has released "Operational Guidelines for Monitoring and Reporting of Public and Semi-Public Water Systems". This document outlines operator responsibilities with regard to fulfilling the monitoring and reporting requirements and includes:

- 1) Disinfection residuals concentrations, testing, recording and reporting
- 2) Bacteriological sampling, submission, and interpretation
- 3) Turbidity monitoring for surface water and GUDI supplies
- 4) Corrective actions reporting
- 5) Emergency reporting

Compliance Plans

Water systems have until March 1, 2012 (five years from the date the regulations came into force) to comply with water quality standards stated in their operating licence. In instances where a standard is not being met, owners must clearly demonstrate a commitment to meeting the standard by preparing a plan that identifies how and when compliance will be achieved. For water systems serving no more than 5000 individuals, a compliance plan must be submitted within 18 months of the operating licence issue date.

Where a water system owner has no reason to believe that their water system is out of compliance with any of the standards set out in their licence, a "Statement of Compliance" form can be completed. A signed "Statement of Compliance" form will be considered the system's compliance plan for the purposes of the *Drinking Water Quality Standards Regulation*.

The G3 Regional Water Co-operative is in compliance with all water quality standards. As required by regulations, a "Statement of Compliance" was submitted to the Office of Drinking Water on May 16, 2012.

Emergency Response Plans

The Emergency Response Plan (ERP) is a document that provides a step-by-step response to, and recovery from, incidents related to emergency situations. The ability of water utility staff to rapidly respond to an emergency will help prevent unnecessary complications and protect consumers' health and safety.

Section 8(1) of *The Emergency Measures Act* requires local authorities to, among other things, to establish a local emergency response committee, appoint an emergency coordinator and prepare and implement emergency response programs and plans. Section 29(1) of the *Water and Wastewater Facilities Operator Regulation* requires water and wastewater facility owners to have documented emergency response plans. Section 29(2) requires that plans be reviewed at least once every two years, and that all facility operators and maintenance personnel have ready access to it at all times.

The G3 Regional Water Co-operative must complete and submit an Emergency Response Plan by January 1, 2013 as required by Operating Licence No. PWS-11-476. The head operator at G3 Regional Water Co-operative is working together with the Drinking Water Officer to develop an Emergency Response Plan.

Annual Public Reports

Section 32 of the Drinking Water Safety Regulation requires public water systems serving 1000 or more people to produce an annual report regarding the system operating status. The purpose of the Public Water System Annual Report is to promote public transparency with regard to drinking water. The annual public report provides a description of the water system, disinfection methods and residuals, water quality results, corrective actions taken, orders or charges laid, and major expenses to repair, replace, or install equipment.

Water systems must ensure free copies of the report are made available to water users and that the report is posted on an Internet website. Copies should be made available at each of the three municipal government offices. A copy of the report must be sent to the Regional Drinking Water Officer within 3 months (by March 31st) of the end of the operating year. The annual public report for the G3 Regional Water Co-operative was submitted to the Office of Drinking Water in March of 2018 and is available to the public.

Public Water System Assessment Reports

Section 37 of the *Drinking Water Safety Regulation* requires every public water system provider to conduct an infrastructure assessment by a Professional Engineer, licensed to practice and consult in the Province of Manitoba, with applicable experience relating to drinking water supplies. Section 9 of *The Drinking Water Safety Act* requires an infrastructure assessment once in every five-year period.

The objective of the Report is to carry out an onsite evaluation to identify, analyze and mitigate any potential adverse health risks and environmental impacts associated with the Water System in a "source to tap" methodology. It is also to determine whether the Water System's source, facilities, equipment and operations are effective in producing safe drinking water, and meet the regulations in force under *The Drinking Water Safety Act*. The level of effort and depth of the report should reflect the Water System size, complexity and risks.

For regional systems where supply, treatment and distribution of potable water to separate reservoir/pumping stations and distribution owned by others, a System Assessment Report is required from each Owner of these systems. The Owner of a system receiving water from another system need not include an assessment of that other system, as the Owner of the other system will be responsible for that assessment. Similarly, the Owner of a regional supply system is not responsible for assessing the distribution systems owned by others.

The G3 Regional Water Co-operative had a professional engineer complete an assessment of the system's infrastructure and was submitted to ODW on January 4th, 2019.

4.3 Environment Act

4.3.1 Environment Act Licence

In August 2008, the MWSB submitted a Manitoba Environment Act Class 2 Development Licence Proposal for the construction and operation of the water treatment and supply system. In November 2008, Manitoba Conservation issued Environment Act Licence 2853 (Appendix F) which requires the Licencee (Co-op) to conduct an effluent monitoring program for a period of two years. The effluent monitoring program consists of sampling membrane concentrate, and upstream and downstream of the effluent discharge pipeline outlet on the Sulphur Spring Creek marsh on a quarterly basis for specified parameters shown in Table 4.3

			26-Apr-11	
Parameter	Unit	Concentrate	Upstream	Downstream
	mg/L as			
Hardness	CaCO ₃	1720	251	278
Total Dissolved	mg/L	2160	246	272
Iron	mg/L	340	0.19	0.22
Calcium	mg/L	445	60.9	66.5
Magnesium	mg/L	149	24.2	27.1
Manganese	mg/L	8.81	0.0197	0.0889
Sodium	mg/L	122	2.15	3.37
			30-Oct-12	
Parameter	Unit	Concentrate	Concentrate	Concentrate
	mg/L as			
Hardness	CaCO ₃	243	465	595
Total Dissolved	mg/L	318	464	634
Iron	mg/L	18.4	0.64	0.36
Calcium	mg/L	60	109	135
Magnesium	mg/L	22.7	47.1	62.7
Manganese	mg/L	0.943	0.124	0.0603
Sodium	mg/L	27.5	6.45	14.1
			14-Feb-13	
Parameter	Unit	Concentrate		
	mg/L as			
Hardness	CaCO₃	1370	446	472
Total Dissolved	mg/L	1750	463	518
Iron	mg/L	13.4	0.53	0.38
Calcium	mg/L	316	105	107
Magnesium	mg/L	141	49.4	49.8
Manganese	mg/L	0.446	0.168	0.139
Sodium	mg/L	83.2	4.25	6.41

Table 4.3 – Effluent Monitoring Program Results

4.3.2 Water & Wastewater Facility Operators Regulation

All water treatment and water distribution facilities in Manitoba must be classified as per the *Water and Wastewater Facility Operators Regulation 77/2003*. Water treatment facilities are classified on a point system based on size, raw water source, complexity of treatment and disinfection, instrumentation, and laboratory control. Water distribution facilities are classified by population served. The G3 WTP has been classified as a Class 2 water treatment facility and Class 1 water distribution facility. Since both Towns are responsible for their own distribution, the G3 distribution is only Class 1.

All water treatment and water distribution facility operators in Manitoba must be certified as per *Water and Wastewater Facility Operators Regulation 77/2003*. Water treatment and

water distribution facility owners are responsible for employing certified operators. The following table outlines the G3 WTP operators and current classification:

Operator	Water Treatment	Water Distribution
Ivan Yakimishen	Class 2	Class 2
Dallas Wilson	Class 1	Class 1

Table 4.4 – Operator Classification

5.0 Groundwater Investigation & Monitoring

5.1 Hydrological Investigations

In 2002, the Prairie Farm Rehabilitation Administration (PFRA) and The Manitoba Water Services Board (MWSB) conducted hydrogeological assessments within the NW corner of the RM of Gilbert Plains and the NE corner of the RM of Grandview. The geological stratigraphy was described as: clay shale overlain by sand and gravel overlain by glacial till. The sand and gravel is a water bearing unit of high transmissivity with a thickness of up to 40 metres. The investigation included the installation of a 125 mm diameter well (MW 98-16) on the SW 34-26-23W.

In 2008, W.L. Gibbons & Associates Inc. (WLG) was retained by MWSB to complete a groundwater supply assessment study for the proposed G3 water supply system. The main purpose was to complete a hydrogeological assessment for potential to extract the required water supply from an aquifer located generally in the area of 26-26-23W, and to provide recommendations for the design and operation of the well system. The report provided the following information:

- The aquifer is considered to be part of a groundwater flow system that consists of recharge in the Duck Mountain Uplands, flow to the southeast off the flanks of the uplands, and discharge to the Valley River Plain.
- Sustainability of the proposed withdrawal from this aquifer has found that even in the absence of recharge for 19 years, the level of drawdown in the aquifer will still be well above the pump intake.
- The evaluation of the information associated with known domestic water wells in the area has found that domestic wells mostly withdraw water from shallower aquifers not directly connected to the project aquifer. Known wells that may withdraw water from the project aquifer are located 2.5 to 3 kms from the well site and are unlikely to be affected or could be mitigated with changes to the pump depth setting or well development.
- The aquifer is located at a depth in excess of 30 metres overlain by an effective aquitard. The potential for environmental effects is therefore limited.

5.2 PW 09-01 Well Installation

In 2009, WLG was retained by MWSB to provide hydrogeological services in association with the upgrades to the G3 Regional Water Co-operative water supply and water treatment system. The overall purpose of this work program was to complete the installation of a production well (PW 09-01) with a target capacity of 34 L/s (450 Igpm) and install an additional monitoring well.

The well was installed in the east road allowance 680 meters south of the NW corner of NW35-26-23W. The stratigraphy encountered consists of 15.8 meters of till followed by 10.4 meters of fine to course sand (designated as the Upper Aquifer). The Upper Aquifer is underlain by 5.8 meters of till followed by 9.1 meters of clay. Fine to coarse sand with gravel layers (designated as the Lower Aquifer) were encountered from a depth of 41.1 meters to 54.6 meters below grade.

The well was constructed with 41.1 meters of nominal 300 mm, schedule 80 PVC casing followed by 12.2 meters of nominal 300 mm, 25 slot stainless steel screen. Filter sand (#30) was placed in the annulus from a depth of 36 meters to the base of the screen at 53.3 meters. The wells were developed and flow capacity tests were completed to establish specific capacity.

The permanent production pump was installed at a depth of 36.6 metres. Subsequent to the initial well capacity tests using a temporary pump, additional well capacity testing was completed using the permanent production pump. The maximum well capacity was rated as approximately 53 L/s (700 Igpm).

5.3 PW 10-02 Back-Up Well Installation

In 2010, WLG was retained by MWSB to complete the installation of a back-up supply well (PW 10-02). PW 10-02 was installed approximately 11 meters south of existing supply well PW 09-01. The well is located approximately 700 meters south of the NW corner of NW35-26-23W. The stratigraphy was very similar to that encountered during the drilling for PW 09-01.

The well was constructed with nominal 305 mm, schedule 80 PVC casing to a depth of 43.0 meters and 9.1 meters of nominal 305 mm telescopic, 25 slot, stainless steel screen. The annulus around the screen was backfilled with #75 filter sand.

A well capacity test was conducted by pumping at a rate of 22.7 L/s (300 lgpm) for a period of 1.0 hour. Based on this test result, the well capacity was rated as approximately 81.0 L/s (1050 lgpm).

5.4 PW 2003-01 Abandonment

The original 200 mm supply well (PW 2003-01) located adjacent to the G3 WTP was abandoned due to the development of two new 300 mm supply wells (PW 2009-01 & PW 2010-02) north of the plant. In November 2010, WLG oversaw well abandonment procedures to prevent further leakage due to artesian conditions.

Well abandonment started with tremie grouting the well screen and casing with cement up to a depth of 33 m below grade. The remainder of the casing to below the pitless unit was backfilled with a combination of cement and granular fill (silty sand). MWSB excavated and removed the pitless unit, and backfilled the excavation with local excavated fill.

5.5 Groundwater Monitoring

WLG stated that proper management of water supplies requires periodic re-evaluation of available information to confirm withdrawal rates are sustainable and/or to determine if withdrawal rates can be increased to meet growing demand. It was recommended to conduct long term groundwater level monitoring to observe how the aquifer responds to recharge and drought events, and long term pumping.

Monitoring well MW 98-16 is located approximately 1500 meters west of the WTP on the SW34-26-23W. The well consists of a 125 mm PVC casing with a stainless steel screen set at a depth of 36.6 to 42.7 meters within the Lower Aquifer. WLG equipped the well with a Solinst Model 3001 LTC Levelogger monitoring groundwater levels on a daily basis.

