Municipal Policies and Procedures Manual

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Foreword

Alberta Environment (AENV) regulates the construction and operation of municipal waterworks, wastewater and storm drainage systems. Standards and guidelines for municipal waterworks, wastewater and storm drainage systems, and the approval procedures for various activities are detailed in the Environmental Protection and Enhancement Act and its regulations. However, it is neither practical nor always possible to have standards and regulations cover every activity in the municipal water, wastewater and storm drainage programs. This document outlines policies and procedures followed by Alberta Environment in dealing with some situations not covered by the regulations.

Seven policies are included in this manual.

i. Municipal Effluent Limits - Policy & Overview

For all new or expanded municipal wastewater systems with continuous discharge, effluent limits will be based on adopting the more stringent requirement of technology or water quality based assessments. This policy outlines the requirements to prevent/control pollution, and the procedures to determine the effluent limits.

ii. Unproven or Innovative/Alternative Technologies

Occasionally, the Department receives applications to evaluate/approve waterworks and wastewater system technologies/processes, which are considered innovative but unproven. This policy outlines the criteria and approach which AENV uses to assess such requests.

iii. Wastewater Bypasses and Spills

This policy outlines how the Department would treat plant bypasses, sewer overflows, accidental spills, and other such conditions, including City of Edmonton's combined sewer system.

iv. Approval of a Private Development

Over the years, the Department followed a set pattern in approving waterworks and wastewater systems serving private developments. This policy lays out the procedures that have been followed in the past.

v. Protocol for Failed Bacteriological Results

The testing for bacteria in drinking water is an important component for ensuring microbiologically safe drinking water. This protocol is intended to ensure that test results that exceed the bacteriological limits are transmitted to the appropriate parties so that follow-up action can be taken immediately.

vi. Stormwater Management Guidelines

Traditionally, stormwater has been managed from a quantity rather than quality standpoint. There has now been an increasing recognition that in certain circumstances stormwater discharges can adversely impact receiving water quality. This policy outlines the requirement from a stormwater quality point of view.

vii. Approval of ETV Program Certified Technologies

The Environmental Technology Verification (ETV) program is a national initiative by the federal government to foster the growth and marketability of Canada's environment industry, by providing validation and independent verification of performance claims for new and innovative technologies. This policy outlines the guiding principles and implementation procedure for the recognition and approval of ETV program certified technologies in Alberta.

The manual will be updated as and when additional policies are developed.

Municipal Policies and Procedures

Table of Contents

Acknowledgement

Alberta Environment acknowledges with gratitude, the guidance and direction provided by the Advisory/Working Group (A/WG) in developing this document. The members willingly participated in the process by volunteering their time to attend meetings and review documents. A/WG consisted of the following:

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Summary

This document outlines the policies followed by Alberta Environment (AENV) staff when developing municipal effluent limits for approvals under the Environmental Protection and Enhancement Act. General procedures interpreting these policies are provided and further detailed in associated Procedures Manuals.

The objective is to ensure that:

- the most appropriate pollution prevention and control technologies are adopted; and
- the receiving stream is protected.

The policies supporting this objective are:

Policy 1-1: In regulating municipal wastewater systems, prevention/control of pollution and protection of water bodies or land that receive the treated municipal wastewater form the basis for the development of system design and performance standards.

Policy 1-2: When treated municipal wastewater is discharged to a water body, the effluent limits will be based on adopting the more stringent requirement of technology or water quality based assessments (note: advanced technology effluent limits may be adopted in lieu of water quality based limits in certain circumstances).

Policy 1-3: When determining effluent limits for treated municipal wastewater discharged to a water body, AENV will first consider the effluent criteria based on the proposed Best Practicable Technology (BPT). BPT limits rely on the use of established and proven pollution control and treatment technologies.

