



APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT S.A. 1992, c.E-13.3, as amended.

APPROVAL NO. 928-02-00

APPLICATION NO. 002-928

EFFECTIVE DATE December 22, 1999

EXPIRY DATE December 1, 2009

APPROVAL HOLDER..... City of Lethbridge

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Pursuant to Part 2, Division 2, of the Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3, as amended, approval is granted to the approval holder subject to the attached terms and conditions for the following activity:

Construction, operation and reclamation of a Class IV water treatment plant and a Class IV water distribution system for the City of Lethbridge.

Date Signed December 22, 1999

Designated Director under the Act

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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, S.A. 1992, c.E-13.3, as amended;
 - (b) "application" means the written submissions to the Director in respect of application number 002-928 and any subsequent applications for amendments of approval number 928-02-00;
 - (c) "chemical" means any substance that is added or used as part of the treatment process;
 - (d) "confluent growth" means an overgrowth of bacteria in a bacterial examination such that an exact determination of coliform number can not be made;
 - (e) "continuous monitoring" means sampling or flow measurement through equipment that creates an uninterrupted output of the analysis or flow measurement;
 - (f) "daily concentration" means the determination of the concentration of a water substance or parameter in any sample by procedures authorized in this approval, and if more than one sample is collected and analysed per day, the arithmetic average of their analytical results shall be considered as the daily concentration;
 - (g) "day" means any sampling period of 24 consecutive hours;
 - (h) "decommissioning" means the closing, dismantling, clean up or remediation of contamination undertaken subsequent to the termination or abandonment of any activity or any part of any activity authorized by this approval;
 - (i) "Director" means the Director of Alberta Environment responsible for issuing approvals or authorizations for waterworks, wastewater and storm drainage systems defined under Alberta Regulation 119/93, 120/93 and 122/93;
 - (j) "grab sample" means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

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- (k) "independent laboratory" means a laboratory with documented quality assurance and quality control programs, including participation in inter-laboratory studies;
- (l) "log removal" means the logarithm of the percent removal or inactivation of *Giardia* cysts as calculated by:

Log removal = log removal by physical treatment+log removal by disinfection where log removal by physical treatment = 2.5, or as demonstrated by particle counting, and

log removal by disinfection = removal by free chlorine + removal by combined chlorine, which shall be calculated as defined by the *UNITED STATES ENVIRONMENTAL PROTECTION AGENCY FEDERAL REGISTRY*, Volume 52, No. 212, November 1987, section 141.74(b)(3) and (4);
- (m) "mg/L" means milligrams per litre;
- (n) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines and other installations, and includes the land, located within the municipal boundaries of the City of Lethbridge and including the NE ¼ of Section 25, Township 8, Range 22, West of the 4th Meridian and the SE ¼ of Section 36, Township 8, Range 22, West of the 4th Meridian that is being or has been used or held for or in connection with the Lethbridge water treatment plant;
- (o) "Regional Engineer" means the Regional Engineer of the regional office of Alberta Environment;
- (p) "regulations" means the regulations issued pursuant to the Act and as amended;
- (q) "week" means any consecutive 7-day period;
- (r) "year" means calendar year;
- (s) "≤" means less than or equal to; and
- (t) "≥" means greater than or equal to.

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PART 2: GENERAL

SECTION 2.1: GENERAL

- 2.1.1 The approval holder shall immediately report by telephone any contravention of the terms and conditions of this approval to the Director at 1-780-422-4505.
- 2.1.2 The approval holder shall submit an application for renewal to the Director a minimum of five months prior to the approval expiry date or otherwise as specified in writing by the Director.
- 2.1.3 Any conflict between the application or any document and the terms and conditions of this approval shall be resolved in favour of the approval.
- 2.1.4 The terms and conditions of this approval do not affect any rights or obligations created under any other approval issued by Alberta Environment.
- 2.1.5 The mention of trade names, commercial products or named technologies in this approval does not constitute an endorsement or recommendation by Her Majesty the Queen in Right of Alberta, her employees, agents and the Director for general use.
- 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 The approval holder shall notify the Director in writing within 30 days of all changes in the corporate status of the approval holder.
- 2.1.8 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.
- 2.1.9 All abbreviations used in this approval follow those given in *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, as amended, unless otherwise specified in this approval.
- 2.1.10 The approval holder shall notify the Director in writing within 30 days of operations ceasing permanently.
- 2.1.11 Environmental Protection and Enhancement Act Approval No 94-MUN-087 is cancelled.