WLG installed a new monitoring well (MW 09-02) approximately 1200 meters north of the existing WTP. Specifically, the monitoring well is located within municipal road allowance 275 meters south of the NW corner of NW35-26-23W. The monitoring well screen was set in the Lower Aquifer at a depth of 46.9 to 48.5 meters. A locked steel protective cover was installed on this well and a Solinst Model 3001 Levelogger installed to record groundwater levels daily.

5.6 Groundwater Levels

MW 98-16 was equipped with a pressure transducer by PFRA and data from 2006 through 2009 is presented in Figure 5.1. This data represents background water depth levels before the new G3 WTP was brought on-line and increased pumping rates from the new wells.

The older PFRA transducer in MW 98-16 failed to record data after November 2009 and the well was equipped with a new transducer in July 2010. MW 98-16 data for 2013 is shown in Figure 5.2. The collected data for MW 09-02 is presented in Figure 5.3. Note that the G3 WTP came on-line on February 25, 2010. G3 pumping activities appear to have no significant impact on groundwater levels. Changes in levels appear to be related to seasonal impacts.



Figure 5.1 – MW 98-16 Background Groundwater Levels (below top of well casing)



Figure 5.2 – MW 98-16 Groundwater Levels (below top of well casing)



Figure 5.3 – MW 09-02 Groundwater Levels (below top of well casing)

March 2019

5.7 Precipitation Records

In addition to pumping rates and volumes, it is important to record precipitation when evaluating impacts to groundwater levels. Environment Canada historical weather records are available for various cities/communities across Canada. The closest community with complete precipitation records is Dauphin, Manitoba. Average monthly precipitation data between 1971-2000 is presented in Figure 5.4.



Figure 5.4 - Dauphin Precipitation Records





5.8 Groundwater Interference Policy

It is recommended that a policy be adopted regarding potential interference from the G3 groundwater pumping activities on private wells to ensure complaints, whether real or perceived, are dealt with fairly and equitably.

The Groundwater Interference Policy is provided in Appendix H and consists of the following elements:

- 1) Complaint written complaint containing contact information and the nature of the complaint.
- 2) Preliminary assessment to be conducted by MWSB to validate complaint and if necessary supply private owner with potable water.
- 3) Secondary assessment If potential for valid complaint, further investigation by hydrogeologist.
- 4) Notification If assessment concludes groundwater interference occurred, immediately contact Manitoba Conservation & Water Stewardship, Water Use Licensing Section.
- 5) Actions Take measures to temporarily and/or permanently rectify the problem.

6.0 Source Water Protection Plan

Source water protection is one of many barriers used in a multi-barrier approach to ensure safe drinking water. For groundwater supplies, a source water protection plan is often referred to as a wellhead protection plan. However, source water protection planning could involve many of the groundwater users from the same aquifer. The main objective is to protect groundwater drinking supplies from contamination.

The Office of Drinking Water recognizes the Ten States Standards as a technical resource when assessing public water supply systems. The Recommended Standards for Water Works 2007 Edition "Ten States Standards" is a guide to the design and preparation of plans and specifications for public water supply systems. These standards are intended to establish, as far as practical, uniformity of practice among several states and was prepared by the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers.

The Ten States Standards recommends a wellhead protection plan for continued protection of the wellhead from sources of contamination as well as continued protection of the well site from potential sources of contamination through ownership, zoning, easements or other acceptable means.

6.1 Main Elements

Manitoba Conservation & Water Stewardship's "Best Practices Manual for Small Drinking Water Systems" identifies four main elements of a wellhead protection plan which are:

- 1) Identify the Critical Area to Protect
- 2) Inventory the Potential Contaminants within the Critical Area
- 3) Develop a Management Strategy Designed to Minimize the Potential of Contamination
- 4) Regularly Inspect Wellheads

1) Identify the Critical Area to Protect

Critical areas include:

- a) Upstream of the groundwater flow which is located northwest of production wells
- b) Immediate area of the wellheads

Since the aquifer is confined with approximately 30 m of till and clay overburden, the potential for contamination close to the wellhead is low. Except for unconfined aquifers, protection upstream of the groundwater flow is typically more critical. WLG concluded the aquifer is considered to be part of a groundwater flow system that consists of recharge in the Duck Mountain Uplands, flow to the southeast off the flanks of the uplands, and discharge to the Valley River Plain.

2) Inventory the Potential Contaminants within Critical Area

Potential contaminates include:

- a) Agriculture contaminates such as fertilizers, chemicals and petroleum products
- b) Agriculture contaminates near abandoned wells
- c) Agriculture contaminates near wellhead

The critical area lies northwest of the well site into Uplands of the Duck Mountains. Surface water drains and elevation contours from the Duck Mountains towards the G3 wells is a basic indicator of the groundwater influence area and flow direction (Figure 6.1). Activities within the Duck Mountain Provincial Park are limited as the area is undeveloped consisting of forest.

There is about 5 km of agriculture activity between the wells and Duck Mountains. Figure 6.2 shows this area comprised mainly of low intensity cereal crop and hay land. Agriculture fertilizers, chemicals and petroleum products are potential contaminants in this area however the aquifer is protected with till and clay overburden. Existing wells and particularly abandoned wells can be conduits for contamination directly to the aquifer. However, WLG identified wells within 2 km of the WTP are mostly in an upper aquifer whereas the G3 wells are in a lower aquifer. In addition, wells constructed into the aquifer northwest of G3 are in artesian condition which further reduces contamination potential.

Other sources of contamination may include contaminates from agriculture activities in the immediate area of the wellheads. This issue has been mitigated by installing bentonite around the

well casing at a depth to isolate the lower aquifer from the upper aquifer. In addition, properly mounded wells and installed pitless units provide further protection.



Figure 6.1 Potential G3 Groundwater Recharge Area - NW of Production Wells



Figure 6.2 Land Use within 5 km Radius of G3 Wells

3) Develop a Management Strategy Designed to Minimize the Potential of Contamination

- a) Identify privately owned abandoned wells and promote well sealing undertaken by a qualified person.
- b) Conduct periodic raw water sampling designed to detect potential contaminates.
- c) Maintain and cut vegetation around the production and monitoring wellheads to provide visibility and limit potential damage from agriculture equipment.
- d) Prevent surface flooding at the wells by maintaining mounding around the wellheads.
- e) Ensure pitless units and monitoring wells are secure from public access.
- f) Implement an Emergency Contingency Plan in the event of contamination.

4) Regularly Inspect Wellheads

Periodically inspect wellheads and monitoring wells for damage and wear. Maintain and cut vegetation around well casings. Since the wellheads are located in municipal right-of-way, ensure wellheads are visible and/or marked in winter for safety.

Appendix A

G3 Regional Water Co-op Infrastructure

G3 Water Co-operative Inc. Groundwater Monitoring Report



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Appendix B

Production Wells and Monitoring Wells



G3 Water Co-operative Inc. Groundwater Monitoring Report

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DEPTH BELOW GROUND LEVEL IN FEET PROM TO Q 135 14 TOP OF CASING OR HE Preside Preside P							TYPE Sched &C 12" Tel #30 Holeplus Back Fill Neat Back Fill C LEVEL LEVEL		MATERI PUC Filter S Bentean Montan Cement Jand Jand Jand Jand Jand Jand Jand Jand	AL S S cond ite Sand - 3×2 2-"ihe C C C C - 3×2 2-"ihe C C - 3×2 2-"ihe - 3×2 2-"ihe C C - 3×2 - 3×2	MAKE Amenican Mat Amenican Mat Bit bushin T h PUC ingit dec min 1 SC = 7.2

G3 Water Co-operative Inc. Groundwater Monitoring Report

			Driller's Report	MANITOBA WATER STEWARI	ознір 🔊
WE LOCA	LL TION	QTR R. LC REM	. <u>NW_</u> SEC. <u>35_</u> TWP. <u>26_</u> RGE. <u>23_</u> W1 DT PARISH ARKS: 0388322 5684001	Location Sk	etch of Well
WEI		NAM ADD PHO	E: G3 Water Cooperative RESS: Gilbert Plains, MB NE:		
WELL	USE	Pum	ping Well		
DA	TE	July	29, 2010		
D Gro	epth E ound I	Below In Feet	DESCRIPTION		Water Record (Kind of Water)
() 1	11 52	Brown Till Gray Till		
5 8	2 6	86	Sand Till		
0 13	30	180 180 180	Sand, fine to coarse End of Hole		
	_				
					l

	Depth Ground In F	Below d Level eet	CASING	DPEN HOLE	PERFORATIONS	SRAVEL PACK	CASING GROUT	PITLESS UNIT	NSIDE DIAMETER NCHES	DUTSIDE DIAMETER NCHES	SCREEN SLOT SIZE VO. OR INCH	TYPE		MATERIAL		MAKE
Z	From 0	141	x	0		-		-	11.4	12.8	0,0,2	Schedule 80		PVC.		
Ĕ	141	171			х				10.5	11.4	25	12" Telescopic		Stainless Steel		Johnson
S	126	171				Х						#75		Filter Sand		Unimin
L R	100	126					X					Holeplug		Bentonite		Enviroplug
NS	0	100					Х					Backfill		Mortar Sand		
8																
L L																
Ē	Top Of	Casing (Dr P	itle	ss /	Ada	apte	er: _	2			Feet Above <u>X</u> Be	elov	w Ground I	Lev	el
5	Remark	s: Appr	oxir	nate	əly	11	me	ters	south c	of well P	N 09-01	and 5 meters east of	f m	unicipal road edge	Э	
1																

	Date Of Test: (y/mm/d) 2010/07/29		Licence No.:
	Pumping / Flowing Rate: 300 I.G.P.M.		
F	Water Level ft. Above Ground	۲C	Name: M & M Drilling
Ш	Before Pumping: Below X Level	ō	
H	Pumping Level 39.1 ft. Above Ground	5	Address: Rivers, MB
ž	At End Of Test: Below X Level	Å	Phone
F	Duration Of Test: (Hrs:Min) 1:00	Ē	
₹	Water Temperature:	ō	Drill Operator:
Ъ	Conductivity:	0	
	Recommended Pumping Rate:		
	With Pump Intake At: ft. Below Ground Level		(Signature of Contractor)

										Dr	iller	's Repor	t	Man Water St	itoba
W	ell Atión	OTR. R.LC	μ n L	/, i	¢∐ ⁴	Se L	c. [] _} s_	3.	S TWI PARISH	-250 teh	NGE. L	231 E V S OF N	w Corner		ATION SKETCH OF WELL
W	'ELL /NER	ADDRESS	0	-	2	\$	1	?~	gion	rt t	Vater				
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DATE	DEP	COMPLETED	DAY	L		8	22 22		MONT	<u>+ 5</u> .	e <u>pt</u> .		20 [0.9]	56	WATER RECORD
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	DE GR FROM	PTH BELOW OUND LEVEL IN PEET	CASING	OPEN HOLE	PERFORATIONS	GRAVEL PACK	CASING GHOUT	PITLESS UNIT	INSIDE DIAMETER INCHES	OUTSIDE DIAMETER INCHES	SCREEN SLOT SIZE NO. OR INCH	TYPE	MAT	ERIAL	MAKE
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IRUC															
SNO			+	+			1								
ELLO	TOP OF	CASING OF PIT	1				L.		(e	FEET	ABOVE	BELOW G	ROUND LEVEL		
3	REN	MARKS:													
			12.3		-										
				324	_		_						and and a second se		
	DATE O	IF TEST: D	AY			ئـــــ	M		μ 3	10 LG.P	<u> </u>	20	LICENCE NO.		<u> </u>
EST	WATER	LEVEL BEFOR	E PU	MPI	NG	L	1	1:	5.57	FT. ABO		TC HOL		1	·····
PING 1	WATER	R LEVEL AT EN	D OF	TE	ŝŦ	Ļ	L.			FT. A60 BELC		LEVEL UL		comun	1er
PUM	OURAT	TON OF TEST				_),		RS			ES		DRILL OPERATOR	-e.50. U	Vatkin 3
2	RECON	MENDED PUMP	ING R	ATE					1,0	S.P.M.				Signature of	Contractor

