



**APPROVAL
PROVINCE OF ALBERTA**

**ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.**

APPROVAL NO.: 1242-02-00

APPLICATION NO.: 008-1242

EFFECTIVE DATE: October 1, 2008

EXPIRY DATE: September 1, 2018

APPROVAL HOLDER: Town of Turner Valley

ACTIVITY: Construction, Operation and Reclamation of a waterworks system
.....
..... for the Town of Turner Valley

is subject to the attached terms and conditions.

Designated Director under the Act

Kevin Wilkinson

Date Signed September 30, 2008

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

- 1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.
- 1.1.2 In all PARTS of this approval:
- (a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;
 - (b) "Alberta Environment Tier 1 Guidelines" means *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, August 2008, Alberta Environment, as amended;
 - (c) "alternate program" means the *Alternate Laboratory Data Quality Assurance Program*, as detailed in Alberta Environment's *Laboratory Data Quality Assurance Policy Procedures and Guidelines*;
 - (d) "approved laboratory" means laboratory accredited to the requirements of ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, for the drinking water test methods specified by the Director;
 - (e) "bacteriological analysis" means the analysis of water for the presence of *E. coli* or total coliforms;
 - (f) "chemical" means any substance that is added or used as part of the treatment process;
 - (g) "chlorine residual" means free chlorine, or combined chlorine or total chlorine;
 - (h) "contact time" ("T₁₀") means the time taken in minutes for 10% of the water to pass through the particular process unit;
 - (i) "continuous monitoring" means flow measurement or sample analysis through in-line equipment that creates flow measurements or frequent, discrete sample analysis output and includes a data recorder;
 - (j) "CT" means disinfectant residual in mg/L multiplied by the contact time;
 - (k) "CT_{lowest actual}" means the lowest CT calculated in a particular day;

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$$CT_{\text{lowest actual}} = C \times \frac{T_{10}}{T} \times \frac{V_{\text{min}}}{Q_{\text{peak}}}$$

Where: C = lowest recorded daily free chlorine residual concentration (in milligrams per litre) at the point T₁₀ is measured;

$\frac{T_{10}}{T}$ = 0.7; OR

Varies based on the empirical method using typical baffling conditions as per Appendix D in the Standards and Guidelines Document, OR

Varies based on a tracer study, where

T₁₀ = the contact time established from the most recent tracer study, and

T = the calculated contact time, assuming no short-circuiting and obtained by dividing the treated water chlorine contact storage volume that was used to determine T₁₀, by the flow that was used to determine T₁₀;

V_{min} = the daily minimum volume (in Litres) of treated water in the treated water chlorine contact storage reservoir; and

Q_{peak} = maximum recorded hourly flow (Litres per minute) or the maximum rate at which treated water can be pumped out of the clearwell;

- (l) "CT_{required}" means the CT required to demonstrate the specified Log reduction of *Giardia* cysts and / or viruses as specified in Appendix A or Appendix B of the Standards and Guidelines Document;
- (m) "CT_{performance ratio}" means CT_{lowest actual} / CT_{required};
- (n) "day" means calendar day;
- (o) "Director" means an employee of the Government of Alberta designated as a Director under the Act;
- (p) "disinfectant residual" means total concentration of disinfectant in water;

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- (q) "disinfection" means a chemical or physical process of treating water to inactivate microorganisms;
- (r) "*E. coli*" means *Escherichia coli* bacteria;
- (s) "electronic reporting" means submitting monitoring results to the Director as required in this approval, electronically through the secure internet website provided by Alberta Environment at: <http://www.environment.alberta.ca/1506.html>;
- (t) "GCDWQ" means the *Guidelines for Canadian Drinking Water Quality*, published by Health Canada, as amended;
- (u) "grab", when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;
- (v) "ISO/IEC" means the International Organization for Standardization / the International Electrotechnical Commission;
- (w) "Log reduction" means the base 10 logarithm of the ratio of raw water concentrations divided by the treated water concentration of total *Giardia* cysts, *Cryptosporidium* oocysts or viruses;
- (x) "MAC" means the Maximum Acceptable Concentration, specified in the GCDWQ for a particular parameter;
- (y) "PWR" means the *Potable Water Regulation*, as amended;
- (z) "produced water" means all water that has gone through treatment and has entered the distribution system;
- (aa) "Provincial Laboratory of Public Health" means the:
 - (i) Environmental Microbiology Provincial Laboratory of Public Health, University of Alberta Hospital, Edmonton, Alberta, or the
 - (ii) Provincial Laboratory of Public Health, Foothills Hospital, Calgary, Alberta;
- (bb) "raw water" means untreated source water from water wells, surface water intakes or infiltration galleries that constitute the water supply;
- (cc) "regulations" means the regulations enacted pursuant to the Act and as amended;

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- (dd) "Standards and Guidelines Document" means the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*, published by the Department, as amended; and
- (ee) "User Agreement" means the *Drinking Water Quality User Agreement* signed by the approval holder and the Director.

PART 2: GENERAL PROVISIONS

SECTION 2.1: GENERAL

- 2.1.1 The approval holder shall comply with all conditions in this approval.
- 2.1.2 Any conflict between the approval application and the terms and conditions of this approval shall be resolved in favour of this approval.
- 2.1.3 The terms and conditions of this approval do not affect any rights or obligations created under any other authorization issued by the Department.
- 2.1.4 The approval holder shall carry out all electronic reporting, or cause all electronic reporting to be carried out in accordance with the User Agreement.
- 2.1.5 The approval holder shall comply with the terms and conditions of the User Agreement.
- 2.1.6 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.
- 2.1.7 If the approval holder monitors for any substances or parameters, which are the subject of limits in this approval more frequently than is required, using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the next annual waterworks report required by this approval.
- 2.1.8 *Environmental Protection and Enhancement Act* Approval No. 1242-01-00 is cancelled.

PART 3: PLANNING, CONSTRUCTION AND / OR UPGRADING REQUIREMENTS

SECTION 3.1: PLANNING

- 3.1.1 For a period of one year commencing November 1, 2008 the approval holder shall sample the raw water from each water well that is used at any time during the year, for *E. coli* for a full year:

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- (a) once a week during the spring run-off period; and
 - (b) at least every two weeks for the rest of the one-year period.
- 3.1.2 If the average of *E. coli* concentration, of an individual water well, is < 10/100 mL, based on all the samples in the one-year period, no further raw water assessment monitoring is required of that well.
- 3.1.3 If the average of *E. coli* concentration, of an individual water well, is \geq 10/100 mL, based on all the samples in the one-year period, the approval holder shall monitor the raw water from that well for *Giardia* and *Cryptosporidium* oocysts for an additional period of two years, at least four times per year.
- 3.1.4 The approval holder shall submit to the Director:
- (a) the raw water assessment of the analytical results obtained under 3.1.1 through 3.1.3, within 3 months of completion of the sampling; and
 - (b) shall obtain written confirmation from the Director of the level of treatment required.
- 3.1.5 On or before October 1, 2010, or another date specified in writing by the Director, the approval holder shall assess the ability of the existing waterworks system to meet the *Potable Water Treatment Performance Standards* in the latest Standards and Guidelines Document.
- 3.1.6 On or before October 1, 2009 and then again on or before October 1, 2014, the approval holder shall undertake a risk assessment of the waterworks system from source to tap to ascertain the integrity, reliability and the long-term sustainability of the system to provide safe drinking water according to the following:
- (a) the assessment shall be performed in accordance with the Standards and Guidelines Document, *Facility Risk Assessment*; and
 - (b) the assessment shall be performed by an independent consultant approved by the Director.
- 3.1.7 The risk assessment of the waterworks system, which is to be completed on or before October 1, 2009, shall be submitted to the Director with the 2009 Annual Waterworks Report.
- 3.1.8 The risk assessment of the waterworks system, which is to be completed on or before October 1, 2014, shall be submitted to the Director with the 2014 Annual Waterworks Report.