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SECTION 2.2: RECORD KEEPING

- 2.2.1 The approval holder shall record and retain all the following information for a minimum of ten years:
- (a) the names and addresses of all persons who discover any contravention of the Act, the regulations or this approval;
 - (b) the names and addresses of all persons who take any remedial action arising from the contravention of the Act, the regulations or this approval;
 - (c) the names and addresses of all persons notified or contacted with regard to any approval contravention; and
 - (d) a detailed description of the remedial measures taken in respect of a contravention of the Act, the regulations or this approval.
- 2.2.2 The approval holder shall record and retain all the following information in respect of any sampling conducted or analyses performed for a minimum of ten years:
- (a) the place, date and time of sampling;
 - (b) the dates the analyses were performed;
 - (c) the analytical techniques, methods or procedures used in the analyses;
 - (d) the names of the persons who collected and analysed each sample; and
 - (e) the results of the analyses.

SECTION 2.3: ANALYTICAL REQUIREMENTS

- 2.3.1 Collection, analysis of samples and reporting shall be conducted in the following manner or otherwise as specified in writing by the Director:
- (a) for waterworks parameters:
 - (i) the *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, as amended, and
 - (ii) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Vegreville, Alberta, 1996, AECV96-M1, as amended.

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- 2.3.2 The preservation, storage and handling of all samples collected at the sampling locations identified in this approval shall be in such a manner that the validity of the samples is not compromised.

PART 3: CONSTRUCTION

SECTION 3.1: CONSTRUCTION.

- 3.1.1 The approval holder shall submit a written request to the Director and receive an amendment to this approval or an authorization, prior to proceeding with any of the following:
- (a) extensions to the water distribution system; or
 - (b) changes to the water treatment plant, other than those identified in this approval.

SECTION 3.2: UPGRADING REQUIREMENT

- 3.2.1 The approval holder shall upgrade the Lethbridge water treatment plant as required to achieve three log removal of *Giardia* cysts by September 1, 2001.
- 3.2.2 The approval holder shall upgrade the Lethbridge water treatment plant as required to achieve four log removal of *Giardia* cysts by September 1, 2005.
- 3.2.3 The approval holder shall submit a complete application for the upgrading requirements outlined in conditions 3.2.1 and 3.2.2 to the Director and receive an amendment to this approval prior to commencement of construction.
- 3.2.4 The approval holder shall conduct an assessment of the impacts of clarifier blowdown and filter backwash discharges into the Oldman River and submit a report which includes the results, interpretation of results and recommendations of the assessment to the Director by December 31, 2002.
- 3.2.5 The approval holder shall discontinue the direct or sewer discharge of lime sludge by December 31, 2000.
- 3.2.6 The approval holder shall upgrade the chlorine room to meet the standards outlined in the *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*, December, 1997 by December 31, 2000.

PART 4: OPERATIONS

SECTION 4.1: WATERWORKS SYSTEM

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- 4.1.1 The waterworks system shall consist of:
- (a) a surface water supply from the Oldman River with the diversion weir located at NE 25-8-22-W4M;
 - (b) a water treatment plant located at SE 36-8-22-W4M with treatment capabilities for:
 - (i) taste and odour control when required,
 - (ii) corrosion and scale control,
 - (iii) pre-treatment chlorination,
 - (iv) flocculation,
 - (v) clarification,
 - (vi) dual media filtration,
 - (vii) disinfection, and
 - (viii) fluoridation;
 - (c) a clearwell with a total volume of 5,500 m³;
 - (d) treated water reservoirs as listed in Appendix I with a total volume of 79,700 m³;
 - (e) two metered truck fill stations located on 13 Street North and 24 Avenue South, and
 - (f) a water distribution system within the City of Lethbridge.