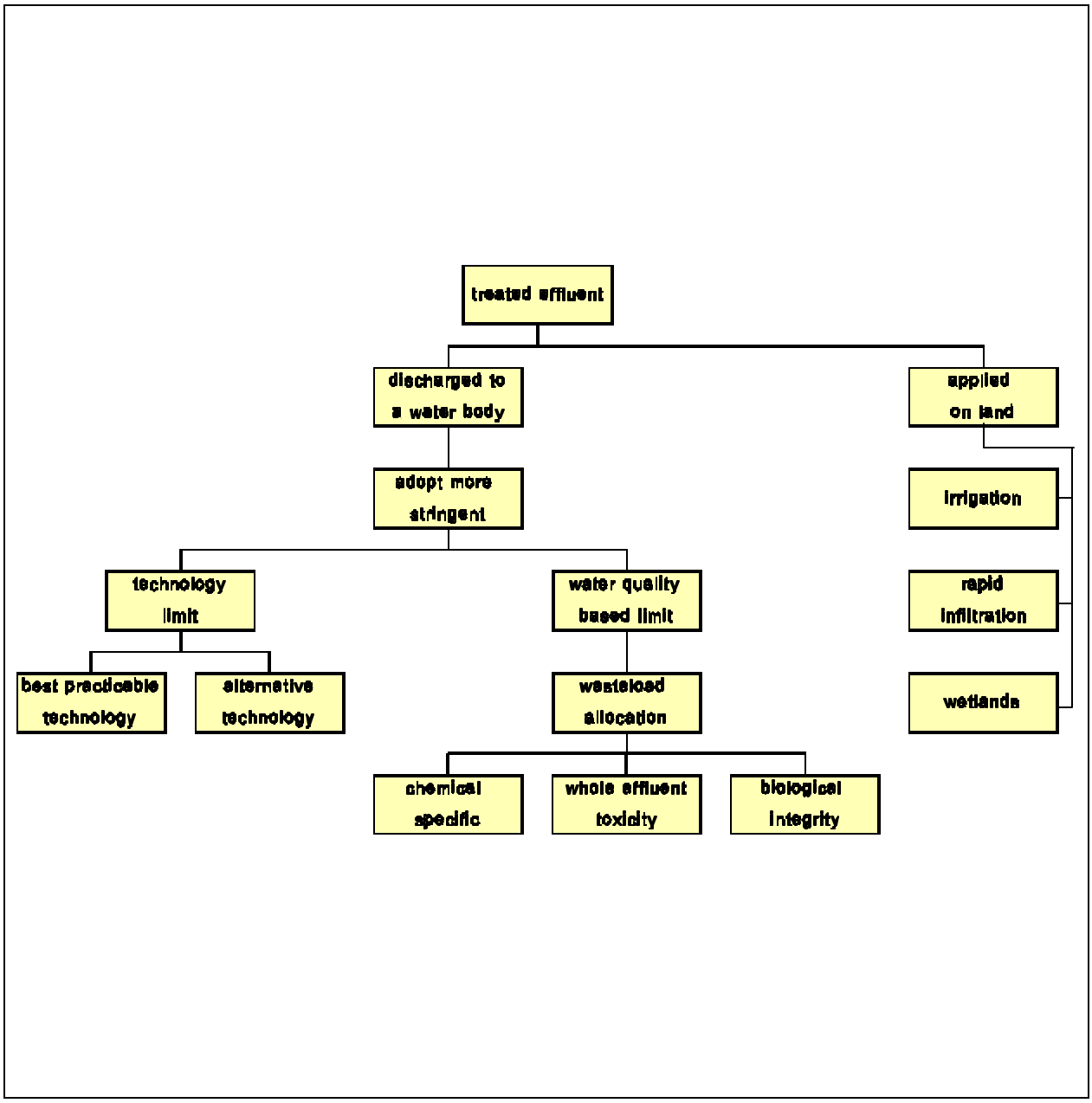
Policy 1-4: When determining the type of technology for treating municipal wastewater, AENV will consider the use of an alternative technology to BPT, only if the effluent criteria achievable by the alternative technology is the same or better than the effluent criteria for the BPT.

Policy 1-5: When developing effluent limits for treated municipal wastewater discharged to a water body, AENV will also consider limits developed from a site specific assessment of water quality impacts. These limits are developed using the procedure outlined in the Water Quality Based Effluents Limits Procedures Manual.

Policy 1-6: When developing effluent limits for treated municipal wastewater applied on land, AENV will consider limits based on the method of disposal, be it by irrigation, rapid infiltration, or wetlands.

Policy 1-7: When stormwater is discharged to a water body, consideration will be given to the development of strategies or options for improving the quality of stormwater and decreasing the impact it may have on receiving water quality. In some instances, alternatives to direct discharge of stormwater into a receiving body of water will be required.

Figure 1:
AENV Approach to Developing Municipal Effluents Limits


treated effluent
discharged to a water body
applied on land
adopt more stringent
irrigation
technology limit
water quality based limit
rapid infiltration
best practicable technology
alternative technology
wasteload allocation
wetlands
chemical specific
whole effluent toxicity
biological integrity

Introduction

Municipal wastewater treatment plant discharges can constitute a significant input source of organic/inorganic substances, nutrients and pathogenic microorganisms to the receiving environment. Release of these substances may result in oxygen depletion, eutrophication, toxicity, increased pathogen levels and aesthetic nuisance in the receiving body of water. Land application of this type of wastewater can also present risks related to groundwater contamination and salinity build-up. If land applied, restrictions on the type of crops that can be grown using wastewater irrigation may be necessary to safeguard human and/or animal health.