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SECTION 3.2: CONSTRUCTION

- 3.2.1 On or before October 1, 2010, the approval holder shall, construct the waterworks system upgrades as detailed in MPE Engineering Ltd.'s September 8, 2008 letter and which shall include at a minimum:
- (a) fencing of water well sites to restrict access to the water wells;
 - (b) raising well heads to above the 1 in 100 year flood level;
 - (c) continuous monitoring of raw water turbidity and including:
 - (i) recording of turbidity data generated, and
 - (ii) high turbidity alarms;
 - (d) continuous monitoring of chlorine residual in the treated water chlorine entering the water distribution system and including:
 - (i) recording of chlorine data generated, and
 - (ii) low and high chlorine residual alarms.

SECTION 3.3: UPGRADE

- 3.3.1 On or before October 1, 2011, the approval holder shall submit a complete amendment application to upgrade the waterworks system, if the assessment in Section 3.1.5 indicates an inability to meet the performance standards set out in the Standards and Guidelines Document.
- 3.3.2 The application in 3.3.1 shall include, at a minimum, all of the following:
- (a) an engineering feasibility study or pre-design report;
 - (b) detailed design, plans and specifications;
 - (c) proposed upgrading schedule and completion date;
 - (d) ultraviolet light disinfection system validation certificate, as specified in the Standards and Guidelines document, if ultraviolet light disinfection is to be used in the upgrade; and
 - (e) any other information specified in writing by the Director.
- 3.3.3 The approval holder shall complete the upgrade of the waterworks system on or before October 1, 2013.

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- 3.3.4 If a maximum acceptable concentration specified in the GCDWQ is changed or a new limit is added in the GCDWQ and the waterworks system will be unable to meet the new or revised limit, then the approval holder shall make application to the Director to upgrade the waterworks system such that the system will be able to meet the new or revised GCDWQ within 5 years of the date the new or revised guideline was published.

PART 4: OPERATIONAL REQUIREMENTS

SECTION 4.1: WATERWORKS SYSTEM

- 4.1.1 The approval holder shall:

- (a) operate; and
- (b) maintain

a waterworks system, which shall include all of the following:

- (i) water wells within W ½ 6-20-2-W5M producing groundwater under the direct influence of surface water,
- (ii) raw water storage,
- (iii) a water treatment plant consisting of:
 - (A) coagulation and flocculation;
 - (B) rapid sand filtration unit(s); and
 - (C) disinfection by chlorination;
- (iv) online turbidity meters that continuously monitor the turbidity of the treated water from each filter train,
- (v) treated water storage, and
- (vi) a treated water distribution system.

- 4.1.2 After completion of the construction in 3.2.1, the online turbidity meter in 4.1.1 (b) (iv) shall:

- (a) continuously monitor the turbidity in the water entering the clearwell;
- (b) continuously record the data generated;

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- (c) activate alarms that notify the certified operator of turbidity above the approval limit; and
 - (d) prevent water with turbidity above the approval limit from entering the clearwell.
- 4.1.3 After completion of the construction in 3.2.1, the waterworks system shall include all the items in 4.1.1 plus an online chlorine monitoring system that:
- (a) continuously monitors the chlorine in the water entering the water distribution system;
 - (b) continuously records the data generated;
 - (c) activates alarms that notify the certified operator of chlorine residual outside of the approval limit; and
 - (d) prevents water from entering the water distribution system if chlorine levels are too low or high.
- 4.1.4 On or before October 1, 2009 the approval holder shall develop a system *Operations Program* that shall include, at a minimum, all of the information in SCHEDULE 1 of this approval.
- 4.1.5 The approval holder shall update the *Operations Program* at least on an annual basis.
- 4.1.6 Where the first sample of any sampling event pursuant to 5.1.1 does not meet the minimum chlorine residual limit in SCHEDULE 3 of this approval, the approval holder shall:
- (a) immediately flush the distribution line in the vicinity of the sample;
 - (b) resample and analyze the chlorine residual at the same location; and
 - (c) resample and analyze the chlorine residual from:
 - (i) a minimum distance of 1 service connection upstream, and
 - (ii) a minimum distance of 1 service connection downstream, where each location is no closer than 100 m and no further than 500 m from the location of the first sample;
 - (d) in the event that any of the resample results are less than the minimum chlorine residual limit specified in SCHEDULE 3 the approval holder shall report as per 6.1.1 and continue to take corrective action.

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- 4.1.7 Where any sample of a treated water sampling event pursuant to 5.1.1 does not meet the turbidity limit in SCHEDULE 3 of this approval, the approval holder shall:
- (a) immediately divert the water to filter-to-waste until the water meets the turbidity limit in SCHEDULE 3; or
 - (b) in the event that the water has entered the clearwell then:
 - (i) immediately divert all the water from the clearwell to waste, and
 - (ii) continue to divert to waste until all the water that did not meet the turbidity limit in SCHEDULE 3 has been flushed from the clearwell.

SECTION 4.2: SUBSTANCE ABOVE GCDWQ OR ALBERTA ENVIRONMENT TIER 1 WATER QUALITY GUIDELINES

- 4.2.1 The approval holder shall implement the *Remedial Action Plan for Specific Possible Contaminants* as per 5.3.30 when:
- (a) a substance in any stored raw water sample exceeds a SCHEDULE 3A quality limit;
 - (b) a substance in any sample from the reservoir site groundwater sampling program is above the SCHEDULE 3B quality limit;
 - (c) a substance in any well water sample exceeds a SCHEDULE 3C quality limit.
- 4.2.2 In addition to reporting pursuant to 6.1.1, the approval holder shall immediately report to the Director when the *Remedial Action Plan for Specific Possible Contaminants* is implemented.
- 4.2.3 The approval holder shall provide in the Annual Waterworks Report a summary of any actions taken when the *Remedial Action Plan for Specific Possible Contaminants* is implemented.

SECTION 4.3: WELL WATER, RESERVOIR SITE GROUNDWATER AND / OR STORED RAW WATER STATISTICALLY SIGNIFICANT INCREASE IN A SUBSTANCE

- 4.3.1 The approval holder shall implement the *Remedial Action Plan for Specific Possible Contaminants*, as per 5.3.30 when the analysis of collected data using the statistical methods from the *Remedial Action Plan For Specific Possible Contaminants* determines further action is required to identify the cause of the increasing concentration of a substance in:
- (a) the stored raw water;

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- (b) the reservoir site groundwater; and/or
 - (c) the well water.
- 4.3.2 In addition to reporting pursuant to 6.1.1, the approval holder shall immediately report to the Director when the *Remedial Action Plan for Specific Possible Contaminants* is implemented.
- 4.3.3 The approval holder shall provide in the Annual Waterworks Report a summary of any actions taken when the *Remedial Action Plan for Specific Possible Contaminants* was implemented.