SECTION 4.2: CERTIFIED OPERATOR

- 4.2.1 The day to day operation of the water treatment plant and the water distribution system shall be directly supervised by certified operators who hold the following valid levels of certification:
- (a) Water Treatment Plant, a minimum of:
 - (i) one Level IV WT, and

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- (ii) one Level III WT, and
- (iii) one Level II WT operator in charge of each shift;
- (b) Water Distribution System, a minimum of:
 - (i) one Level IV WD, and
 - (ii) one Level III WD, and
 - (iii) one Level II WD.

SECTION 4.3: CHEMICALS USED

4.3.1 The approval holder shall not use any chemicals in the waterworks system except as provided in this approval or as authorized in writing by the Director.

SECTION 4.4: WASTE STREAMS

4.4.1 The approval holder shall only release the following waste streams from the water treatment plant:

- (a) clarifier blowdown;
- (b) filter backwash; and
- (c) filter-to-waste.

4.4.2 All clarifier blowdown shall be discharged to the Oldman River at SE 36-8-22-W4M.

4.4.3 All filter backwash shall be discharged to the Oldman River at SE 36-8-22-W4M.

4.4.4 All filter-to-waste shall be discharged to the Oldman River at SE 36-8-22-4M.

SECTION 4.5: EMERGENCY OPERATION

CHLORINE RESIDUALS

4.5.1 If the daily concentration of combined chlorine residuals in the water entering the distribution system are less than 1.8 mg/L, the approval holder shall immediately take the following corrective action:

- (a) increase disinfection until the concentration of combined chlorine residual of at least 1.8 mg/L is achieved; and

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- (b) increase combined chlorine residual monitoring frequency to a minimum of once per hour until the concentration of combined chlorine residual of at least 1.8 mg/L is achieved.

4.5.2 If the daily concentration of combined chlorine residuals in the water entering the distribution system are less than 0.5 mg/L, the approval holder shall immediately take the following action:

- (a) stop water production and increase disinfection until the concentration of combined chlorine residual of at least 1.8 mg/L is achieved; and
- (b) increase combined chlorine residual monitoring frequency to once per hour until the concentration of combined chlorine residual of at least 1.8 mg/L is achieved.

4.5.3 If combined chlorine residuals in the water in the water distribution system are less than 0.5 mg/L, the approval holder shall take the following corrective action:

- (a) flush the line(s) until the combined chlorine residuals, in the water distribution system, of at least 0.5 mg/L is achieved;
- (b) increase combined chlorine residual monitoring frequency to a minimum of once per hour until the concentration of combined chlorine residuals, in the water distribution system, of at least 0.5 mg/L is achieved; and
- (c) increase the chlorine feed rate, if required.

PARTICLE COUNTS

Not used at this time.

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CHLORINE CONTACT TIME

Not used at this time.

FLUORIDE RESIDUALS

- 4.5.4 If the daily fluoride residual exceeds 0.8 mg/L +/- 0.2 mg/L, the approval holder shall take the following corrective action:
- (a) adjust and recalibrate the feed rate; and
 - (b) take a sample to verify that proper fluoride residual levels have been obtained.
- 4.5.5 If the fluoride residual exceeds 1.5 mg/L or if the fluoride residual exceeds 0.8 mg/L +/-0.2 mg/L on two consecutive days the approval holder shall undertake corrective action in consultation with the Regional Engineer.

BACTERIOLOGICAL ANALYSIS

- 4.5.6 If any bacteriological sample contains confluent growth or total coliform of 1 per 100 mL to 9 per 100 mL inclusive, the approval holder shall take the following corrective action:
- (a) upon notification of the bacteriological results immediately flush the site from which the sample was drawn until the approval holder meets the chlorine residual limits specified in TABLE 5-1; and
 - (b) take a second sample to verify that confluent growth or total coliform are less than 1 per 100 mL.
- 4.5.7 In addition to 4.5.6 the approval holder shall take corrective action in consultation with the Regional Engineer, if any of the following occur:
- (a) two consecutive samples from the same site show confluent growth or total coliform of 1 per 100 mL to 9 per 100 mL inclusive; or
 - (b) any single sample contains total coliform of 10 per 100 mL or more, or any faecal coliform; or
 - (c) more than one sample from different locations contain total coliform or faecal coliform; or
 - (d) treated water turbidity at the entrance to the distribution system exceeds 1.0 NTU.