Thus, it is of paramount importance that governments set clear environmental goals, enact legislation, develop regulations and policies to protect the environment, and maintain the air, land and water in a state that protects the ecosystem.

Policy Objectives and Goals

The government of Alberta's environmental goal with respect to surface waters is to protect, preserve and restore the water as close to its natural state as possible, to permit the greatest number of uses. The objective is to ensure that Alberta's surface waters have water quality that is better than Alberta Ambient Surface Water Quality Guidelines (AASWQG). For those parameters that have no AASWQG, guidelines from Canadian Water Quality Guidelines or USEPA Quality Criteria for Water will be used.

To achieve this environmental goal and the objective, the government has enacted the Environmental Protection and Enhancement Act (EPEA), which prohibits the discharge of contaminants to the natural environment, except where specifically permitted by an approval. EPEA is administered by Alberta Environment (AENV). The policies and procedures set out in this document will assist users to understand how AENV arrives at its decisions under EPEA.

AENV's strategy for achieving environmental goals places first priority on avoiding the creation of pollution. If the creation of pollution cannot be avoided, AENV's next priority is reuse or recycle. When this is not possible, the strategy is to capture the pollutants and prevent their release to the environment. In general, municipal wastewater releases to the environment are inevitable and the only practicable management option; in such cases every effort should be made to minimize the impact of the releases. AENV operationalizes this strategy through the following seven policies:

Policy 1-1: ***In regulating municipal wastewater systems, prevention/control of pollution and protection of water bodies or land that receive the treated municipal wastewater form the basis for the development of system design and performance standards.***

1. Pollution Prevention/Control

i. In general, AENV encourages owners[1] to pursue pollution prevention practices rather than relying solely on treatment of pollution after its generation, which is commonly referred to as end-of-pipe treatment. These practices to eliminate or minimize pollution include, but are not limited to, conservation or more efficient use of: the water supply; hazardous or non-hazardous materials; energy or other resources. Finding alternatives, using best management practices, water conservation programs, and increased recycling and reuse of substances are preferable approaches to simply concentrating on meeting the established effluent limits through waste treatment.

ii. End-of-pipe treatment is the next step in controlling the pollution after its generation. In Alberta, end of pipe treatment is termed "Best Practicable Technology" and is categorized by its ability to remove certain conventional pollutants.

iii. Sewer use by-laws which prohibit or restrict the type of waste that can be discharged to the municipal system are considered another form of pollution prevention.

2. Environmental Protection

i. Protection of receiving water bodies that have water quality meeting Alberta Ambient Surface Water Quality Guidelines (AASWQG)

Where water quality now meets AASWQG, discharge of treated municipal wastewater should not result in lowering of receiving water quality to that below AASWQG.

Although some lowering of receiving water quality immediately downstream of wastewater release is often unavoidable, these zones of impact must be minimized. Also, degradation below the AASWQG beyond a defined mixing zone will not be permitted.

ii. Protection of receiving water bodies that have water quality not meeting AASWQG.

In situations where the water quality in the receiving water body does not meet AASWQG, discharge of treated municipal wastewater should not result in further degradation of the receiving water quality.

1 "Owners" means owners of the wastewater systems or storm drainage systems as defined in the Regulations.

In the case of existing discharges, the municipalities should, when facilities are expanded or upgraded, undertake all reasonable and practical measures to improve the receiving water quality to AASWQG. However, if it is demonstrated that all reasonable and practical measures to attain AASWQG have been undertaken, deviations from this policy may be allowed under the following conditions:

a. AASWQGO are not attainable because background/upstream water quality already exceeds the limits due to natural or irreversible human induced conditions;

b. To attain or maintain AASWQG would result in substantial and widespread adverse economic and social impact; or

c. Suitable pollution prevention techniques are not available.

iii. Protection of land receiving wastewater

Under this policy, application of treated municipal wastewater on land should not result in the possible harmful effects of certain wastewater contaminants on vegetation, soils, surface waters and groundwaters. To avoid adverse environmental impacts, many factors such as soil and crop characteristics and wastewater make-up must be considered in designing a land application system. Consequently, a land application system for treating municipal wastewater must be specifically designed for a selected site.