SECTION 4.4: OPERATIONAL CHANGES

- 4.4.1 The approval holder shall pump all well water into the stored raw water storage reservoir unless the requirements of 4.4.2 or 4.4.4 have been met.
- 4.4.2 The approval holder shall only pump well water direct to the water treatment plant when:
- (a) the stored raw water does not contain a substance in excess of a SCHEDULE 3A quality limit; and
 - (b) results from the testing of the well water confirm the well water quality complies with all approval and GCDWQ requirements.
- 4.4.3 If testing in 4.4.2 determines that the well water does not meet approval requirements, the approval holder shall implement the *Remedial Action Plan for Specific Possible Contaminants* as per 4.2.1.
- 4.4.4 If the approval holder must pump well water into the water treatment plant without first being able to obtain the well water testing results as required in 4.4.2, the approval holder shall:
- (a) immediately test the well water quality;
 - (b) report this occurrence to the Director;
 - (c) immediately provide the well water quality test results to the Director when they are received; and
 - (d) if the well water testing finds the well water does not meet approval requirements, implement the *Remedial Action Plan for Specific Possible Contaminants* as per 4.2.1.

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SECTION 4.5: FACILITY CLASSIFICATION AND CERTIFIED OPERATOR REQUIREMENTS

FACILITY CLASSIFICATION

- 4.5.1 The water treatment facility in this approval is classified as Class II, in accordance with the *Water and Wastewater Operators' Certification Guidelines*.
- 4.5.2 The water distribution system in this approval is classified as Class I, in accordance with the *Water and Wastewater Operators' Certification Guidelines*.

CERTIFIED OPERATOR

- 4.5.3 At all times, the operation of the waterworks system shall be performed by, or under the direction of, a person who holds a valid Level II (or higher) Water Treatment Operators Certificate.
- 4.5.4 At all times, the operation of the waterworks system shall be performed by, or under the direction of, a person who holds a valid Level II (or higher) Water Distribution Operators Certificate.

SECTION 4.6: POTABLE WATER QUALITY STANDARDS

- 4.6.1 All produced water shall meet the Treated Water Quality Limits specified in SCHEDULE 3.
- 4.6.2 At all times, the water treatment plant, shall achieve:
- (a) a total 4-Log reduction for viruses by chlorine disinfection;
 - (b) a total 3-Log reduction for *Giardia* by filtration and chlorine disinfection; and
 - (c) a total 2.5-log reduction for *Cryptosporidium* by filtration
- when all limit requirements of this approval are met.
- 4.6.3 In addition to compliance with the limits specified in SCHEDULE 3, the produced water shall comply with the *Potable Water Quality* requirements of the *Potable Water Regulation*, as amended, for those parameters specified in SCHEDULE 4, and any parameters added to the GCDWQ.

SECTION 4.7: CHEMICALS USED

- 4.7.1 The approval holder shall not add a substance, material or compound to water being treated to be potable unless the substance, material or compound:

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- (a) conforms to American National Standards Institute and National Sanitation Foundation ANSI/NSF Standards 60 for health effects;
- (b) is certified for potable use by an agency accredited to the requirements of ISO/IEC 9000 and ISO/IEC 14001; and
- (c) is added in a dosage that does not exceed the dosage specified as Maximum Use.

SECTION 4.8: WASTE STREAM

4.8.1 Waste streams shall be released only as follows:

- (a) filter backwash shall be discharged to the exfiltration pond;
- (b) filter-to-waste shall be discharged to the exfiltration pond;
- (c) water wasted to meet the requirements of 4.1.7 shall be discharged to the exfiltration pond;
- (d) sanitary waste streams shall be discharged to the pump out tank with ultimate disposal at an approved facility; and
- (e) any other waste stream shall be discharged as authorized in writing by the Director.

PART 5: MONITORING REQUIREMENTS

SECTION 5.1: MONITORING

5.1.1 The approval holder shall monitor the waterworks system in accordance with:

- (a) SCHEDULE 2 RAW WATER;
- (b) SCHEDULE 3 TREATED WATER QUALITY;
- (c) SCHEDULE 3A STORED RAW WATER;
- (d) SCHEDULE 3B RESERVOIR SITE GROUNDWATER;
- (e) SCHEDULE 3C WELL WATER; and
- (f) SCHEDULE 4 Table of Physical, Inorganic Chemicals, Organic Chemicals and Pesticides.

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SECTION 5.2: DATA QUALITY ASSURANCE

- 5.2.1 With respect to any monitoring required pursuant to this approval, all samples shall be:
- (a) collected;
 - (b) preserved;
 - (c) stored;
 - (d) handled; and
 - (e) analysed
- in accordance with:
- (i) the *Standard Methods for the Examination of Water and Wastewater*, published by the American Public Health Association, the American Waterworks Association and the Water Environment Federation, as amended or replaced from time to time, or
 - (ii) a method authorized in writing by the Director.
- 5.2.2 Any analysis of a sample required pursuant to this approval shall be done only in an approved laboratory or in a laboratory that complies with the Department's alternate program.
- 5.2.3 Data results of the on-line or continuous monitoring equipment must be validated to ensure that the results reflect the actual quality of the water and are not electronic or meter spikes by direct or indirect means.
- 5.2.4 Any analysis for treated water bacteriological quality required pursuant to this approval shall be conducted by the Provincial Laboratory for Public Health.

SAMPLING AND ANALYTICAL PROTOCOL FOR THE STORED WATER QUALITY MONITORING PROGRAM AND THE RESERVOIR SITE GROUNDWATER MONITORING PROGRAM

- 5.2.5 The approval holder shall:
- (a) implement; and
 - (b) maintain

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the *Sampling and Analytical Protocol* as described in the approval holder's July 23, 2008 application to the Director for authorization to implement the protocol and as authorized in writing by the Director on September 5, 2008.

- 5.2.6 The approval holder shall follow the *Sampling and Analytical Protocol* for all of the sampling and analysis carried out under the *Stored Raw Water Quality Monitoring Program* and the *Reservoir Site Groundwater Monitoring Program*.
- 5.2.7 The approval holder shall:
- (a) annually review the *Sampling and Analytical Protocol*; and
 - (b) provide to the Director with the Annual Waterworks Report, recommendations for changes to the *Sampling and Analytical Protocol*.
- 5.2.8 The approval holder shall implement the recommendations in the *Sampling and Analytical Protocol*, as directed in writing by the Director.

SECTION 5.3: SPECIAL MONITORING, REPORTING AND OTHER REQUIREMENTS

SOURCE WATER PROGRAM

- 5.3.1 The approval holder shall:
- (a) develop;
 - (b) implement; and
 - (c) maintain
- a *Source Water Program* in accordance with this approval.
- 5.3.2 The approval holder shall provide to the Director a plan for a *Source Water Program*, which shall at a minimum provide the following information:
- (a) an assessment of the source water as laid out in Section 6.1 of "From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water", Canadian Council of Ministers of the Environment, 2004;
 - (b) an inventory of the potential sources of groundwater contaminants within each of the aquifer recharge areas, as per appendix C of "From Source to Tap: Guidance on the Multi-Barrier Approach to Safe Drinking Water", Canadian Council of Ministers of the Environment, 2004;
 - (c) identification of any parties responsible for management of the potential sources of groundwater contaminants;

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- (d) identification of existing management plans that have been developed to deal with potential contaminants within the aquifer recharge areas in conjunction with any parties responsible for management of these contaminants;
- (e) identification of management plans needed to deal with potential contaminants within the aquifer recharge areas in conjunction with any parties responsible for management of these potential sources of groundwater contaminants;
- (f) how the assessment, management plans, and other results from the *Source Water Program* will be updated annually; and
- (g) how the *Source Water Program* will be adjusted to address any groundwater contaminants identified by the *Well Water Monitoring Program*, treated water quality monitoring or other relevant new information.