						Dr	iller'	s Report		Manitoba Conservation
WELL LOCATION	R. LOT	5 μ.		ic. [3	PARISH	260 f	I RGE 2 A cast of ¢	EW Road	9	LOCATION SKETCH OF WELL
WELL DENTIFIC, NUMER NUMER DENTIFIC, NELL USE PF WATER USE AI							8 -1 nch 1 inch 1 indus indus scpt	Carins PHONE Comp test we observation well IRRIGATION IRRIGATION 20		See Sketch for 2-inch obs well
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DEPHT GROUN IN	BELOW ID LEVEL FEET TO	CASING OPEN HOLE	PERFORATIONS GRAVEL PACK		INSIDE DIAMETER INCHES	oursibe blameTer inches	SCREEN SLOT SIZE NO. OR INCH	TYPE	an C MATERIA	L MAKE
	120 140 140	× 	XX		444	£	18	60-,65	Filter	45 biss: 501
TOP OF CAS	SING OR PITLES	is unit		7.: 25	hair 20 7	Test	above 🕵 - 0000 7	BELOW GROUND LE	EVEL	Field and EC-650 Hord-27 gp Iron-2.7 m
REMARK Pun Coest	b and	Than aly	50	5 (<u>à 2</u>	,)Z	+24	hours : att	ached	

Appendix C

Annual Water Use Report 2018

G3 Water Co-operative Inc. Groundwater Monitoring Report

nnual V	Vater Use	Report fo	or 2018	Water St Water Lic Box 16 200 Sault Winnipeg wateruse	ewardship Divisik tensing Section teaux Crescent MB R3J 3W3 @gov.mb.ca	Conserva	nitobe ation and Water Sb	a 🎔
Pursuant	to The Wa	ter Riahts A	Act					
LICENSEE'S	NAME: G3 Regi	onal Water Co-ope	erative inc.			LICENCE	NO.201-107	
POST OFFIC	E ADDRESS	10-0923-000-000.	003/0.0900			PHONE N	0 204-548-4561	
				v		1 Holde I		
QUART	OF PUMP (OR W	VELL):1 km North	t of G3 wtp. TOWNSHIP 26		SURFACE WATE	R (Name of River, Co OR OT	HER (SPECIFY)	<u>-</u>
DE8IGN PUI	мРING RATE: QUANTITI Ц LITF X отн	LITRES F	PER SECOND 34 N TABLE BELOW DECAMETRES	EXPRESSED IN	OR OTH	ER (SPECIFY)		
		ER 31/2017 23	11993					
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axy of souths 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 26 27 28 29 30 31		ULARY INSTITUTION 1786 1786 1786 1786 1786 1724 1724 1724 1724 1724 1724 1724 1724 1724 1833 1090	FEBR	BIT BORNLY 002 817 602 817 616 684 755 877 876 540 608 677 648 658 621 940 705 697 620 649 705 697 620 849 705 747 662 769 894 755 755 755	MA	RCH MONTINALY construction 863 678 737 727 647 621 621 627 621 637 947 443 705 710 700 649 664 775 758 815 540 995 1447 384 749 552 1070 1055 541 749 552 1070 1055 561 748 807 762 762	AP	RIL CONNUMPIC CONNUPIC CONNUPIC CONNUPIC CONNUPIC CONNUPIC CONNUPIC CONNUPIC CO
according to the second		HUARY HENTILY 001184 786 857 819 724 823 809 850 960 817 633 693 853 778 839 815 807 710 880 800 800 800 800 763 832 763 870 786 789 760 220 090 2472	FEBR	BIT BORNLY 002 817 817 602 877 616 684 755 876 540 606 677 648 658 621 940 705 697 620 649 792 619 1012 371 747 662 769 894 755	MA	RCH HONTINA,7 Community Community Community RCH 863 737 727 647 607 621 637 947 443 705 710 700 649 664 710 700 649 664 710 700 649 664 710 705 758 815 540 995 1447 384 749 552 1070 1054 561 748 607 762 22690	AP METER ASSOCIONO 2380017	RIL COMMUNE COMUNE COMUNE COMUNE COMUNE COMUNE COMUNE COMUNE COMUNE

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DAY OF MONTH	HETER READING	MONTHLY CONSUMPTION	METTER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSUMPTION
1	2401790	829	2427684	984	2456560	699	2484100	935
2	2.0.0.00	734	212/001	677	2100000	1138	2.01.00	810
3		819	0	824	3	1031		686
4	1	888	1	828	S.	819	6	715
5		748		943		1112		705
6		766	12	1040	3	1118	8	908
7		894		839		867		782
8		974		807		854		910
9		661	18	1030	8	1159	8	814
10		660		931		1166		913
11	1	765	1	1062		770		831
12		916		1005	-	922		895
13		826		1189		969		924
14		811		1173		690		986
15		947	1	983	3	803	8	1142
16		565		1055		920		842
17		1051		996		901		918
18		852		1124	1	903		988
19	1	914		1107		793		942
20		812		1115		939		941
21		1032		915	5 C	783	1	715
22		904		1074		746		1165
23		973		780		833		831
24		604		846	1	773		761
25		811		1042		725		785
26		794		747	1	1038	2	658
27		987		1185	6	709	1	920
28	-	1053		999		1107		584
29		820	12	829	3	747	2	981
30		668		747	15	921	8	917
31		818		1.1.1		585		801
TOTAL		25894	3	28876	8	27540		26705
	1200				163353		1000	
DAY OF	SEPTE	MBER	001	OBER	NOVE	MBER	DECE	MBER
MULT ME		MONTHLY.		MONTHLY		BICHTHE Y		MONTHLY
MONTH		MONTHLY CONSUMPTION		MONTHLY CONSUMPTION	METTER REACING	MONTHLY CONSUMPTION	METER READING	MONTHLY CONSLIMPTION
MONTH	2510805	NEWTHEY CONSUMPTION	2535684	NONTHLY CONSUMPTION 823	METTER READING	INCHITHLY CONSUMPTION 838	METER READING	MONTHLY CONSUMPTION 842
1 2	2510805	исилист сонациятном 771 777	101110 NEADING	монтных сонашлятион 823 1228	меттия нелония 2562751	BONTHLY COMPLIANTION 838 922	METER READING 2588615	MONTHLY CONSUMPTION 842 008
MONTH 1 2 3	2510805	исиллы, у сонацииллом 771 777 868	2535684	823 1228	меттек наизно 2562751	838 922 761	метек налони 2588615	монтных сожадляртон 842 908 837
MONTH 1 2 3 4	100000 2510805	исилицу сонаширтон 771 777 868 750	неттек калоно 2535684	ночтні у соняшяртон 823 1228 1192 720	метек налона 2562751	838 922 761 984	METER READING	монтна.у сонацаятися 842 908 837 957
MONTH 1 2 3 4 5	2510805	ментных сонашинтон 771 777 868 750 730	12535684	ночтя у сонашиетом 823 1228 1192 720 750	NETTER READING 2562751	контису сомпшинтом 838 922 761 984 716	METER READING 2588615	монтна.v соняшанитон 842 908 837 957 717
MONTH 1 2 3 4 5 6	2510805	ментны т сонашиттон 771 777 868 750 730 784	12535684	номтяст сонасыятном 823 1228 1192 720 750 800	NUTTER REACTING 2562751	вонтн.у сождаетнок 838 922 761 984 716 862	METER READING	менты у соналиртон 842 908 837 957 717 900
MONTH 1 2 3 4 5 6 7	12510805	ментны у сонвымится 771 777 868 750 730 784 857	автак калоно 2535684	823 1228 1192 720 750 800 821	METTER READING 2562751	838 922 761 984 716 862 862 877	METER READING 2588615	монтна.у сонышитон 842 908 837 957 717 900 845
MONTH 1 2 3 4 5 6 7 8	100000	ментны у сонвымится 771 777 868 750 730 784 857 857 870	автак каконо 2535684	804794_Y consultantion 823 1228 1192 720 750 800 821 839	METTER READING 2562751	838 922 761 984 716 862 677 952	METER READING 2588615	ментна.у сожылятнон 842 908 837 957 717 900 845 939
MONTH 1 2 3 4 5 6 7 8 9	10000000000000000000000000000000000000	80/mL/ consummon 771 777 968 968 750 750 730 784 857 870 923	2535684	80x794_Y consultantice 823 1228 1192 720 750 800 821 830 721	METTER READING	838 922 761 984 716 862 677 952 804	2588615	MONTHLY CONBLIGHTION 842 908 837 957 717 900 845 939 931
MONTH 1 2 3 4 5 6 7 8 9 10	12510805	нонтик v сонвымином 771 777 868 750 730 730 784 857 870 923 871	12535684	нокты у сонязантся 823 1228 1192 720 750 800 821 830 821 839 721 747	метик налона 2562751	вонты, сомплетох 838 922 761 984 716 984 716 862 677 952 804 933	METER READING 2598615	монты у сонациянтон 842 908 837 957 717 900 845 939 911 905
MONTH 1 2 3 4 5 6 7 8 9 10 11	100000	нонтик у соналичном 771 777 868 750 730 784 857 857 857 857 857 857 1049	нетек каконо 2535684	нокты, сона.китон 823 1228 1102 720 750 800 821 839 721 747 747 738	нетак явлоно 2562751	вонтику сомплятом 838 922 761 984 716 862 677 952 804 933 798	METER READING	менты у соналартон 842 908 837 957 717 900 845 939 911 905 799
MONTH 1 2 3 4 5 6 7 8 9 10 11 12	100000	нонтику сонкимитон 771 868 750 730 784 857 870 923 871 923 871 1049 956	натак каконо 2535684	нокты у соналится 823 1228 1182 720 750 800 821 839 721 747 738 835	нетак явлоно 2562751	всинику сомилирток 838 922 761 984 716 862 677 952 804 952 804 933 798 897	METER READING	менты у соналантон 842 908 837 957 717 900 845 939 911 905 799 887
MONTH 1 2 3 4 5 6 7 8 9 10 11 12 13	12510805	конты, у сонвымится 771 777 868 750 730 730 734 857 870 923 871 1049 923 871 1049 923	натак какозер 2535684	нокты у соявляется 823 1228 1192 720 720 720 800 821 830 721 830 721 747 738 835 987	метак надено 2562751	804094.7 0091389100 838 922 761 984 716 862 677 952 804 977 952 804 933 798 897 755	метек налони 2588615	менты у соналяется 842 908 837 957 717 900 845 930 900 845 939 911 905 799 887 920
Month 1 2 3 4 5 6 7 8 9 10 11 12 13 14	12510805	конта.v сонв.ампсон 771 777 868 750 750 730 784 857 870 923 871 1049 956 933 945	натак наконе 2535684	нокты т соявляется 823 1228 1192 720 750 800 821 839 721 747 747 738 835 987 986	нетак явлоно 2562751	контику соняшиетом 838 922 761 984 716 862 862 862 867 952 804 952 804 933 798 897 755 847	метек налони 2588615	менты у соналартся 842 908 837 957 717 900 845 939 911 905 799 887 905 799 887 920 887
MONTH 1 1 2 3 4 5 5 7 8 9 10 11 12 13 14 15 15	BETTER READING 2510805	нонты, у сонымитом 771 777 868 750 730 784 857 857 857 857 857 857 857 857 857 857	натак каконе 2535684	нокты т соналится 823 1228 1102 720 750 800 821 839 721 839 721 747 738 835 987 986 885	NETUR READING 2562751	ыснты, у соняляется 838 922 761 984 716 862 867 752 804 952 804 933 798 897 755 847 897	METER READING	менты у соняляется 908 837 957 717 900 845 939 911 905 799 887 920 887 920 696 982
Month 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	12510805	нонтик у сонкаличном 771 868 750 730 784 857 857 857 857 857 857 857 857 857 856 923 871 1049 956 956 933 845 704 867	натак каконо 2535684	нокты у соналится 823 1228 1182 720 750 800 821 839 721 839 721 747 747 835 987 986 835 987 966 885	NETUR REACHS 2562751	ыснты, у соняляется 838 922 761 984 716 862 867 867 867 952 804 952 804 933 798 897 755 847 887 887 8849	METER READING	менты у сонязантон 842 908 837 957 717 900 845 939 911 905 799 887 920 696 982 888
Month 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	12510805	конты, у сонвымится 771 777 868 750 730 784 857 870 923 871 1049 926 871 1049 923 871 1049 956 933 845 704 867 720	антик каконе 2535684	нокты у соявляется 823 1228 1192 720 750 800 821 839 721 747 747 747 747 747 747 985 987 996 885 906 885 909 900	метак надона 2562751	BOHTNLY COMBLIGHTON 838 922 761 984 716 862 677 952 804 933 798 804 933 798 897 755 847 897 847 897 849 976	метек налони 2588615	менты у соналяется 842 908 837 957 717 900 845 939 911 905 799 887 920 696 920 888 982 888 952
MONTH 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	BETTER READING	контик v сонкамински 771 777 868 750 730 784 857 870 923 871 1049 956 933 871 1049 956 933 845 704 967 720 747	натак наконе 2535684	нокты т соязычется 823 1228 1192 720 750 800 821 839 721 747 738 835 967 966 885 909 1030 812	нетак явлоно 2562751	контику соняшиетом 838 922 761 984 716 882 862 677 952 862 862 877 952 804 933 798 897 755 847 849 897 849 897 849 877	метек налони 2588615	менты у соналяется 842 908 837 957 717 900 845 939 911 905 799 887 920 887 920 887 920 888 955 888 952 855
MONTH 1 2 3 4 5 5 7 8 9 10 11 12 13 14 15 16 17 18 19	ERTER READING 2510805	нонтику сонишитном 771 777 868 750 730 784 857 857 870 923 871 1049 956 933 871 1049 956 933 871 1049 956 933 871 1049 956 933 845 704 967 720 747	NETER REACHED	нокты т соналится 823 1228 1192 720 750 800 821 839 721 839 721 747 747 738 835 987 966 885 909 1030 812 848	NETUR READING 2562751	ыснты, у соняляется 838 922 761 984 716 882 862 862 862 862 862 862 862 862 877 955 804 933 798 897 755 847 897 897 849 976 873	METER READING	менты у соняляется 908 837 957 717 900 845 939 911 905 799 845 939 911 905 799 887 920 696 982 888 982 888 962 888 962 888 904
Month 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	BETTER READING	контьку сонвымится 771 777 868 750 730 730 734 857 870 923 871 1049 925 870 923 871 1049 926 933 845 704 867 720 747 1188 806	автек какозер 2535684	нокты у соявляется 823 1228 1192 720 750 800 821 830 721 747 728 836 987 986 885 909 1030 812 812 848	NETUR REACHS 2562751	8040047 838 922 761 984 716 862 677 952 804 933 798 804 933 798 807 755 847 897 849 976 849 976 877 849 976 877 873 785	метек налочи 2588815	менты у соняляется 908 837 957 717 900 845 939 911 905 799 887 920 887 920 887 920 887 920 887 920 887 920 887 920 887 920 887 94 888 952 855 904
MONTH 1 2 3 4 5 6 7 8 9 10 11 12 3 14 15 15 16 17 18 19 20 21	BETTER READING	контьку сонвымится 771 777 868 750 730 784 857 870 923 871 1049 956 923 871 1049 956 933 845 704 867 720 720 747 1188 806	ELTER REACHED	нокты т 223 1228 1192 720 750 800 821 839 721 747 738 835 987 966 885 909 1030 812 848 748 985	NETUR PEACHON 2562751	804794.7 consultation 838 922 761 984 716 862 877 952 804 877 952 804 933 798 897 755 847 897 849 976 849 976 877 873 785 991	METER READING	менты у соналяется 842 908 837 957 717 900 845 939 911 900 845 939 911 905 799 887 920 887 920 887 920 887 920 882 888 952 888 952 855 904 813 1031
MONTH 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	BETTER READING	конть v сонвымится 771 777 868 750 730 784 857 870 923 871 1049 956 933 871 1049 956 933 871 1049 956 933 871 1049 956 933 845 704 845 704 867 720 747 71 747 1049 956 845 704 867 704 867 704 867 704 867 704 867 704 877 704 877 705 707 705 707 707 707 707 707 707 7	**************************************	нокты т 223 1228 1192 720 750 800 821 839 721 747 738 835 987 966 885 909 1030 812 848 748 985 816	NETUR READING 2562751	контику соняшиетом 838 922 761 984 716 882 862 862 877 952 804 933 798 897 755 847 897 849 897 849 897 849 849 976 873 785 991 795	метек налони 2588615	менты у соналяется 842 908 837 957 717 900 845 939 911 905 799 887 920 887 920 887 920 888 952 888 952 855 904 613 1031 823
MONTH 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	BETTER READING	нонтик у сонишитном 771 777 868 750 730 868 750 730 857 857 857 857 857 857 857 857 857 857	NETER REACHED	нокты т соналится 823 1228 1192 720 750 800 821 839 721 839 721 747 738 835 987 986 885 909 1030 812 885 909 1030 812 848 948 948 956	HETER READING 2562751	жинны, соняляется 838 922 761 984 716 882 862 862 862 862 862 862 877 955 804 933 798 897 755 847 755 847 897 897 897 849 976 873 873 785 991 795 1015	METER READING	менты у соняляется 908 837 957 717 900 845 939 911 905 799 887 920 887 920 887 920 887 920 888 952 888 962 888 952 888 962 888 962 888 963 888 964 904 813 1031 823 840
MONTH 1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	BETTER READING	конта.v сонвалитися 771 777 868 750 730 734 857 870 923 871 1049 925 870 923 845 704 865 704 865 720 747 1188 806 1016 788 728 728 748 720 747 747 747 750 730 730 730 730 730 730 730 73	ELTER REACHED	нокты у совышется 823 1228 1192 720 750 800 821 830 721 747 738 836 928 966 885 909 906 885 909 906 885 909 900 812 848 748 985 816 966 816 9771	METER READMS 2562751	BOHTHLY COMBLIGHTON 838 922 761 964 716 862 677 952 804 933 798 807 755 847 755 847 897 897 849 976 877 873 785 901 795 1015 901 927 927	метек налония 2588815	менты у сонклантся 842 908 837 957 717 900 845 939 901 905 799 887 920 696 982 888 952 855 904 013 1031 823 840
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Appendix D