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4.5.8 If corrective action is undertaken as outlined in any part of SECTION 4.5, the approval holder shall report as required in PART 6.

PART 5: LIMITS

SECTION 5.1: WATERWORKS

5.1.1 The waterworks system shall be operated to comply with the limits specified in TABLE 5-1.

TABLE 5-1: LIMITS

PARAMETERS	DESIGNATED SAMPLING LOCATION	LIMIT
Turbidity of Treated Water	Prior to entering the clearwell	1. When raw water turbidity is greater than 2.5 NTU: a) ≤ 0.5 NTU in at least 95% of the samples per month, and b) between 0.5 and 1.0 NTU in no more than 4% of the samples per month. 2. When raw water turbidity is less than 2.5 NTU: a) 80% reduction in raw water turbidity based on an average of the daily turbidity reductions measured per month and no less than 50% reduction to be achieved each day; or b) ≤ 0.1 NTU.
Turbidity of Treated Water	Random location in the water distribution system	≤ 5 NTU
pH of Treated Water	Entering the water distribution system	6.5 - 8.5
Combined Chlorine Residual of Treated Water	In the water distribution system	≥ 0.5 mg/L in 95% of samples per month
Combined Chlorine Residual of Treated Water	After a minimum of 20 minutes of contact	≥ 1.8 mg/L
Fluoride Concentration	Entering the water distribution system	0.8 mg/L ± 0.2 mg/L

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- 5.1.2 The approval holder shall shut down the fluoridation system if the approval holder is unable to test fluoride residual or if fluoride testing equipment is measuring fluoride residual inaccurately.
- 5.1.3 In addition to the limits specified in TABLE 5-1 the waterworks system shall be maintained and operated to produce and distribute water which meets the maximum acceptable concentrations specified in the *Guidelines for Canadian Drinking Water Quality* (GCDWQ), as amended.

PART 6: MONITORING AND REPORTING

SECTION 6.1: WATERWORKS

- 6.1.1 The approval holder shall monitor the waterworks system as required in TABLE 6-1 and the waste stream from the water treatment plant as required in TABLE 6-2.
- 6.1.2 The approval holder shall report as specified in TABLE 6-1 and TABLE 6-2.

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TABLE 6-1: MONITORING AND REPORTING - WATERWORKS SYSTEM

PARAMETERS	FREQUENCY	SAMPLE TYPE	SAMPLING LOCATION	REPORTING FREQUENCY	REPORT TO
Raw water turbidity	Continuous with on-line meter	Continuous	Prior to chemical addition	Annually	Director
Raw water pH	Continuous with on-line meter	Continuous	Prior to chemical addition		
Raw water Fluoride concentration	Once per day	Grab	Prior to chemical addition		
Raw water volume	Continuous	Continuous	Entering treatment plant		
Treated water volume	Continuous	Continuous	Entering the water distribution system		
Treated water turbidity	Continuous with on-line meter	Continuous	After each filter		
Treated water turbidity	Continuous with on-line meter	Continuous	After clarification		
Turbidity of water within the distribution system	Once per week	Grab	Random locations in the water distribution system		
Treated water pH	Continuous with on-line meter	Continuous	Entering the water distribution system		
Combined Chlorine residual of treated water	Continuous with on-line meter	Continuous	After a minimum of 20 minutes of contact		
Combined Chlorine residual of treated water	5 days per week	Grab	Random locations in the water distribution system		
Combined Chlorine residual of treated water	Once per week	Grab	At each treated water reservoir		
Name, concentration and dosage of the chemicals added	Once per day	N/A	To the water treatment process		
Raw water Fluoride concentration	Once per month, analyzed by an independent laboratory	Grab	Prior to chemical addition		
Treated water Fluoride concentration	Once per day	Grab	Water entering the water distribution system		
Treated water Fluoride concentration	Once per month, analyzed by an independent laboratory	Grab	Water entering the water distribution system		
Volume of water to which Fluoride was added	Total in a day	Continuous	After Fluoridation		
Weight of Fluoride added to Water in kg	Total in a day	N/A	N/A		
Weight of Fluoride in the feeding equipment in kg	Total in a day	N/A	N/A		