- 5.3.3 The approval holder shall provide the plan for the *Source Water Program* to the Director on or before June 1, 2009.
- 5.3.4 If the Director finds the plan for the *Source Water Program* deficient, the approval holder shall correct all the deficiencies as outlined in writing by the Director by the deadline specified in writing by the Director.
- 5.3.5 The approval holder shall implement the *Source Water Program* as authorized in writing by the Director.
- 5.3.6 After the Director has authorized the implementation of the *Source Water Program*, the approval holder shall submit an Annual *Source Water Program* Report to the Director that provides updated information on items 5.3.2 (a) to 5.3.2 (e).
- 5.3.7 The Annual *Source Water Program* Report shall make recommendations for any proposed changes to the program.
- 5.3.8 The approval holder shall submit the Annual *Source Water Program* Report to the Director with the Annual Waterworks Report.
- 5.3.9 The approval holder shall implement the recommended changes in the *Source Water Program* identified in 5.3.7 as authorized in writing by the Director.

WELL WATER MONITORING PROGRAM

- 5.3.10 The approval holder shall:
- (a) develop;
 - (b) implement; and

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- (c) maintain
a *Well Water Monitoring Program* in accordance with this approval.
- 5.3.11 The *Well Water Monitoring Program* shall include at a minimum the monitoring and reporting specified in SCHEDULE 3C of this approval.
- 5.3.12 The approval holder shall submit the *Well Water Monitoring Program* to the Director on or before January 1, 2009.
- 5.3.13 If the Director finds the submitted *Well Water Monitoring Program* deficient, the approval holder shall correct all the deficiencies as outlined in writing by the Director by the deadline specified in writing by the Director.
- 5.3.14 The approval holder shall implement the *Well Water Monitoring Program* as authorized in writing by the Director.
- 5.3.15 After the Director has authorized the implementation of the *Well Water Monitoring Program*, the approval holder shall submit an *Annual Well Water Monitoring Program Report* to the Director that includes, at a minimum, the following information:
- (a) all historical data collected from each well in accordance with SCHEDULE 3C;
 - (b) an analysis of the data that:
 - (i) compares the measured values to the GCDWQ and Alberta Environment Tier 1 Guidelines,
 - (ii) explains how the well water quality compares to the quality of water needed for the approval holder's water treatment to be able to produce a potable water that complies with all approval requirements, and
 - (iii) utilizes the statistical methods from the *Remedial Action Plan For Specific Possible Contaminants* to determine when further action is required;
 - (c) proposed changes to the *Well Water Monitoring Program* to address any potential contaminant sources or other information identified by the *Source Water Program*; and
 - (d) any other proposed changes to the *Well Water Monitoring Program*.
- 5.3.16 The approval holder shall submit the *Annual Well Water Monitoring Program Report* to the Director with the *Annual Waterworks Report*.

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5.3.17 The approval holder shall implement the proposed changes to the *Well Water Monitoring Program* identified in 5.3.15 (c) and (d), as required in writing by the Director.

STORED RAW WATER QUALITY MONITORING PROGRAM

5.3.18 The approval holder shall:

- (a) implement; and
- (b) maintain

the *Stored Raw Water Quality Monitoring Program* as described in the approval holder's July 23, 2008 application to the Director for authorization to implement the program and as authorized in writing by the Director on September 5, 2008.

5.3.19 The approval holder shall:

- (a) by February 15, 2009; or
- (b) prior to water from the stored raw water reservoir being directed to the water treatment plant

whichever occurs first, provide to the Director a report that includes, at a minimum:

- (i) all of the data collected in accordance with SCHEDULE 3A, and
- (ii) an analysis of the data collected.

5.3.20 The approval holder shall submit an *Annual Stored Raw Water Quality Monitoring Program Report* and an *Interim Stored Raw Water Quality Monitoring Program Report* to the Director that includes, at a minimum, the following updated information:

- (a) all of the data collected in accordance with:
 - (i) condition 5.1.1, and
 - (ii) SCHEDULE 3A;
- (b) an interpretation of that data that:
 - (i) compares the measured values to GCDWQ and Alberta Environment Tier 1 Guidelines,

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- (ii) explains how the stored water quality compares to the quality of water needed for the approval holder's water treatment plant to be able to produce a potable water that complies with all approval requirements, and
 - (iii) utilizes the statistical methods from the *Remedial Action Plan For Specific Possible Contaminants* to determine when further action is required;
- (c) any proposed changes to the *Stored Raw Water Quality Monitoring Program* based on the:
- (i) actual stored raw water reservoir liner permeability measured in the field,
 - (ii) noted trends in the stored raw water quality data, and
 - (iii) results from the *Reservoir Site Groundwater Monitoring Program* and *Well Water Monitoring Program*.

5.3.21 The approval holder shall submit:

- (a) the *Annual Stored Raw Water Quality Monitoring Program Report* to the Director with the *Annual Waterworks Report*; and
- (b) the *Interim Stored Raw Water Quality Monitoring Program Report* to the Director with the *Interim Annual Waterworks Report*.

5.3.22 The approval holder shall implement the proposed changes to the *Stored Raw Water Quality Monitoring Program* as per 5.3.20 (c) as authorized in writing by the Director.

5.3.23 The approval holder shall continue the sampling, analysis and reporting of data under the *Stored Raw Water Quality Monitoring Program* even in the event that water from the stored raw water reservoir is not being used by the approval holder.

RESERVOIR SITE GROUNDWATER MONITORING PROGRAM

5.3.24 The approval holder shall:

- (a) implement; and
- (b) maintain

the *Reservoir Site Groundwater Monitoring Program* as described in the approval holder's July 23, 2008 application to the Director for authorization to implement the program and as authorized in writing by the Director on September 5, 2008.

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5.3.25 The approval holder shall:

- (a) by February 15, 2009; or
- (b) prior to water from the stored raw water reservoir being directed to the water treatment plant

whichever occurs first, provide to the Director a report that includes, at a minimum:

- (i) all of the data collected in accordance with 5.1.1 and SCHEDULE 3B of this approval, and
- (ii) an interpretation of the collected data as per 5.3.26 (b).

5.3.26 The Annual *Reservoir Site Groundwater Monitoring Program Report* and the Interim Annual *Reservoir Site Groundwater Monitoring Program Report* shall provide, at a minimum:

- (a) all of the data collected in accordance with 5.1.1 and SCHEDULE 3B of this approval since the start of the program;
- (b) an interpretation of the data that:
 - (i) compares the measured values to GCDWQ and Alberta Environment Tier 1 Guidelines,
 - (ii) establishes groundwater flow patterns, and
 - (iii) determines groundwater level trends;
- (c) an evaluation of monitoring well performance after any well development activities;
- (d) utilizes the statistical methods from the *Remedial Action Plan For Specific Possible Contaminants* to determine when further action is required; and
- (e) a proposal for changes to the *Reservoir Site Groundwater Monitoring Program* to make it more effective based on the actual stored raw water reservoir liner permeability as measured in the field and other factors.