Water Rights Licence 2010-107

March 2019

MG-14854 (English)

Licence to Use Water for Municipal Purposes



Issued in accordance with the provisions of **The Water Rights Act** and regulations made thereunder.

Licence No.: 2010-107 (Original Lic. No.: 2005-124) U.T.M.: Zone 14 388321 E 5684011 N

Know all men by these presents that in consideration of and subject to the provisos, conditions and restrictions hereinafter contained, the Minister of Water Stewardship for the Province of Manitoba does by these presents give full right and liberty, leave and licence to G3 Regional Water Co-operative Inc. of the Rural Municipality of Gilbert Plains in the Province of Manitoba (hereinafter called "the LICENSEE") to divert water from a and gravel aquifer by means of 2 water wells, pumps, pipeline(s) and other appurtenances (hereinafter called "the WORKS"), located on the following described lands:

the municipal road allowance lying to the West of the Northwest Quarter of Section 35, in Township 26 and Range 23, West of the Principal Meridian in Manitoba,

and more particularly shown on a plan filed in the office of the Executive Director, Regulatory and Operational Services Division, a copy of which plan is hereto attached and marked Exhibit "A" for **municipal** purposes on the following described lands:

the Rural Municipality of Gilbert Plains, the Town of Gilbert Plains and the Town of Grandview.

This licence is issued upon the express condition that it shall be subject to the provisions of The Water Rights Act and Regulations and all amendments thereto and, without limiting the generality of the aforesaid, to the following terms and conditions, namely:

- 1. The water shall be used solely for municipal purposes.
- 2. The WORKS shall be operated in accordance with the terms herein contained.
- 3. a) The maximum rate at which water may be diverted pursuant hereto shall not exceed (1.2 cubic feet per second) .

b) The total quantity of water diverted in any one year shall not exceed 315 cubic decametres (255.37 acre feet)

4. Water shall not be diverted during any period when the water level in the aquifer as measured at:

a) 2010 Well is more than 39.9 metres (141.0 feet) beneath the surface of the ground. b) 2009 Well is more than 41.1 metres (135.0 feet) beneath the surface of the ground.

- 5. The LICENSEE does hereby remise, release and forever discharge Her Majesty the Queen in Right of the Province of Manitoba, of and from all manner of action, causes of action, claims and demands whatsoever which against Her Majesty the LICENSEE ever had, now has or may hereafter have, resulting from the use of water for **municipal** purposes.
- 6. In the event that the rights of others are infringed upon and/or damage to the property of others is sustained as a result of the operation or maintenance of the WORKS and the rights herein granted, the LICENSEE shall be solely responsible and shall save harmless and fully indemnify Her Majesty the Queen in Right of the Province of Manitoba, from and against any liability to which Her Majesty may become liable by virtue of the issue of this Licence and anything done pursuant hereto.
- This Licence is not assignable or transferable by the LICENSEE and when no longer required by the LICENSEE this Licence shall be returned to the Executive Director, Regulatory and Operational Services Division, for cancellation on behalf of the Minister.
- 8. Upon the execution of this Licence the LICENSEE hereby grants the Minister or the Minister's agents the right of ingress and egress to and from the lands on which the WORKS are located for the purpose of inspection of the WORKS and the LICENSEE shall at all times comply with such directions and/or orders that may be given by the Minister or the Minister's agents in writing from time to time with regard to the operation and maintenance of the WORKS.
- This Licence may be amended, suspended or cancelled by the Minister in accordance with The Water Rights Act by letter addressed to the LICENSEE at Box 642, Gilbert Plains, MB, R0L 0X0, Canada and thereafter this Licence shall be determined to be at an end.
- Notwithstanding anything preceding in this Licence, the LICENSEE must have legal control, by ownership or by rental, lease, or other agreement, of the lands on which the WORKS shall be placed and the water shall be used.
- 11. This Licence shall expire on March 26, 2026 and this Licence shall become effective only on the date of execution hereof by a person so authorized in the Department of Water Stewardship. The LICENSEE may apply for renewal of this Licence not more than 365 days and not less than 90 days prior to the expiry date.
- 12. This Licence expires automatically upon the loss of the legal control of any of the lands on which the WORKS are located or on which water is used, unless the Licence is transferred or amended by the Minister upon application for Licence transfer or amendment.

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- 13. The LICENSEE shall keep records of daily and annual water use and shall provide a copy of such records to the Executive Director, Regulatory and Operational Services Division, not later than February 1st of the following year.
- 14. A flow meter must be installed, positioned to accurately measure instantaneous pumping rate and accumulative withdrawals from the water source.
- 15. The LICENSEE does hereby agree to correct, to the satisfaction of the Minister, any water supply problems to wells or other forms of supply, which were constructed and operating prior to the date of application for the original Licence (No. 2005-124), and which are partly or wholly attributable, in the opinion of the Minister, to the diversion of water as authorized by this Licence.
- 16. The LICENSEE shall hold and maintain all other regulatory approvals that may be required and shall comply with all other regulatory requirements for the construction, operation, or maintenance of the WORKS or to divert or use water as provided by this Licence.

In witness whereof I the undersigned hereby agree to accept the therein and hereby set my hand and seal this	ne aforesaid Licence on the terms and conditions set forth day of	
SIGNED, SEALED AND DELIVERED in the presence of		
	}	
Witness	Licensee (S	sear)
Canada, PROVINCE OF MANITOBA To Wit:		
I,	of the	
of	in the Province of Manitoba, MAKE OATH AND SAY:	
1. That I was personally present and did see the within named party, execute the within Instrument.		<u> </u>
 That I know the said and am satisfied that he/she is of the full age of eighteen y 	rears.	
 That the said Instrument was executed at aforesaid and that I am subscribing witness thereto. 		
SWORN BEFORE me at the		
in the Province of Manitoba this o	day of A.D. 20	
	١	
A COMMISSIONER FOR OATHS in and for the Province of Manitoba	Witness	
My Commission expires		
Issued at the City of Winnipeg, in the Province of Manitoba, thi	s day of A.D. 20	•
The Honourable	the Minister of Water Stewardship	
Licence No.2010-107	Page 2 of 2	

Appendix E

Operating Licence PWS 11-47

	OPERATING L	ICENCE FOR TER SYSTEM
	LICENCE NUMBER	R: PWS-11-476-01
	THE DRINKING WA CHAPTER D10	TER SAFETY ACT 11, C.C.S.M.
WATER SYSTEM CO	DE: 71.25	
OPERATION ID:	44602	
EFFECTIVE DATE:	JANUARY 1, 2016	
EXPIRY DATE:	November 30, 2020	0
IN ACCORDANCE WITH ISSUED PURSUANT TO	THE DRINKING WATER SA SUBSECTION 8(1) TO:	FETY ACT, THIS OPERATING LICENCE IS
G-3	REGIONAL WATER CO-OPE	RATIVE INC.: "THE LICENSEE"
FOR THE OPERATION C SECURE WELLS, TREAT LINES, SUBJECT TO TH	F THE G-3 REGIONAL PUE MENT FACILITIES, WATER S E ATTACHED TERMS AND C	OLIC WATER SYSTEM, WHICH INCLUDES STORAGE RESERVOIRS, AND DISTRIBUTION CONDITIONS.
THIS LICENCE DOES N WITH ALL APPLICABLE I SUPERSEDES ALL PRE	OT AFFECT THE LICENSEE' MUNICIPAL, PROVINCIAL, AN /IOUS LICENSES FOR THIS F	S OBLIGATIONS WITH RESPECT TO COMPLIANCE ND FEDERAL LEGISLATION. THIS LICENCE PUBLIC WATER SYSTEM.
		Original signed by:
Dате: June 10, 2016		Kim Philip, P.Eng. Director