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PARAMETERS	FREQUENCY	SAMPLE TYPE	SAMPLING LOCATION	REPORTING FREQUENCY	REPORT TO
Bacteria in treated water	As required by the Guidelines for Canadian Drinking Water Quality	Grab	Random locations in the water distribution system		
APPROVAL CONTRAVENTION REPORTING/EMERGENCY REPORTING					
If any application of fluoride is discontinued.				Immediate notification as per 2.1.1 and Monthly and Annual Reporting to the Director	
If any equipment used for disinfection fails or is shut down.					
If any terms or conditions of this approval have been contravened					
Any emergency reporting as required in Section 4.5					

TABLE 6-2: MONITORING AND REPORTING REQUIREMENTS FOR WASTE STREAMS

WASTE STREAM PARAMETER	FREQUENCY	SAMPLE TYPE	SAMPLING LOCATION	REPORTING FREQUENCY	REPORT TO
Clarifier blowdown	Calculated continuously	Calculated Volume	Waste stream discharge from plant	Annually	Director
Backwash water	Continuous	Volume	Waste stream discharge from plant		
Filter to Waste	Continuous	Volume	Waste stream discharge from plant		

- 6.1.3 If the water treatment plant is not operated on any calendar day, then:
- (a) monitoring of the water treatment plant is not required on that calendar day; and
 - (b) the monitoring report shall indicate that the water treatment plant did not produce water on that day.
- 6.1.4 In addition to 6.1.1, the approval holder shall draw a minimum of, two samples of treated water each year, one grab sample during the winter and one grab sample during the summer (with a minimum of four months between sampling), from the

TERMS AND CONDITIONS ATTACHED TO APPROVAL

treated water entering the distribution system and conduct chemical analysis on those samples for:

- (a) turbidity, TDS, calcium, magnesium, hardness, sodium, NO₂-NO₃, TKN, NH₃-N, T-Alkalinity, Fluoride, Nitrite-N, Total Organic Carbons (TOC), Aluminum, Copper, Lead, THMs;
- (b) any other parameters as may be required in writing by the Regional Engineer; and
- (c) analysis shall be conducted by an independent laboratory.

6.1.5 In addition to the requirements of 6.1.1 and 6.1.2, the approval holder shall compile a Monthly Waterworks Report which includes the following information:

- (a) name of the supervising operator responsible for the operation of the waterworks;
- (b) any incidence which required reporting as per 2.1.1; and
- (c) a summary of any operational problems.

6.1.6 The approval holder shall retain a copy of the Monthly Waterworks Report at the Lethbridge Water Treatment Plant.

6.1.7 The approval holder shall submit one copy of an Incident Report of any incident requiring reporting as per 2.1.1 and outlined in TABLE 6-1. The report shall be submitted 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.

6.1.8 In addition to the requirements of 6.1.1 and 6.1.2, the approval holder shall also include all the following information in the Annual Waterworks Report:

- (a) the monthly average of each parameter monitored, as outlined in TABLE 6-1 and TABLE 6-2;
- (b) maximum and minimum daily value of each parameter monitored, as outlined in TABLE 6-1 and TABLE 6-2, for each month;
- (c) the result of the chemical analysis of water as required in 6.1.4;
- (d) name of the supervising operator responsible for the operation of the waterworks system;
- (e) any incidence which required reporting as per 2.1.1;

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APPENDIX I

TREATED WATER STORAGE RESERVOIRS

Type	Material	Volume (m ³)	Location
Underground	Concrete	21,500	SW 26-8-22-W4M
Underground	Concrete	23,500	SW 17-9-21-W4M
Underground	Concrete	13,700	SE 8-9-21-W4M
Underground	Concrete	18,500	NW 32-8-21-W4M
Elevated	Steel	2,500	NW 32-8-21-W4M