5.3.27 The approval holder shall submit to the Director:

- (a) the Annual *Reservoir Site Groundwater Monitoring Program Report* with the Annual Waterworks Report; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- (b) the Interim Annual *Reservoir Site Groundwater Monitoring Program* Report with the Interim Annual Waterworks Report.
- 5.3.28 The approval holder shall continue the sampling, analysis, and reporting of data under the *Reservoir Site Groundwater Monitoring Program* even in the event that water from the stored raw water reservoir is not being used by the approval holder.
- 5.3.29 The approval holder shall implement the changes to the *Reservoir Site Groundwater Monitoring Program* proposed in 5.3.26 (e) as required in writing by the Director.

REMEDIAL ACTION PLAN FOR SPECIFIC POSSIBLE CONTAMINANTS

- 5.3.30 The approval holder shall:
- (a) implement; and
 - (b) maintain
- the *Remedial Action Plan for Specific Possible Contaminants*.
- 5.3.31 If the Director finds the *Remedial Action Plan for Specific Possible Contaminants* as submitted to the Director on September 26, 2008 deficient, the approval holder shall correct all the deficiencies as outlined in writing by the Director by the deadline specified in writing by the Director.
- 5.3.32 The approval holder shall implement the *Remedial Action Plan for Specific Possible Contaminants* as authorized in writing by the Director.
- 5.3.33 After the Director has authorized the implementation of the *Remedial Action Plan for Specific Possible Contaminants*, the approval holder shall submit to the Director in the Annual Waterworks Report a *Remedial Action Plan For Specific Possible Contaminants* Annual Report that provides:
- (a) a summary of the actions taken during the year as part of the *Remedial Action Plan for Specific Possible Contaminants*; and
 - (b) proposal for changes to the *Remedial Action Plan For Specific Possible Contaminants* to make it more effective.
- 5.3.34 The approval holder shall implement the changes to the *Remedial Action Plan for Specific Possible Contaminants* proposed in 5.3.33 (b) as authorized in writing by the Director.

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APPROVAL HOLDER CONTACT AND COMPLAINT FOLLOW-UP PROGRAM

5.3.35 The approval holder shall:

- (a) provide to all users of the potable water produced by the approval holder, the contact name(s) and telephone numbers of the approval holder or representative(s);
- (b) investigate all written complaints accepted by the Director relating to the activities carried out pursuant to this approval; and
- (c) provide a written report to the Director, within a time specified in writing by the Director, detailing the results of the investigation relating to the complaint accepted by the Director including:
 - (i) any steps taken to remediate or mitigate the impact(s) identified in the investigation, and
 - (ii) any other information required by the Director.

5.3.36 The approval holder shall submit to the Director in the Annual Waterworks Report a summary of the:

- (a) written complaints investigated; and
- (b) steps taken, if any, to remediate or mitigate the impact(s) identified in the investigation.

PART 6: REPORTING REQUIREMENTS

SECTION 6.1: CONTRAVENTION REPORTING

6.1.1 In addition to any other reporting required pursuant to this approval, the Act, or the regulations, the approval holder shall immediately report to the Director any contravention of this approval, either:

- (a) by telephone at 1-780-422-4505; or
- (b) by a method:
 - (i) in compliance with the release reporting provisions in the Act and the regulations, or
 - (ii) as authorized in writing by the Director.

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6.1.2 In addition to any other reporting required pursuant to this approval, the Act, or the regulations, the approval holder shall immediately report to the Director by a method specified in 6.1.1, any structural or equipment malfunction in the waterworks system that may affect the quality or supply of potable water.

6.1.3 In addition to the immediate reporting in 6.1.1, the approval holder shall provide a report to the Director:

- (a) in writing; or
- (b) by a method:
 - (i) in compliance with the release reporting provisions in the Act and the regulations, or
 - (ii) as authorized in writing by the Director

within seven (7) calendar days after the discovery of the contravention, or within another time period specified in writing by the Director, unless the requirement for the report is waived by the Director.

6.1.4 The report required in 6.1.3 shall contain, at a minimum, the following information:

- (a) a description of the contravention;
- (b) the date of the contravention;
- (c) the duration of the contravention;
- (d) the legal land description of the location of the contravention;
- (e) an explanation as to why the contravention occurred;
- (f) a summary of all preventive measures and actions that were taken prior to the contravention;
- (g) a summary of all measures and actions that were taken to mitigate any effects of the contravention;
- (h) a summary of all measures that will be taken to address any remaining effects and potential effects related to the contravention;
- (i) the number of the approval issued under the Act for the waterworks system, and the name of the approval holder who held the approval at the time the contravention occurred;

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- (j) the name, address, phone number and responsibilities of all persons operating the waterworks system at the time the contravention occurred;
- (k) the name, address, phone number and responsibilities of all persons who had charge, management or control of the waterworks system at the time that the contravention occurred;
- (l) a summary of proposed measures that will prevent future contraventions, including a schedule of implementation for these measures;
- (m) any information that was maintained or recorded under this approval, as a result of the incident; and
- (n) any other information required by the Director in writing.

6.1.5 Where a sample does not meet one or more of the bacteriological quality limits in SCHEDULE 3, in addition to any reporting or other requirements pursuant to the Act, or the Regulations, the approval holder shall carry out the corrective actions set out in the *Communication and Action Protocol for Failed Bacteriological Results in Drinking Water for Waterworks Systems Authorized under the Environmental Protection and Enhancement Act*, entered into by Alberta Environment, the Alberta Provincial Laboratory for Public Health, and Alberta Health and Wellness, as amended.

SECTION 6.2: MONTHLY REPORTING

6.2.1 The approval holder shall compile and retain monthly reports at the water treatment plant.

6.2.2 The monthly report in 6.2.1 shall include, at a minimum:

- (a) the name, telephone and fax numbers of all certified operators;
- (b) the analytical results for all parameters required to be monitored in accordance with this approval during the month;
- (c) the locations of all sampling performed during the month in accordance with this approval;
- (d) the name and manufacturer of all treatment chemicals added during the month, and each manufacturer as listed by the certified agency that tested the chemical to ANSI/NSF Standards 60 for health effects;
- (e) the results of all approval required monitoring and measurements conducted during the month in accordance with this approval; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- (f) a description of any problems experienced, and corrective actions taken at the waterworks system during the month, including all actions taken as per 4.1.6 through 4.2.3.

SECTION 6.3: ANNUAL WATERWORKS REPORT

- 6.3.1 In addition to any other reporting required under the Act, the regulations and this approval, the approval holder shall compile an annual report and submit to the Director, by February 28 of the year following the calendar year in which the information on which the report is based was collected.
- 6.3.2 The annual report in 6.3.1 shall contain, at a minimum, all of the following information:
 - (a) a summary of the monthly reports, specifying the monthly minimum, average, and maximum results for each parameter monitored, excluding bacteriological results, for each month;
 - (b) a summary of the number, sampling dates and analytical results of the bacteriological samples analyzed for each month;
 - (c) the results of any other compliance monitoring done during the year pursuant to this approval, that was not included in any monthly report;
 - (d) recommendations for changes to the *Sampling and Analytical Protocol*;
 - (e) the *Annual Source Water Program Report*;
 - (f) the *Annual Well Water Monitoring Program Report*;
 - (g) the *Annual Stored Raw Water Quality Monitoring Program Report*;
 - (h) the *Reservoir Site Groundwater Monitoring Program Report*;
 - (i) the *Remedial Action Plan for Specific Possible Contaminants Annual Report*;
 - (j) the risk assessment of the waterworks system as per 3.1.7 and 3.1.8;
 - (k) a summary of the written complaints investigated and steps taken, if any, to remediate or mitigate the impact(s) identified in the investigation as part of the *Approval Holder Contact and Complaint Follow-Up Program*;
 - (l) a description of any problems experienced, and corrective actions taken at the waterworks system during the year; and
 - (m) any changes to the *Operations Program*.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

SECTION 6.4: INTERIM ANNUAL WATERWORKS REPORT

- 6.4.1 On or before August 28 each year, in addition to any other reporting required under the Act, the regulations and this approval, the approval holder shall submit to the Director an Interim Annual Waterworks Report that covers the period from January 1 to June 30th of that year.
- 6.4.2 The Interim Annual Waterworks Report shall contain, at a minimum, all of the following information:
 - (a) the Interim *Stored Raw Water Quality Monitoring Program* Report; and
 - (b) the Interim *Reservoir Site Groundwater Monitoring Program* Report.