		TERMS AND CONDITIONS
1. (Gene	RAL
	1.1.	The Licensee shall operate the public water system in accordance with all applicable requirements of <i>The Drinking Water Safety Act</i> and its regulations, and the requirements of this Licence. In the event that specific terms and conditions of this Licence imposed under the authority of subsection 8(3) of the Act exceed the general requirements of the Act and regulations, the specific requirements of this Licence shall apply.
1	1.2.	The Licensee shall obtain approval from the Office of Drinking Water prior to making any significant alterations to the water source, the water treatment process, the water storage facilities, or the water distribution system.
1	1.3.	This Licence may be amended by the Director where, in the opinion of the Director, an amendment is necessary and the amendment will not negatively impact the safety of water obtained from the water system, or effective environmental management.
	1.4.	The Licensee may request an amendment to this licence by submitting an amendment application to the Office of Drinking Water.
1	1.5.	This Licence may be suspended or cancelled by the Director for any of the reasons identified in Section 11 of <i>Manitoba Regulation 40/2007, Drinking Water Safety</i> <i>Regulation</i> or due to a failure to comply with any term or condition of this Licence.
1	1.6.	The Licensee shall provide written notice to the Office of Drinking Water of any change in ownership of the water system within seven days of the transfer of ownership.
1	1.7.	The Licensee shall provide written notice to the Office of Drinking Water of any changes in the operational status of the water system, such as a permanent cessation of service, or changing the length of service from year-round to seasonal or the opposite.
1	1.8.	The Director of the Office of Drinking Water, Medical Officer of Health or Drinking Water Officer may enter any water system facility as necessary to carry out the provisions of <i>The Drinking Water Safety Act</i> and its regulations.
1	1.9.	The Licensee shall post the ceremonial framed Licence at the water treatment facility.
1	1.10.	The Licensee shall keep a copy of this Licence in its entirety at a location established by the Drinking Water Officer and ensure all operators are familiar with its terms and conditions.
1	1.11.	The Licensee shall apply for renewal of this Licence at least 60 days prior to its expiry.
PW:	S-11-	476-01 Page 2 of 6

2	OPERATION	GENERAL
۷.	OPERATION	- GENERAL

2.1.	The Licensee shall operate all water system facilities, control systems and equipment
	as efficiently as possible, inspect them on a regular basis, maintain them in good working order, and ensure that the water system is protected from the risks associated
	with cross-contamination.

- 2.2. The Licensee shall ensure that all chemicals and components that may come into contact with potable water are certified safe for potable water use through AWWA Standards, ANSI/NSF Standard 60 or 61, Health Canada, or other standards acceptable to the Director.
- 2.3. No alternate water source shall be brought into service without the consent of the Drinking Water Officer and the maintenance of adequate cross connection control between the alternate source and the primary source.
- 2.4. The Licensee shall have an assessment of the water system infrastructure and water supply sources completed and submitted by a qualified professional engineer, who is not an employee of the water system, in a form satisfactory to the Director by January 1, 2016.
- 2.5. The Licensee shall have a re-assessment of the water system infrastructure and water supply sources completed and submitted by a qualified professional engineer, who is not an employee of the water system, in a form satisfactory to the Director by March 1, 2021 and every five years thereafter.
- 2.6. The Licensee shall, upon request from the Office of Drinking Water, submit or resubmit a compliance plan, in a form satisfactory to the Director, to address any noncompliance issues identified at the time.
- 3. OPERATION EMERGENCIES
 - 3.1. The Licensee shall ensure that disinfection is undertaken following construction, repair or maintenance activities on the water system, in accordance with applicable AWWA standards, or Manitoba Water Services Board specifications, or any other standards approved by the Director. A copy of all associated test results must be kept available for review by the Office of Drinking Water for a minimum of 24 months.
 - 3.2. The Licensee shall ensure that all equipment used for disinfection is maintained in effective working order and keep available for immediate use all spare parts and chemical supplies as may be necessary to ensure continuous disinfection, including a spare disinfection unit, if necessary.
 - 3.3. The Licensee shall immediately notify the Office of Drinking Water of any condition that may affect the ability of the water system to produce or deliver safe drinking water including but not limited to treatment upsets or bypass conditions, contamination of the source water or treated water, a disinfection system failure, or a distribution system failure.
 - 3.4. If a Medical Officer of Health, the Director of the Office of Drinking Water, or a Drinking Water Officer issues a water advisory on the water system, the Licensee shall provide notice of the advisory to all water users in accordance with the Advisory Notification Plan.

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4. WATER QUALITY/TREATMENT STANDARDS

4.1. The Licensee shall operate the water system in a manner that achieves the water quality/treatment standards specified in Table 1, as determined through the monitoring requirements specified in Table 2:

	Table 1: Water Quality/Treatment Standard						
Deremeter	Quality						
Parameter	Standard						
Total coliform	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water						
E. coli	Less than one <i>E. coli</i> bacteria detectable per 100 mL in all treated and distributed water						
Chlorine residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system						
Arsenic	Less than or equal to 0.01 mg/L						
Benzene	Less than or equal to 0.005 mg/L						
Fluoride	Less than or equal to 1.5 mg/L						
Lead	Less than or equal to 0.01 mg/L in the water distribution system						
Nitrate	Less than or equal to 45 mg/L measured as nitrate (10 mg/L measured as nitrogen)						
Trichloroethylene	Less than or equal to 0.005 mg/L						
Tetrachloroethylene	Less than or equal to 0.03 mg/L						
Uranium	Less than or equal to 0.02 mg/L						

- 4.2. If a bacteriological standard is not met, the Licensee shall immediately undertake the applicable corrective actions as listed in "Schedule A" of Manitoba Regulation 41/2007, Drinking Water Quality Standards Regulation.
- 4.3. If a microbial, chemical, radiological, or physical standard is not met, the Licensee shall immediately undertake the applicable corrective actions specified in "Schedule C" of Manitoba Regulation 41/2007, the *Drinking Water Quality Standards Regulation*.
- 4.4. The Licensee shall maintain in effective working order chlorination and treated water storage equipment and controls designed to achieve a minimum of 20 minutes of chlorine contact time prior to water entering the distribution system.

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5. WATER QUALITY MONITORING

5.1. The Licensee shall ensure monitoring is completed as set out in Table 2.

	Parameter	Monitoring Requirement
	Bacteriological (total coliform and	Biweekly sampling program with each set of samples consisting of one raw, one treated, and a minimum of one distribution sample
	E. coli)	Consecutive sample sets to be separated by at least 12 days
	Free chlorine (treated water)	Continuous sampling of water entering the distribution system following at leas 20 minutes of contact time A confirmatory sample to be taken daily at the online chlorine analyzer samplin or effluent point
	Free chlorine (distribution system)	At the same time and location(s) as bacteriological distribution system sampling
	Total chlorine (treated water)	One sample per day of water entering the distribution system following at least 20 minutes of contact time
	Total chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling
	General chemistry (parameter list	One raw and one treated water sample once every three years
	Drinking Water)	
5.2.	The Licensee shall Manitoba Regulatio following analysis re a) bacteriolog b) general chi c) any other p	As per the instructions of the Drinking Water Officer ensure that an accredited laboratory, as specified in section 35 of n 40/2007 the <i>Drinking Water Safety Regulation</i> , undertake the equired in Table 2: ical (total coliform and <i>E. coli</i>) emistry parameter required by the Drinking Water Officer
5.2.	The Licensee shall Manitoba Regulatio following analysis re a) bacteriolog b) general chu c) any other p and that all sample satisfactory to the a	As per the instructions of the Drinking Water Officer ensure that an accredited laboratory, as specified in section 35 of n 40/2007 the <i>Drinking Water Safety Regulation</i> , undertake the equired in Table 2: ical (total coliform and <i>E. coli</i>) emistry parameter required by the Drinking Water Officer s are collected, handled, and submitted in a manner that is accredited laboratory.
.2.	The Licensee shall Manitoba Regulatio following analysis re a) bacteriolog b) general chi c) any other p and that all sample satisfactory to the a The Licensee shall 5.2 are measured u approved by the late Wastewater publish Water Works Assoc	As per the instructions of the Drinking Water Officer ensure that an accredited laboratory, as specified in section 35 of n 40/2007 the Drinking Water Safety Regulation, undertake the equired in Table 2: ical (total coliform and <i>E. coli</i>) emistry varameter required by the Drinking Water Officer s are collected, handled, and submitted in a manner that is accredited laboratory. ensure that parameters listed in Table 2 but not specified in clause tilizing certified water quality monitoring equipment and methods est edition of Standard Methods for the Examination of Water and ed jointly by the American Public Health Association, the American diation and the Water Environment Federation.
.2.	The Licensee shall Manitoba Regulatio following analysis re a) bacteriolog b) general ch c) any other p and that all sample satisfactory to the a The Licensee shall 5.2 are measured u approved by the late Wastewater publish Water Works Assoc The Licensee shall instances where me	As per the instructions of the Drinking Water Officer ensure that an accredited laboratory, as specified in section 35 of n 40/2007 the Drinking Water Safety Regulation, undertake the equired in Table 2: ical (total coliform and <i>E. coli</i>) emistry barameter required by the Drinking Water Officer is are collected, handled, and submitted in a manner that is accredited laboratory. ensure that parameters listed in Table 2 but not specified in clause tilizing certified water quality monitoring equipment and methods est edition of Standard Methods for the Examination of Water and ed jointly by the American Public Health Association, the American ciation and the Water Environment Federation. ensure that raw water samples are taken on an alternating basis in ore than one water supply source is used.
5.2. 5.3. 5.4.	The Licensee shall Manitoba Regulatio following analysis re a) bacteriolog b) general ch c) any other p and that all sample satisfactory to the a The Licensee shall 5.2 are measured u approved by the late Wastewater publish Water Works Assoc The Licensee shall instances where m The Licensee shall maintained and cal recommendations a	As per the instructions of the Drinking Water Officer ensure that an accredited laboratory, as specified in section 35 of n 40/2007 the Drinking Water Safety Regulation, undertake the equired in Table 2: ical (total coliform and <i>E. coli</i>) emistry barameter required by the Drinking Water Officer s are collected, handled, and submitted in a manner that is accredited laboratory. ensure that parameters listed in Table 2 but not specified in clause tilizing certified water quality monitoring equipment and methods est edition of Standard Methods for the Examination of Water and ed jointly by the American Public Health Association, the American ciation and the Water Environment Federation. ensure that raw water samples are taken on an alternating basis in ore than one water supply source is used. ensure that all water quality monitoring equipment is properly ibrated by a qualified person according to manufacturer and that records are maintained to that effect.