SECTION 6.5: ELECTRONIC REPORTING

- 6.5.1 The Director may, by notice in writing, require the approval holder to submit periodic reports:
 - (a) in an electronic format; and
 - (b) with the following frequency:
 - (i) monthly, to the Director on or before the end of the month following the month in which the information on which the report is based was collected,
 - (ii) annually, to the Director on or before February 28 of the year following the year in which the information on which the report is based was collected, or
 - (iii) as specified by the Director.
- 6.5.2 The approval holder who receives a notice as specified in section 6.5.1 shall comply with the notice.

PART 7: RECORD KEEPING REQUIREMENTS

SECTION 7.1: GENERAL

- 7.1.1 The approval holder shall:
 - (a) record the following information; and
 - (b) maintain and retain the following records for five (5) years from the date the record was created:

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- (i) bacteriological analysis results,
- (ii) daily records, including but not limited to:
 - (A) flow meter readings;
 - (B) chlorine concentrations;
 - (C) treatment chemical dosages;
 - (D) all the requirements of SCHEDULE 3 specific to daily monitoring required under this approval; and
 - (E) the requirements of SCHEDULE 3A, 3B, and 3C;
- (iii) all monthly reports required under this approval, and
- (iv) records of action taken by the approval holder to correct contraventions of potable water quality limits, including the following information for each contravention:
 - (A) name and address of the person who discovered the contravention; and
 - (B) copies of all notifications to the public.

7.1.2 The approval holder shall retain the following records for the life of the waterworks system:

- (a) the *Operations Program*;
- (b) copies of all:
 - (i) applications submitted to the Department for an approval regarding the waterworks system and correspondence related to the approval,
 - (ii) engineering drawings and specifications,
 - (iii) project reports,
 - (iv) construction documents,
 - (v) as-built drawings,
 - (vi) reports of inspections conducted by the Department,

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- (vii) correspondence and written notifications sent to the Department regarding a proposed extension of a water distribution system, replacement of a portion of a water distribution system, expansion or modification of potable water storage within the water distribution system,
 - (viii) approvals issued under the Act for the waterworks system,
 - (ix) annual reports,
 - (x) reports prepared pursuant to sections 6.1.3 and 6.1.4; and
- (c) all physical, organic and inorganic chemical and pesticide analytical results required pursuant to this approval, excluding daily monitoring.
- 7.1.3 The results and records in sections 7.1.1(b) shall contain, at a minimum, all of the following information:
- (a) the date, location and time of monitoring, and the name of the person collecting the sample;
 - (b) identification of the sample type, including, but not limited to, whether the sample is taken as required in the approval, a repeat sample, a source or potable water sample, or other special purpose sample;
 - (c) date of analysis;
 - (d) laboratory name and person responsible for performing analysis;
 - (e) the analytical method used; and
 - (f) the results of the analysis.
- 7.1.4 The approval holder shall immediately provide any records, reports or data required under this approval to the Director or an inspector, upon request.

PART 8: RECLAMATION REQUIREMENTS**SECTION 8.1: GENERAL**

- 8.1.1 Where the land surface has been disturbed during construction, expansion, modification or repair of any portion of a waterworks system, reclamation of the land surface to equivalent land capability shall be performed following the construction, expansion, modification or repair, in accordance with the Standards and Guidelines Document.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

- 8.1.2 Within six months after the waterworks system, or a portion of the waterworks system, permanently ceases operation, the approval holder shall submit a reclamation plan to the Director for the portion of the system that is no longer in operation.
- 8.1.3 The approval holder shall not commence reclamation of the waterworks system until that person has received an amendment to this approval from the Director for the reclamation.

DATED September 30, 2008



DESIGNATED DIRECTOR UNDER THE ACT
KEVIN WILKINSON

SCHEDULE 1

OPERATIONS PROGRAM

1. Routine Operational Procedures, which shall, at a minimum, include:
 - a. contact name and telephone numbers for the system owner, system operator, engineering consultants and equipment suppliers;
 - b. operating instructions:
 - i. general description of treatment process and operating procedures,
 - ii. performance requirements, and
 - iii. location of equipment major controls;
 - c. general maintenance schedule;
 - d. general maintenance instructions for:
 - i. treatment / process equipment,
 - ii. monitoring equipment, and
 - iii. pumping equipment;
 - e. the schedule and procedures for cleaning and flushing of the water distribution system, including potable water storage reservoirs; and
 - f. how water users will be notified in the event that water consumption must be stopped or reduced.

2. Routine Operational Procedures for Monitoring and Analysis, which shall, at a minimum, include:
 - a. operational and compliance tests to be performed;
 - b. bacteriological quality monitoring plan;
 - c. methods used for monitoring and analysis;
 - d. locations of monitoring points; and
 - e. laboratory data quality assurance information.

3. Emergency Response Plan, which shall, at a minimum, include steps to be taken in the event of the following:
 - a. bacteriological results exceeding the prescribed limits;
 - b. turbidity exceeding the limits;
 - c. chemical overfeed;
 - d. no chemical or coagulant feed;

SCHEDULE 1

OPERATIONS PROGRAM

- e. low chlorine residual;
 - f. equipment breakdown;
 - g. flood;
 - h. water well(s) become un-useable;
 - i. water distribution system pipeline break and repair, and the return of the pipeline to service;
 - j. power failure;
 - k. the waterworks system becoming inoperable, including steps in providing an alternate potable water supply;
 - l. cover-off in the event that the Certified Operator is not available to operate the system;
 - m. list of contacts; Alberta Environment, Alberta Health, Regional Health Authorities, Fire Department, Disaster Coordinator, and other agencies; and
 - n. date of last update.
4. Copy of the as-built drawings.