5.7. In instances where continuous disinfectant residual mor Licensee shall ensure that a minimum of four samples p chlorine analyzer sampling or effluent point using an ap and that the results are recorded in a form satisfactory t	nitoring equipment is offline, the per day are tested at the online proved portable analysis unit to the Director.
5.8. The Licensee shall ensure that sampling within the distr varied locations acceptable to the Drinking Water Office	ribution system takes place at er.
6. RECORD-KEEPING AND REPORTING	
6.1. The Licensee shall maintain in a secure location all cont the water system components.	struction drawings for the life of
6.2. The Licensee shall retain in chronological order for a mi information specified in subsection 34(2) of Manitoba Re Water Safety Regulation.	inimum of 24 months all legulation 40/2007, Drinking
6.3. The Licensee shall ensure the information identified in a inspection by any member of the public during normal b the water supplier or at a location convenient to the use	clause 6.2 is available for business hours at the office of ers of the system.
6.4. The Licensee shall record disinfectant residual measure disinfection report or other forms satisfactory to the Dire	ements on the monthly ector.
6.5. The Licensee shall keep one copy of all monthly report and forward the original copy to the Drinking Water Offic end of each calendar month.	forms required in this licence, cer within seven days after the
6.6. The Licensee shall record all distribution system measu Monitoring Schedule on the chain of custody form (labo accompanies the bacteriological sample bottles to the laboration of the statement of the laboration of the sector of the	rements specified in <i>Table 2:</i> ratory submission form) which aboratory.
6.7. The Licensee shall ensure that water metering devices storage reservoir are maintained in good working order are recorded on a daily basis and such records are mad Drinking Water Officer.	at the water treatment plant or and that flow meter readings de available for inspection by a
6.8. The Licensee shall submit an annual report to the Direc on the operation of the water system in the immediately report shall include the information as set out in subsect Regulation 40/2007, Drinking Water Safety Regulation.	ctor by March 31 st of each year ^y preceding calendar year. The tion 32(2) of <i>Manitoba</i>
6.9. The Licensee shall inform the public, in a form satisfacter annual report has been prepared and identify how a free	ory to the Director, when an e copy can be obtained.
6.10. The Licensee shall make a copy of each annual report a charge on an internet website within two weeks of the is otherwise approved by the Director. The annual report s public for at least one year.	available to the public at no ssuance of the report, unless shall remain available to the
6.11. The Licensee shall maintain and submit an Advisory No by May 1 st of each year. The plan must include a detaile communication tools and methods to be used to notify t emergency, considering key contacts, fan-outs, critical o difficult-to-reach sub-groups, and template notices when	otification Plan to the Director ed description of the public of a drinking water customers, susceptible or re applicable.
PWS-11-476-01	Page 6 of 6

Appendix F

Environment Act Licence 2853 & Effluent Monitoring

THE ENVIRONMENT ACT LOI SUR L'ENVIRONNEMENT

LICENCE



Licence No. / Licence n° _____

2853

Issue Date / Date de délivrance <u>November 5, 2008</u>

In accordance with The Environment Act (C.C.S.M. c. E125) / Conformément à la Loi sur l'environnement (C.P.L.M. c. E125)

Pursuant to Section 11(1) / Conformément au Paragraphe 11(1)

THIS LICENCE IS ISSUED TO: / CETTE LICENCE EST DONNÉE À :

G3 REGIONAL WATER CO-OPERATIVE INC.; "the Licencee"

for the construction and operation of the Development being a water treatment and supply system for the Towns of Grandview and Gilbert Plains and the Rural Municipality of Gilbert Plains, with a well in SW 34-26-23W and a reverse osmosis water treatment plant located in the R.M. of Gilbert Plains in NW 26-26-23W, with the discharge of reject water to the Sulphurspring Creek marsh, in accordance with the Proposal filed under The Environment Act and dated August 26, 2008, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"as constructed drawings" means engineering drawings complete with all dimensions which indicate all features of the Development as it has actually been built;

GENERAL TERMS AND CONDITIONS

This Section of the Licence contains requirements intended to provide guidance to the Licencee in implementing practices to ensure that the environment is maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for present and future Manitobans.

A COPY OF THE LICENCE MUST BE KEPT ON SITE AT THE DEVELOPMENT AT ALL TIMES

G3 Regional Water Co-operative Inc. Licence No. 2853 Page 2 of 6

- 1. The Licencee shall, in addition to any of the following specifications, limits, terms and conditions specified in this Licence, upon the request of the Director:
 - a) sample, monitor, analyse or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such duration and at such frequencies as may be specified;
 - b) determine the environmental impact associated with the release of any pollutants from the said Development;
 - c) conduct specific investigations in response to the data gathered during environmental monitoring programs; or
 - d) provide the Director, within such time as may be specified, with such reports, drawings, specifications, analytical data, flow rate measurements and such other information as may from time to time be requested.
- 2. The Licencee shall collect and dispose of all used oil products and other regulated hazardous wastes generated by the machinery used in the construction and operation of the Development in accordance with applicable Manitoba Conservation and legislation requirements.
- 3. The Licencee shall, prior to the commencement of operation of the Development, receive approval pursuant to The Drinking Water Safety Act for final plans for the Development.
- 4. The Licencee shall design, construct and operate the Development in accordance with Manitoba Regulations under the Public Health Act and the Drinking Water Safety Act and all operating requirements as recommended by Manitoba Water Stewardship.
- 5. The Licencee shall properly train or qualify individuals to carry out the operation of the Development pursuant to the requirements of *Manitoba Regulation* 77/2003 respecting *Water and Wastewater Facility Operators*, or any future amendment thereof.
- 6. The Licencee shall not permit the interconnection of a private water supply system with the Development.
- 7. The Licencee shall maintain the water supply wells associated with the Development to prevent the contamination of groundwater by surface water:
 - a) entering the well casings through the top of the casings; and
 - b) entering the well casings through the sides of the casings.
- 8. The Licencee shall:
 - a) prepare "As Constructed" drawings for the Development and shall label the drawings "As Constructed"; and

G3 Regional Water Co-operative Inc. Licence No. 2853 Page 3 of 6

b) provide to the Director, within one year of the completion of construction of the Development, two sets of "As Constructed" drawings.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

- 9. The Licencee shall, during construction of the Development, dispose of nonreusable construction debris at a waste disposal ground operating under the authority of a permit issued under *Manitoba Regulation 150/91* respecting *Waste Disposal Grounds* or any future amendment thereof, or a Licence issued pursuant to The Environment Act.
- 10. The Licencee shall, prior to commencing construction of the Development, obtain all necessary approvals from Manitoba Infrastructure and Transportation and the Highway Traffic Board.
- 11. The Licencee shall notify the Historic Resources Branch not less than one month prior to commencing construction of the Development in any year in which construction occurs, in compliance with the requirements of The Heritage Resources Act. The notification shall include pipeline route locations.
- 12. The Licencee shall notify the Western Regional Office of Manitoba Conservation in Dauphin not less than two weeks prior to commencing construction of the Development in any year in which construction occurs. The notification shall include the intended starting date of construction and the name of the contractor responsible for the construction.
- 13. The Licencee shall, during construction and operation of the Development:
 - a) immediately report any reportable spills to Manitoba Conservation's Accident Reporting Line at (204) 944-4888; and
 - b) provide a follow-up report to the Director on a reportable environmental accident outlining the cause(s) and proposing corrective action to prevent reoccurrence.
- 14. The Licencee shall, at all times during the construction of the Development, maintain materials to contain and recover spills of fuel and other fluids associated with construction machinery at construction sites.
- 15. The Licencee shall establish fuel storage and equipment servicing areas for the construction and operation of the Development:
 - a) a minimum distance of 100 metres from any waterbody; and
 - b) in compliance with the requirements of *Manitoba Regulation 188/2001* respecting *Storage and Handling of Petroleum Products and Allied Products.*

G3 Regional Water Co-operative Inc. Licence No. 2853 Page 4 of 6

- 16. The Licencee shall construct waterway crossings on flowing waterways by augering, tunneling or boring. Open cut crossings on flowing waterways shall not be made unless prior consultation with Manitoba Water Stewardship and Department of Fisheries and Oceans staff has occurred and the prior written approval of the Director has been obtained. Dry or non-flowing (i.e. hydraulically unconnected to downstream flowing water) natural and artificial waterways may be crossed with open cut techniques where approval has been obtained where necessary from the authority responsible for the channel.
- 17. The Licencee shall, where open cut stream crossing techniques are used on intermittent waterways and artificial drainage channels, minimize disturbance to riparian areas and restore the bottom and banks of the waterways to their original elevations and shapes.
- 18. The Licencee shall, where open cut stream crossing techniques are used on intermittent waterways and artificial drainage channels, not construct open cut crossings associated with the Development between April 1 and June 15 of any year.
- 19. The Licencee shall construct open cut stream crossings associated with the Development in accordance with the methodologies described in the October, 2005 publication "Pipeline Associated Watercourse Crossings Third Edition", published by the Canadian Pipeline Water Crossing Committee, and the May, 1996 publication "Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat", published by the Department of Fisheries and Oceans and Manitoba Natural Resources.
- 20. The Licencee shall not alter local drainage patterns by the construction of the Development, including inflows and outflows from small wetlands adjacent to the route of pipelines.
- 21. The Licencee shall, during construction of the Development, implement all necessary measures to prevent the erosion of exposed soil into any waterbodies. Construction adjacent to waterbodies shall not occur during high rainfall events.
- 22. The Licencee shall not, during construction and operation of the Development, remove, destroy or disturb species listed as rare, endangered, or of special concern, or their habitats. These species are listed in *Manitoba Regulation 25/98*, or any future amendment thereof, respecting *Threatened*, *Endangered and Extirpated Species* and in the federal Species at Risk Act.
- 23. The Licencee shall not construct the Development in areas likely to provide bird habitat before August 1 of any year. Construction in wetland areas and in riparian zones adjacent to rivers shall not occur before August 15 of any year.

G3 Regional Water Co-operative Inc. Licence No. 2853 Page 5 of 6

- 24. The Licencee shall separate and replace topsoil from backhoe and trenching operations associated with the Development in accordance with the methodology described in Figures 1, 2 and 3 attached to this Licence. This requirement is not applicable where the topsoil has been previously disturbed due to the construction of roads or drains.
- 25. The Licencee shall revegetate soil exposed during the construction of the Development with native or introduced grasses or legumes. Native species shall be used to revegetate areas where native species existed prior to construction. Revegetation is not required for pipelines installed by chain trenching or ploughing on previously disturbed ground including road allowances.
- 26. The Licencee shall not release chlorinated water from pipeline testing and startup activities associated with the Development to a surface water body until chlorine level concentrations are equal to or less than 0.1 milligrams per litre. Releases of chlorinated water at higher concentrations may be made to vegetated land or dry waterways, provided that chlorine level concentrations have decayed to 0.1 milligrams per litre or less before the released water reaches any body of surface water.
- 27. The Licencee shall conduct an effluent monitoring program as described in Clauses 28 to 31 of this Licence, for a period of two years commencing with the operation of the Development. Following this period, the duration of the monitoring program may be extended by the Director if the results, in the opinion of the Director, indicate that a longer monitoring period is appropriate.
- 28. The Licencee shall, on a quarterly basis for the duration of the effluent monitoring program, collect grab samples at locations approved by the Director in the reverse osmosis concentrate wastewater stream within the water treatment plant and upstream and downstream of the effluent discharge pipeline outlet on the Sulphurspring Creek marsh.
- 29. The Licencee shall transport the grab samples collected pursuant to Clause 28 of this Licence, to an accredited laboratory for analysis. The samples shall be stored and transported in accordance with procedures specified by Manitoba Water Stewardship to ensure that the samples are suitable for analysis.
- 30. The Licencee shall, at an accredited laboratory, have the samples collected pursuant to Clause 29 of this Licence, analysed for the following parameters:

G3 Water Co-operative Inc. Groundwater Monitoring Report

G3 Regional Water Co-operative Inc. Licence No. 2853 Page 6 of 6

- a) hardness as CaCO3;
- b) total dissolved solids;
- c) iron;
- d) calcium;
- e) magnesium;
- f) manganese; and
- g) sodium.
- 31. The Licencee shall, not more than 30 days after the results of each quarterly analysis are available, submit the results to the Director.
- 32. The Licencee shall, each winter during the operation of the Development:
 - a) monitor ice accumulation in Sulphurspring Creek at the effluent discharge pipeline outlet, and
 - b) take action as may be necessary to prevent flooding on Sulphurspring Creek due to ice accumulation from the operation of the Development.

REVIEW AND REVOCATION

- A. Environment Act Licence No. 2597 is hereby rescinded.
- B. If, in the opinion of the Director, the Licencee has exceeded or is exceeding or has or is failing to meet the specifications, limits, terms, or conditions set out in this Licence, the Director may, temporarily or permanently, revoke this Licence.
- C. If construction of the development has not commenced within three years of the date of this Licence, the Licence is revoked
- D. If, in the opinion of the Director, new evidence warrants a change in the specifications, limits, terms or conditions of this Licence, the Director may require the filing of a new proposal pursuant to Section 11 of The Environment Act.

Tracey Braun, M. Sc.

Tracey Braun, M. Sc. Director Environment Act

FILE: 5360.00

L972884 CONTD.... PAGE 2 of 3 Version: FINAL REV.

ALS LABORATORY GROUP ANALYTICAL REPORT

L972884-1 EFFLUENT WASTE PIT Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscelianeous Parameters Hardness (as CaCO3) 2560 0.30 mg/L Calcium (Ca)-Total 596 0.10 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 259 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Manganess (M)-Total 0.722 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 J972884-2 EFFLUENT DOWNSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT DOWNSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 433 0.30 mg/L 27-JAN-11 R1889284 L972884-2 EFFLUENT DOWNSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 433 0.30 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT Manganesium (Mg)-Total 0.010 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT Marganess (Mh)-Total 0.010 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT Marganess (Mh)-Total 0.010 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT DOWNSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Marganess (Mh)-Total 0.010 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT DOWNSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT DFT AM Manganess (Mh)-Total 0.0169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: IFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: IFFLUENT UPSTREAM Sampled Sp: IVAN YAKIMISHEW ON 24-JAN-11 @ 12:30 Matrix: IFFLUENT IFT AM Sampled Sp: IVAN YAKIMISHEW ON 24-JAN-11 @ 12:30 Matrix: IFFLUENT IFT AM Sampled Sp: IVAN YAKIMISHEW ON 24-JAN-11 @ 12:30 Matrix: IFFLUENT IFT AM Sampl	Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
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Total Metals by (CP-MS Calcium (Ca)-Total Total Total <td>Total Dissolved Solids</td> <td>3690</td> <td></td> <td>5.0</td> <td>mg/L</td> <td></td> <td>26-JAN-11</td> <td>R1879665</td>	Total Dissolved Solids	3690		5.0	mg/L		26-JAN-11	R1879665
Calcium (Ca)-Total 556 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 11.8 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 259 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 0.722 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Id97284-2 EFFLUENT DOWNSTREAM 219 0.030 mg/L 27-JAN-11 R1889284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 mg/L 27-JAN-11 R189284 Matrix: EFFLUENT mscellaneous Parameters 31-JAN-11 R189284 Hardness (as CaCO3) 433 0.30 mg/L 2-JAN-11 R1879665 Total Metals by ICP-MS 26-JAN-11 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 102 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 0.169 0.00030 mg/L 27-JAN-11 R1889284	Total Metals by ICP-MS							
Iron (Fe)-Total 11.8 0.10 mg/L 27-JAN-11 27-JAN-11 R189224 Magnesium (Mg)-Total 259 0.010 mg/L 27-JAN-11 27-JAN-11 R189224 Sodium (Na)-Total 0.722 0.0030 mg/L 27-JAN-11 27-JAN-11 R189224 Sodium (Na)-Total 219 0.030 mg/L 27-JAN-11 R7.189224 Sodium (Na)-Total 219 0.030 mg/L 27-JAN-11 R189284 L972884-2 EFFLUENT DOWNSTREAM Sampled By: IVAN YAKIMSHEW on 24-JAN-11 @ 12-30 mg/L 27-JAN-11 R189284 Hardness (as CaCO3) 433 0.30 mg/L 26-JAN-11 R1879665 Total Dissolved Solids 512 5.0 mg/L 27-JAN-11 R1879665 Total Metais by (CP-MS 26-JAN-11 R189284 27-JAN-11 R189284 Magnesium (Mg)-Total 102 0.10 mg/L 27-JAN-11 R189284 Magnesium (Mg)-Total 0.169 0.0003 mg/L 27-JAN-11 R189284 Sodium (Ma)-Total 11.7 0.030 mg/L 27-JAN-1	Calcium (Ca)-Total	596		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Magnesium (Mg)-Total 259 0.010 mg/L 27-JAN-11 27-JAN-11 R189224 Manganese (Mn)-Total 0.722 0.00030 mg/L 27-JAN-11 27-JAN-11 R189224 L972884-2 EFFLUENT DOWNSTREAM 219 0.030 mg/L 27-JAN-11 R189224 L972884-2 EFFLUENT DOWNSTREAM 230 mg/L 27-JAN-11 R189284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 mg/L 27-JAN-11 R189284 Matrix: EFFLUENT Sodium (Na)-Total 0.30 mg/L 26-JAN-11 R189264 Total Dissolved Solids 512 5.0 mg/L 27-JAN-11 R189284 Iron (Fe)-Total 102 0.10 mg/L 27-JAN-11 27-JAN-11 R189284 Maganeseum (Mg)-Total 0.10 mg/L 27-JAN-11 27-JAN-11 R189284 Magnesium (Mg)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R189284 Sodium (Na)-Total 0.169 0.00030 mg/L	Iron (Fe)-Total	11.8		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mn)-Total 0.722 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 219 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 J97288-42 EFFLUENT DOWNSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 nmg/L 27-JAN-11 27-JAN-11 R1889284 Matrix: EFFLUENT FLUENT nmg/L 27-JAN-11 R1879665 Total Dissolved Solids 512 5.0 mg/L 27-JAN-11 R1879665 Total Metals by ICP-MS 0.00 mg/L 27-JAN-11 R1889284 Iran 88284 Iron (Fe)-Total 102 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 0.159 0.00030 mg/L 27-JAN-11 R1889284 Magnesium (Na)-Total 0.169 0.00030 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 11.7 0.030 mg/L 27-JAN-11 R189284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 mg/L 26-JAN-11	Magnesium (Mg)-Total	259		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total 219 0.030 mg/L 27-JAN-11 R1889284 L972884-2 EFFLUENT DOWNSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 IVAN YAKIMISHEW ON 24-JAN-11	Manganese (Mn)-Total	0.722		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
L972884-2 EFFLUENT DOWNSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 433 0.30 mg/L 31-JAN-11 R1879665 Total Metals by ICP-MS Calcium (Ca)-Total 102 0.10 mg/L 27-JAN-11 27-JAN-11 R189284 Iron (Fe)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R189284 Magnesium (Mg)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R189284 Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 27-JAN-11 R189284 L972884-3 EFFLUENT UPSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 382 0.30 mg/L 27-JAN-11 R189284 Iron (Fe)-Total 89.6 0.10 mg/L 27-JAN-11 R189284 Iron (Fe)-Total 89.6 0.10 mg/L 27-JAN-11 R189284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 R189284 Magnesium (Mg)-Total 0.14 0.149 0.00030 mg/L 27-JAN-11 R189284 Magnesium (Mg)-Total 0.14 0.149 0.00030 mg/L 27-JAN-11 R189284 Sodium (Na)-Total 0.14 0.149 0.00030 mg/L 27-JAN-11 R189284 Sodium (Na)-Total 0.14 0.149 0.00030 mg/L 27-JAN-11 R189284	Sodium (Na)-Total	219		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284
Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Attrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 433 0.30 mg/L 31-JAN-11 Total Dissolved Solids 512 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 0102 0.10 mg/L 27-JAN-11 27-JAN-11 R189284 Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 27-JAN-11 R189284 Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R189284 Magnese (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R189284 L972884-3 EFFLUENT UPSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 mg/L 27-JAN-11 27-JAN-11 R189284 Martix: EFFLUENT Bradmese (as CaCO3) 382 0.30 mg/L 27-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 27-JAN-11 R1879665 Total Metals by ICP-MS 26-JAN-11 27-JAN-11 R1879665 27-JAN-11 R189284	L972884-2 EFFLUENT DOWNSTREAM							
Matrix: EFFLUENT Image: Second Secon	Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12	:30						
Miscellaneous Parameters number of the second	Matrix: EFFLUENT							
Hardness (as CaCO3) 433 0.30 mg/L 31-JAN-11 Total Dissolved Solids 512 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 102 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnese (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 11.7 0.030 mg/L 27-JAN-11 R1889284 Matrix: EFFLUENT UPSTREAM 382 0.30 mg/L 27-JAN-11 27-JAN-11 R1879665 Total Metals by ICP-MS Iron (Fe)-Total 60-10 mg/L 27-JAN-11 R1879665 Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11	Miscellaneous Parameters							
Total Dissolved Solids 512 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS Calcium (Ca)-Total 102 0.10 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 Z7-JAN-11 R1889284 Magnesium (Ma)-Total 0.169 0.00030 mg/L 27-JAN-11 Z7-JAN-11 R1889284 Sodium (Na)-Total 0.169 0.00030 mg/L 27-JAN-11 Z7-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 50 mg/L 27-JAN-11 Z7-JAN-11 R1889284 L972884-3 EFFLUENT Matrix: EFFLUENT R1889284 Z6-JAN-11 R1879665 Matrix: EFFLUENT Matrix: EFFLUENT R1879665 Z6-JAN-11 Z7-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 27-JAN-11 R1879665 Total Metals by ICP-MS Z6-JAN-11	Hardness (as CaCO3)	433		0.30	ma/L		31-JAN-11	
Total Metals by ICP-MS Calcium (Ca)-Total 102 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesse (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 0.169 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 matrix: EFFLUENT R1889284 Matrix: EFFLUENT Miscellaneous Parameters 31-JAN-11 26-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 27-JAN-11 R1879665 Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.1	Total Dissolved Solids	512		5.0	mg/L		26-JAN-11	R1879665
Calcium (Ca)-Total 102 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnese (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 11.7 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 mg/L 27-JAN-11 27-JAN-11 R1889284 Matrix: EFFLUENT miscellaneous Parameters	Total Metals by ICP-MS	512		0.0				
Iron (Fe)-Total 2.71 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Manganese (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 matrix: EFFLUENT R1889284 R1889284 Matrix: EFFLUENT miscellaneous Parameters 31-JAN-11 R1879665 Hardness (as CaCO3) 382 0.30 mg/L 27-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 89.6 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 Mangaeses (Mn)-Total 0.149 0.00030	Calcium (Ca)-Total	102		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Magnesium (Mg)-Total 43.1 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Manganese (Mn)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 R1889284 Matrix: EFFLUENT 31-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 26-JAN-11 R1889284 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Magnese (Mn)-Total 0.149 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284	Iron (Fe)-Total	2.71		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mh)-Total 0.169 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 11.7 0.300 mg/L 27-JAN-11 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 reference reference <td>Magnesium (Mg)-Total</td> <td>43.1</td> <td></td> <td>0.010</td> <td>mg/L</td> <td>27-JAN-11</td> <td>27-JAN-11</td> <td>R1889284</td>	Magnesium (Mg)-Total	43.1		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total 11.7 0.030 mg/L 27-JAN-11 R1889284 L972884-3 EFFLUENT UPSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 IVAN YAKIMISHEW on 24-JAN-11 R189284 IVAN YAKIMISHEW on 24-JAN-11 @ R189284 IVAN YAKIMISHEW on 24-JAN-1	Manganese (Mn)-Total	0.169		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
L972884-3 EFFLUENT UPSTREAM Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 382 Otal Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 26-JAN-11 Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Sodium (Na)-Total	11.7		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284
Sampled By: IVAN YAKIMISHEW on 24-JAN-11 @ 12:30 Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 382 Otal Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 27-JAN-11 Calcium (Ca)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 0.010 mg/L Magnesium (Mg)-Total 0.149 0.00030 mg/L Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284 3.17 0.030 mg/L 27-JAN-11 R1889284	1972884-3 FEELUENT UPSTREAM				-			
Matrix: EFFLUENT Miscellaneous Parameters Hardness (as CaCO3) 382 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS 27-JAN-11 Calcium (Ca)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 0.010 mg/L Magnesium (Mg)-Total 38.4 0.010 mg/L Vanganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Sampled By: IVAN YAKIMISHEW on 24-IAN-11 @ 12	:30						
Miscellaneous Parameters 382 0.30 mg/L 31-JAN-11 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS								
Hardness (as CaC03) 382 0.30 mg/L 31-JAN-11 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS - - - - - - Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Miscellaneous Parameters							
Total Dissolved Solids 3.02 0.3.0 mg/L 26-JAN-11 R1879665 Total Dissolved Solids 404 5.0 mg/L 26-JAN-11 R1879665 Total Metals by ICP-MS - - - - - Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Hardness (as CaCO3)	382		0.30	ma/l		31- IAN-11	
Total Dissolver Solids 404 3.0 Ing/L 20-3/A+11 R1879003 Total Metals by ICP-MS 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Total Dissolved Solids	302		5.0	mg/L		26 JAN 11	D1970665
Calcium (Ca)-Total 89.6 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 R1889284	Total Matels by ICB MS	404		5.0	mg/L		20-JAN-11	R10/9005
Iron (Fe)-Total 0.57 0.10 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Magnese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284	Calcium (Ca)-Total	89.6		0.10	ma/l	27-JAN-11	27- JAN-11	R1889284
Magnesium (Mg)-Total 38.4 0.010 mg/L 27-JAN-11 27-JAN-11 R1889284 Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284	Iron (Fe)-Total	0.57		0.10	mg/L	27-JAN-11	27-JAN-11	R1889284
Manganese (Mn)-Total 0.149 0.00030 mg/L 27-JAN-11 27-JAN-11 R1889284 Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284	Magnesium (Mg)-Total	38.4		0.010	mg/L	27-JAN-11	27-JAN-11	R1889284
Sodium (Na)-Total 3.17 0.030 mg/L 27-JAN-11 27-JAN-11 R1889284	Manganese (Mn)-Total	0 149		0.00030	mg/L	27-JAN-11	27-JAN-11	R1889284
	Sodium (Na)-Total	3 17		0.030	mg/L	27-JAN-11	27-JAN-11	R1889284
		0.11		0.000				111000201