SCHEDULE 2 – RAW WATER

Monitoring, Measuring and Reporting Frequency Requirements

PARAMETER	STATION LOCATION	MONITORING TYPE and FREQUENCY	REPORTING FREQUENCY
Turbidity	RAW WATER ENTERING THE WATER TREATMENT PLANT	Grab sample, Once per day (before completion of construction as per 3.2.1) Continuous monitoring and recording at ≤ 5 minute sampling intervals report daily maximum (after completion of construction as per 3.2.1)	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4
Volume		Metered, Once per day Reported as Total in m ³	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4
pH		Grab Sample Once per day	Reported Monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
RAPID SAND FILTER - Treated Water TURBIDITY					
Turbidity	INDIVIDUAL FILTER TRAIN #1 (after Individual filter train at a point upstream of the clear water tank)	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Report MAXIMUM DAILY value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	<0.3 NTU, at least 99% of the samples on a daily basis; and <1.0 NTU, 100% of the time
			Report number of cumulative minutes per day the turbidity was between 0.3 and 1.0 NTU.	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	
Turbidity	INDIVIDUAL FILTER TRAIN #2 (after Individual filter train at a point upstream of the clear water tank)	Continuous monitoring and recording at ≤ 5 minute sampling intervals	Report MAXIMUM DAILY value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	<0.3 NTU, at least 99% of the samples on a daily basis; and <1.0 NTU, 100% of the time

SCHEDULE 3 – TREATED WATER QUALITY
Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Turbidity			Report number of cumulative minutes per day the turbidity was between 0.3 and 1.0 NTU.	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	
Treated Water DISINFECTION					
Chlorine Residual – Free	ENTERING DISTRIBUTION SYSTEM (where “C” is measured for log reduction of <i>Giardia</i> prior to entering distribution system)	Grab, once per day (before completion of construction as per 3.2.1) Continuous monitoring and recording at ≤ 5 minute sampling intervals (after completion of construction as per 3.2.1)	Once per day (before completion of construction as per 3.2.1) Daily maximum and minimum (after completion of construction as per 3.2.1)	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	≥ 0.2 mg/L as Free Chlorine and ≤ 3.0 mg/L Free Chlorine
Treated Water DISINFECTION					
CT _{required}	ENTERING DISTRIBUTION SYSTEM	Calculated Once per day	Daily values	Reported monthly As per Part 6 of the approval,	

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
CT _{lowest actual}				unless notified in writing by the Director as per Section 6.4	
CT performance ratio <i>Giardia</i>	ENTERING DISTRIBUTION SYSTEM	Calculated Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	≥ 1 except for one day per month, which can be less than 1, but must be > 0.9
CT performance ratio Viruses	ENTERING DISTRIBUTION SYSTEM	Calculated Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	≥ 1 except for one day per month, which can be less than 1, but must be > 0.9
Volume	CLEARWELL RESERVOIR	Calculated Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Flow	ENTERING DISTRIBUTION SYSTEM	Continuous	MAXIMUM hourly flow in L/Min Recorded Once per day	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	
pH	ENTERING DISTRIBUTION SYSTEM	Grab Sample Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	6.5 -8.5 pH
Temperature	ENTERING DISTRIBUTION SYSTEM	Grab Sample Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
<i>Treated Water DISINFECTION</i>					
Chlorine Residual – Free, Combined or Total	DISTRIBUTION: RANDOM LOCATIONS	Grab sample Once per day	Daily value	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	≥ 0.1 mg/L, based on 75% of the samples taken on a particular day
<i>Treated Water BACTERIOLOGICAL</i>					
Microbiological quality <i>E.coli</i> Total Coliforms	DISTRIBUTION: BACTERIOLOGICAL, RANDOM LOCATIONS	Grab samples in the quantity specified in the GCDWQ, and the samples shall be taken at regular intervals throughout the month	Number of Grab samples taken per month and Presence or Absence of indicator organisms	Reported monthly As per Sections 6.2, 6.3 and 6.4 of the approval	Zero <i>E. coli</i> organisms per 100 mL Zero Total coliform organisms per 100 mL

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
<i>Treated Water</i>					
Total Trihalomethanes (TTHM) and Bromodichloromethane (BDCM)	4 Grab samples every three month distributed as per the following and the samples are to be taken within a 24 hour period		Analytical Results	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	As per the PWR
	ENTERING DISTRIBUTION SYSTEM	1 Grab sample every 3 months			
	DISTRIBUTION: RANDOM LOCATIONS	2 Grab samples every 3 months			
	DISTRIBUTION: EXTREME END	1 Grab sample every 3 months			
Total Trihalomethanes (TTHM) and Bromodichloromethane (BDCM)	If and only if the TTHM results from the same location (based on running annual average from the previous 12 months), and the BDCM results (based on any single result) are less than the respective GCDWQ MAC, subsequent monitoring shall be conducted, at a minimum, in the following manner:		Analytical Results	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	As per the PWR
	DISTRIBUTION: EXTREME END	1 Grab sample every 3 months			

SCHEDULE 3 – TREATED WATER QUALITY

Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
<i>Treated Water</i>					
The physical, inorganic and organic chemical and pesticide parameters listed in SCHEDULE 4, and any new parameters with MAC's published in the GCDWQ	DISTRIBUTION: RANDOM LOCATIONS	2 Grab samples per annum One during winter (December to February); and One during summer (June to August)	Analytical Results	Reported monthly As per Part 6 of the approval, unless notified in writing by the Director as per Section 6.4	As per the PWR

**SCHEDULE 3A
STORED RAW WATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Physical parameters Color, pH, Total Dissolved Solids, Turbidity	EACH STORED RAW WATER RESERVOIR CELL THAT PROVIDES WATER DIRECT TO THE WATER TREATMENT PLANT IN THAT MONTH	Grab One per Month	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	GCDWQ
Routine Parameters Bicarbonate, Calcium, Carbonate, Chloride, Conductivity, Fluoride, Hydroxide, Iron, Magnesium, Manganese, Nitrate, Nitrite, Potassium, Sodium, Sulphate, Total Alkalinity, Total Dissolved Solids, Total Hardness, Total Kjeldahl Nitrogen, Total Organic Carbon	EACH STORED RAW WATER RESERVOIR CELL THAT PROVIDES WATER DIRECT TO THE WATER TREATMENT PLANT IN THAT MONTH	Grab One per Month	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	
Dissolved Metals Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Chromium, Cobalt, Copper, Cyanide, Fluoride, Iron, Lead, Magnesium, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc	EACH STORED RAW WATER RESERVOIR CELL THAT PROVIDES WATER DIRECT TO THE WATER TREATMENT PLANT IN THAT MONTH	Grab One per Month	Analytical Results and analysis of results Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	

**SCHEDULE 3A
STORED RAW WATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes Petroleum Hydrocarbon Fractions F1 and F2	EACH STORED RAW WATER RESERVOIR CELL THAT PROVIDES WATER DIRECT TO THE WATER TREATMENT PLANT IN THAT MONTH	Grab One per Month	Analytical Results and analysis of results Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines
PAHs Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, Naphthalene, Phenanthrene, Pyrene <u>Carcinogenic</u> Benzo(a)anthracene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-c,d)pyrene	EACH STORED RAW WATER RESERVOIR CELL THAT PROVIDES WATER DIRECT TO THE WATER TREATMENT PLANT IN THAT MONTH	Grab One per Month	Analytical Results and analysis of results Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines

**SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
Water Level Measurements	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Weekly unless otherwise authorized by the Director in writing	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks	
Water Flow Measurement	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Monthly	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	
Physical Parameters Color, pH, Total Dissolved Solids, Turbidity	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Grab Every 2 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report.	GCDWQ

**SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
Physical Parameters Color, pH, Total Dissolved Solids, Turbidity	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Every 4 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	GCDWQ
Routine Parameters Bicarbonate, Calcium, Carbonate, Chloride, Conductivity, Fluoride, Hydroxide, Iron, Magnesium, Manganese, Nitrate, Nitrite, Potassium, Sodium, Sulphate, Total Alkalinity, Total Dissolved Solids, Total Hardness, Total Kjeldahl Nitrogen, Total Organic Carbon, Turbidity	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Grab Every 2 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	GCDWQ
	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Every 4 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	

SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
Dissolved Metals Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Chromium, Cobalt, Copper, Cyanide, Fluoride, Iron, Lead, Magnesium, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Grab Every 2 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	GCDWQ
	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Every 4 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	
Hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes, Petroleum Hydrocarbon Fractions F1 and F2	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Grab Every 2 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines

**SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
Hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes Petroleum Hydrocarbon Fractions F1 and F2	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Every 4 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines
PAHs Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, Napthalene, Phenanthrene, Pyrene <i>Carcinogenic</i> Benzo(a)anthracene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-c,d)pyrene	TVR-1.1, TVR-1.2, TVR-1.3, TVR-1.4, TVR-2.1, TVR-2.2, TVR-2.3, TVR-2.4, TVR-3.1, TVR-3.2, TVR-3.3, TVR-4.1, TVR-4.2, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.2, TVR-5.3, TVR-5.4	Grab Every 2 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines

**SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
PAHs Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, Napthalene, Phenanthrene, Pyrene <i>Carcinogenic</i> Benzo(a)anthracene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-c,d)pyrene	DEEP GROUNDWATER INTERCEPTOR PIPE DISCHARGE and SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Every 4 months	Analytical Results and analysis of results	Annual Waterworks Report and Interim Annual Waterworks Report	Alberta Environment Tier 1 Guidelines
PCBs Polychlorinated Biphenyls	TVR-1.3, TVR-2.1, TVR-5.1	One time prior to reservoir use	Analytical Results and analysis of results	Annual Waterworks Report and in an Annual Interim Waterworks Report	Alberta Environment Tier 1 Guidelines
	SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab Monthly for the 2 months immediately following the date of this Ministerial Order	Analytical Results and analysis of results	Annual Waterworks Report and in an Annual Interim Waterworks Report	

**SCHEDULE 3B
RESERVOIR SITE GROUNDWATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
GROUNDWATER					
Naturally Occurring Radioactive Material (NORMs)	TVR-1.1, TVR-1.2, TVR-1.3, TVR-2.1, TVR-2.3, TVR-3.1, TVR-3.2, TVR-4.1, TVR-4.3, TVR-4.4, TVR-5.1, TVR-5.3	Grab One time prior to reservoir use	Analytical Results and analysis of results	Annual Waterworks Report and in an Annual Interim Waterworks Report	GCDWQ
	SHALLOW GROUNDWATER INTERCEPTOR PIPE DISCHARGE	Grab One time prior to reservoir use	Analytical Results and analysis of results	Annual Waterworks Report and in an Annual Interim Waterworks Report	

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**SCHEDULE 3C
WELL WATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Physical parameters Color, pH, Total Dissolved Solids, Turbidity	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once every six months or Once per month if well water pumped from the well into the water treatment plant at any time during that month	Analytical Results and analysis of results	Annual Waterworks Report	GCDWQ
Routine Parameters Bicarbonate, Calcium, Carbonate, Chloride, Conductivity, Fluoride, Hydroxide, Iron, Magnesium, Manganese, Nitrate, Nitrite, Potassium, Sodium, Sulphate, Total Alkalinity, Total Dissolved Solids, Total Hardness, Total Kjeldahl Nitrogen, Total Organic Carbon Turbidity	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once every six months or Once per month if well water pumped from the well into the water treatment plant at any time during that month	Analytical Results and analysis of results	Annual Waterworks Report	GCDWQ
Metals Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Chromium, Cobalt, Copper, Cyanide, Fluoride, Iron, Lead, Magnesium, Mercury, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once every six months or Once per month if well water pumped from the well into the water treatment plant at any time during that month	Analytical Results and analysis of results	Annual Waterworks Report	GCDWQ

**SCHEDULE 3C
WELL WATER
Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes, Petroleum Hydrocarbon Fractions F1 and F2	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once every six months or Once per month if well water pumped from the well into the water treatment plant at any time during that month	Analytical Results and analysis of results	Annual Waterworks Report	Alberta Environment Tier 1 Guidelines
PAHs Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, Naphthalene, Phenanthrene, Pyrene <u>Carcinogenic</u> Benzo(a)anthracene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-c,d)pyrene	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once every six months or Once per month if well water pumped from the well into the water treatment plant at any time during that month	Analytical Results and analysis of results	Annual Waterworks Report	Alberta Environment Tier 1 Guidelines
Polychlorinated Biphenyls PCBs	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once	Analytical Results and analysis of results	Annual Waterworks Report	Alberta Environment Tier 1 Guidelines

**SCHEDULE 3C
 WELL WATER
 Limits, Monitoring and Reporting Frequency**

PARAMETER	STATION LOCATION	MONITORING/MEASUREMENT TYPE, NUMBER AND FREQUENCY	REPORTING CONTENT	REPORTING FREQUENCY	QUALITY LIMITS
Naturally Occurring Radioactive Material (NORMs)	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once	Analytical Results and analysis of results	Annual Waterworks Report	GCDWQ
Petroleum Hydrocarbon Fractions F3 and F4	EACH WATER WELL THAT IS USED TO SUPPLY WATER AT ANY TIME DURING THE YEAR	Grab Once	Analytical Results and analysis of results	Annual Waterworks Report	

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SCHEDULE 4
Table of Physical, Inorganic chemicals, Organic chemicals and Pesticides

Substance	Specific Parameter	Substance	Specific Parameter
Physical Parameters (Primary and Secondary)	Colour; pH; Total Dissolved Solids;	Organic Chemicals and Pesticides (Primary)	Atrazine + metabolites; Benzene; Benzo(a)pyrene; Bromoxynil; Carbon Tetrachloride; Chlorpyrifos; Cyanazine; Cyanobacterial toxins (as Microcystin – LR); Diazinon; Dicamba; 1,2-Dichlorobenzene; 1,4-Dichlorobenzene; 1,2-Dichlorethane; Dichloromethane; 2,4-Dichlorophenol; 2,4-D; Diclofop-methyl; Diuron; Dimethoate; Ethylbenzene; Glyphosate; Malathion; Methoxychlor; Metolachlor; Metribuzin; Monochlorobenzene; Nitrilotriacetic Acid (NTA); Pentachlorophenol; Picloram; Simazine; Terbufos; Tetrachloroethylene; 2,3,4,6-Tetrachlorophenol; Toluene; Triallate; Trichloroethylene; 2,4,6-Trichlorophenol; Trifluralin; and Vinyl Chloride.
Inorganic chemicals (Primary)	Antimony; Arsenic; Barium; Boron; Bromate; Cadmium; Chloramines; Chromium; Cyanide; Fluoride; Lead; Mercury; Nitrate; Nitrite; Selenium; and Uranium;		
Inorganic and Organic Chemicals (Secondary)	Aluminum; Ammonia; Calcium; Chloride; Copper; Total Hardness; Iron; Magnesium; Manganese; Silver; Sodium; Sulphate; Sulphide; Total Organic Carbon; Xylenes (total); and Zinc;		

SCHEDULE 4

Table of Physical, Inorganic chemicals, Organic chemicals and Pesticides

Substance	Specific Parameter	Substance	Specific Parameter
ADDITIONAL SUBSTANCES TO BE MONITORED IF THESE ARE DETECTED AT ABOVE DETECTION METHOD LIMITS IN THE STORED RAW WATER OR WELL WATER PUMPED DIRECT TO THE WATER TREATMENT PLANT			
PAHs	Acenaphthene, Acenaphthylene, Anthracene, Fluoranthene, Fluorene, Napthalene, Phenanthrene, Pyrene <u>Carcinogenic</u> Benzo(a)anthracene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenzo(a,h)anthracene, Ideno(1,2,3-c,d)pyrene	Hydrocarbons	Petroleum Hydrocarbon Fractions F1 and F2