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

G3 CO-OP TREATEMENT PLANT - GILBERT PLAINS WTP - (71.25) March 2019

L999260 CONTD.... PAGE 3 of 4 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L999260-3 Sampled By:	3) EFFLUENT UPSTREAM LLOYD BECKLEY on 26-APR-11 @ 10:00	1						
Matrix:	EFFLUENT WATER							
Total Metal Potassium (Sodium (Na	s by ICP-MS K)-Total)-Total	2.31 2.15		0.10 0.050	mg/L mg/L	02-MAY-11 02-MAY-11	02-MAY-11 02-MAY-11	R2183868 R2183868

L1230594 CONTD.... PAGE 2 of 4 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1230594-1 EFFLUENT @ DISCHARGE							
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:0	0						
Matrix: EFFLUENT							
Miscellaneous Parameters	010		5.0			24 OCT 42	D0400400
Nator Softonor Suitability	318		5.0	mg/L		31-001-12	R2466439
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	17.1		0.010	arn/IMPaal		31-OCT-12	
Hardness - grains/US gallon				J			
Hardness-grains/USgal	14.2		0.010	grn/USgal		31-OCT-12	
Hardness Calculated							
Hardness (as CaCO3)	243		0.30	mg/L		02-NOV-12	
Total Metals by ICP-MS							
Calcium (Ca)- I otal	60.0		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Iron (Fe)-I otal	18.4		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	22.7		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
Potassium (K) Total	0.943		0.0010	mg/L	01-NOV-12	01-NOV-12	R2407228
Sodium (Na)-Total	27.5		0.10	mg/L	01-NOV-12	01-NOV-12	R2407228
	21.5		0.000	ing/L	01-1007-12	01-1101-12	112407220
Sampled By: LLOYD BECKLEY on 20 OCT 12 @ 11:							
	50						
Matrix. EFFLUENT Miscellaneous Parameters							
Total Dissolved Solids	634		5.0	ma/l		31-OCT-12	P2466439
Water Softener Suitability	034		5.0	ing/L		01-001-12	112400435
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	41.8		0.010	grn/IMPgal		31-OCT-12	
Hardness - grains/US gallon							
Hardness-grains/USgal	34.8		0.010	grn/USgal		31-OCT-12	
Hardness Calculated							
Hardness (as CaCO3)	595		0.30	mg/L		02-NOV-12	
Total Metals by ICP-MS	105		0.00		01 NOV 12	01 NOV 12	D0407000
Iron (Ee)-Total	135		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	62.7		0.10	mg/L	01-NOV-12	01-NOV-12	R2407220
Magnese (Mn)-Total	0.0603		0.0010	mg/L	01-NOV-12	01-NOV-12	R2467228
Potassium (K)-Total	7 11		0.10	ma/L	01-NOV-12	01-NOV-12	R2467228
Sodium (Na)-Total	14.1		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
L1230594-3 EFFLUENT UPSTREAM				-			
Sampled By: LLOYD BECKLEY on 29-OCT-12 @ 11:0	00						
Matrix: EFFLUENT							
Miscellaneous Parameters							
Total Dissolved Solids	464		5.0	mg/L		31-OCT-12	R2466439
Water Softener Suitability				-			
Hardness - grains/Imperial gallon							
Hardness-grains/IMPgal	32.7		0.010	grn/IMPgal		31-OCT-12	
Hardness - grains/US gallon						AL 007 15	
Hardness-grains/USgal	27.2		0.010	grn/USgal		31-OCT-12	
Hardness Calculated Hardness (as CaCO3)	465		0.30	ma/l		02-NOV-12	
Total Metals by ICP-MS	-00		0.00			52110112	
Calcium (Ca)-Total	109		0.20	mg/L	01-NOV-12	01-NOV-12	R2467228
Iron (Fe)-Total	0.64		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Magnesium (Mg)-Total	47.1		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228
Manganese (Mn)-Total	0.124		0.0010	mg/L	01-NOV-12	01-NOV-12	R2467228

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

G3 WATER CO-OP TREATMENT PLANT

L1230594 CONTD.... PAGE 3 of 4 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
1 4000504 0								
L1230594-3	EFFLUENT UPSTREAM							
Sampled By:	LLOYD BECKLEY on 29-OCT-12 @ 11:0	0						
Matrix:	EFFLUENT							
Total Metals by ICP-MS								
Potassium (K)-Total		5.62		0.10	mg/L	01-NOV-12	01-NOV-12	R2467228
Sodium (Na)-Total		6.45		0.050	mg/L	01-NOV-12	01-NOV-12	R2467228

3-3 WATER CO-OP TREATMENT PLANT

L1268522 CONTD.... PAGE 2 of 3 Version: FINAL

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1268522-1 EFFLUENT @ DISCHARGE							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	1370		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	1750		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	316		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)-Total	13.4		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	141		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Manganese (Min)- I otal	0.446		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na)-Totai	83.2		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
L1268522-2 EFFLUENT DOWNSTREAM							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	472		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	518		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	107		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)-I otal	0.38		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	49.8		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Manganese (Min)- I otal	0.139		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na)-Totai	6.41		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
L1268522-3 EFFLUENT UPSTREAM							
Sampled By: Ivan Yakimishen on 13-FEB-13 @ 11:00							
Matrix: Effluent							
Miscellaneous Parameters							
Hardness (as CaCO3)	466		0.30	mg/L		20-FEB-13	
Total Dissolved Solids	463		5.0	mg/L		14-FEB-13	R2532813
Total Metals by ICP-MS							
Calcium (Ca)-Total	105		0.20	mg/L	19-FEB-13	19-FEB-13	R2536503
Iron (Fe)- I otal	0.53		0.10	mg/L	19-FEB-13	19-FEB-13	R2536503
Magnesium (Mg)-Total	49.4		0.050	mg/L	19-FEB-13	19-FEB-13	R2536503
Sodium (Na) Total	0.108		0.0010	mg/L	19-FEB-13	19-FEB-13	R2536503
	4.25		0.050	IIIg/L	19-FEB-13	19-FED-13	R2536505

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Appendix G

Groundwater Interference Policy

Groundwater Interference Policy G3 Regional Water Co-operative Inc.

Purpose:

The purpose of the Groundwater Interference Complaint Response Policy is to establish a procedure to deal with complaints of groundwater interference regarding private wells.

The groundwater interference complaint response policy will be invoked if a resident makes a written groundwater interference complaint to the G3 Regional Water Cooperative on the form as set out in Schedule "A" attached to and forming part of this policy.

Any resident contacting Manitoba Conservation or Manitoba Water Stewardship regarding a well water interference complaint should first be referred to the G3 Regional Water Co-operative.

Definitions:

"Groundwater Interference" is defined as a decrease in residential well performance due to factors such as the pumping of the G3 Regional Water Co-operative production well(s) that causes a decrease in well capacity such that the supply of water to the well is temporarily or permanently interrupted.

Procedure:

The procedures for responding to a groundwater interference complaint have been divided into two categories as follows:

- 1) Preliminary Well Assessment; and
- 2) Secondary Well Assessment

All complaints shall be in writing and shall be submitted on the Groundwater Interference Complaint Incident Report on the form as set out in Schedule "A" attached to and forming part of this policy. Upon receipt of a written complaint, the preliminary well assessment will be completed by The Manitoba Water Services Board (MWSB) as set out in Schedule "B". Depending on the results of the preliminary assessment, it may be necessary to have an approved private sector Investigating Contractor as listed in Schedule "C" attached to and forming part of this policy complete a more detailed secondary well assessment.

1) Preliminary Well Assessment

- a) The MWSB will undertake a well assessment within twenty-four (24) hours of receiving the interference complaint. The initial assessment and discussion with the well owner may conclude that no further action is required on the part of the G3 Regional Water Co-operative.
- b) In the event that MWSB concludes that groundwater interference may have occurred, the following actions will be taken:

- i) Immediately offer or provide the resident with a reasonable amount of potable water; and
- ii) Contact the G3 Regional Water Co-operative's Investigating Contractor to undertake an investigation to determine the cause of the complaint.

2) Secondary Well Assessment

- a) In the event that the Investigating Contractor concludes that ground water interference **did not** occur, the resident may be required to pay for the temporary water supply.
- b) In the event that the Investigating Contractor concludes that a bona fide groundwater interference may have occurred, the MWSB will complete one of the following actions:
 - i) With agreement of the affected resident, continue to deliver water to the resident at no cost; or
 - ii) Institute mitigation measures such as lowering the well pump or repairing/replacing the well in order to accommodate the observed interference; or
 - iii) Reduce the rate and amount of municipal water taking so as to alleviate the observed interference. This action may not immediately restore water to the private well and it may be necessary to continue action (i) above in the interim.

3) Documentation

The groundwater interference complaint incident report should be summarized and as a minimum, documents the following:

- a) The location of the complaint (name, address, telephone number);
- b) Investigation procedures and results; and
- c) Any actions taken to restore water supply

4) Notification

Manitoba Water Stewardship must be notified of any bona fide well interference problem as follows:

- a) The MWSB must notify Manitoba Water Stewardship, Water Use Licensing Section, by phone and email immediately after the Investigating Contractor has confirmed that a well interference may have occurred.
- b) The Groundwater Interference Complaint Incident Report documenting the well interference must be submitted to Manitoba Water Stewardship, Water Use Licensing Section no more than one (1) week after the interference was confirmed.

5) Updating the Groundwater Interference Complaint Response Policy

The groundwater interference complaint response policy should be regarded as a living document that is updated whenever there are changes in any of the contact information provided on the Groundwater Interference Complaint Information Sheet as listed in Schedule "C". As a minimum the groundwater interference complaint response policy should be reviewed annually to ensure that the information is up to date.

Schedule "A" G3 Regional Water Co-operative Inc. Groundwater Interference Complaint by Private Owner

Name					
Address					
Phone Number					
Date					
Nature of Complaint					
Description of problem(s) and dates when problem occurred:					

Schedule "B" G3 Regional Water Co-operative Inc. Groundwater Interference Complaint Contractor Incident Report

Preliminary Well Assessment				
Assessment completed by:				
Date completed:				
	INVESTIGATION			
Including inve	stigation procedures, observations and results.			
	ACTIONS TAKEN			
	By owner or ESP			

Secondary Well Assessment						
Name of Company						
Contact Person						
Date Completed						
	INVESTIGATION					
Including investigation procedures, observations and results.						
	ACTIONS TAKEN					
	By owner, Investigator, or ESP					
Date Water Supply						
Temporarily Restored						
Date Water Supply						
Restored						
NOTIFICATION OF MANITOBA WATER STEWARDSHIP						
Contact Person Notified	of					
Bona Fide Interference						
Date Contacted						

Schedule "C" G3 Regional Water Co-operative Inc. Groundwater Interference Complaint Information Sheet

G3 Regional Water Co-operative

G3 Regional Water Co-operative Inc.

114 Main Street North Box 642 Gilbert Plains, MB ROL 0X0 (204) 548-2761

The Manitoba Water Services Board

The Manitoba Water Services Board Unit 1A 2010 Currie Boulevard Brandon, MB R7B 4E7

Manitoba Water Stewardship

Manitoba Conservation and Water Stewardship

Water Use Licensing Section Box 16-200 Saulteaux Crescent Winnipeg, MB R3J 3W3 Office: (204) 945-6474 Fax: (204) 945-7419

<u>Consultant</u> Investigation Contractor:

W.L. Gibbons & Associates Inc.

64 St. Andrew Road Winnipeg, MB R2M 3H6 Office: (204) 771-4389

Subcontractor

Investigation Subcontractor:

M & M Drilling 531-9th Avenue

(204) 726-6076

Rivers, MB (204) 328-7112