Policy 1-2: When treated municipal wastewater is discharged to a water body, the effluent limits will be based on adopting the more stringent requirement of technology or water quality based assessments. (Note: advanced technology effluent limits may be adopted in lieu of water quality based limits in certain circumstances.)

There are essentially two approaches for establishing municipal effluent requirements when the effluent discharges into a water body. These are:

- the technology based approach, where the effluent limits are based on the use of established and proven treatment technologies; and
- the water quality impact approach, where the effluent limits are based on the ability of the water body to receive the effluent while still maintaining instream water quality objective.

The quality of effluent that is acceptable for release to a receiving water body is determined using the following two step process:

- the municipality determines the effluent criteria based on the use of established and proven treatment technology. This is the <u>minimum</u> quality requirement for municipal wastewater discharge in Alberta; and

- the municipality undertakes a receiving water assessment to evaluate the water quality impacts of the various contaminants in the effluent that results from the use of proven treatment technology. AENV will validate these assessments and set effluent criteria to protect the receiving water quality at the site in question.

  Exception to this rule are the seasonal discharges into receiving streams from wastewater lagoons, or when a water quality based limit is not technically attainable. In the latter case, an advanced technology limit may be adopted as an interim effluent limit.

For a given site, the effluent criteria based on technology and water quality impact are compared and the owner is required to comply with the more stringent of the two limits.

Policy 1-3: ***When determining effluent limits for treated municipal wastewater discharged to a water body, AENV will first consider the effluent criteria based on the proposed Best Practicable Technology (BPT)[2]. BPT limits rely on the use of established and proven pollution control and treatment technologies.***

The technology-based approach generally establishes a minimum required treatment level, based on the premise that this technology level must be technically proven, and affordable for the municipality. In Alberta, this treatment level is termed "Best Practicable Technology" (BPT) and is categorized by its ability to remove certain conventional pollutants that include such parameters as Biochemical Oxygen Demand, Total Suspended Solids, Fecal coliform, pH and oil and grease, and non-conventional pollutants such as phosphorus and ammonia.

Because BPT is supposed to be a practicable approach based on the ability of the municipalities to finance the facility, the technology adopted by major municipalities, which enjoy economics of scale advantages over small municipalities, may not necessarily be affordable for the small municipalities. Further, adoption of advanced technology by major municipalities may be necessary in that the level of environmental protection provided by these municipalities is continuously diminishing as population or industrial growth within the municipality increases. Therefore, to maintain the same ambient water quality, higher levels of treatment must be provided, which in turn translates to the need for more stringent provincial standards for major municipalities when compared to requirements for smaller municipalities.

[2] BPT is the preferred traditional terminology applied to municipal discharges. This terminology has different variations in industrial applications, but the intent is similar.

Using this approach, AENV has taken the position that the BPT for large municipalities with population more than 20,000 will be more advanced than the BPT for small municipalities with population less than 20,000. BPT for small municipalities will be determined by its ability to remove/reduce organic matter and suspended solids only and BPT for large municipalities will be determined by its ability to remove/reduce organic matter, suspended solids, ammonia/ nitrogen, phosphorous and total and fecal coliforms.

What constitutes BPT for large and small municipalities and the minimum performance expected from these technologies are outlined in Section 3.0 - Performance Standards, Wastewater Systems, in the Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Facilities.

Policy 1-4: ***When determining the type of technology for treating municipal wastewater, AENV will consider the use of an alternative technology to BPT, only if the effluent criteria achievable by the alternative technology is the same or better than the effluent criteria for the BPT.***

AENV encourages the development and application of new technologies and alternative treatment technologies provided that there is adequate engineering justification. There must be a high degree of certainty that the technologies and processes employed will work effectively, be reliable, and be operable by available/typical operators.

Procedures for approval of an alternative technology are outlined in the policy entitled "Unproven or Innovative/Alternative Technologies", in section 2.0 of this document.

Policy 1-5: ***When developing effluent limits for treated municipal wastewater discharged to a water body, AENV will also consider limits developed from a site specific assessment of water quality impacts. These limits are developed using the procedure outlined in the Water Quality Based Effluents Limits Procedures Manual.***

These limits are often developed under the assumption of worse case conditions. Alternatively, more sophisticated modelling approaches may be employed that more precisely reflect the desired frequency of compliance of the discharged substance with instream guidelines.

Some components of the water quality based procedure for setting effluent limits are:

1. Mixing zones

Water quality based limits may also provide for limited zones for dilution of the effluent plume where substances may exceed instream guidelines. These "*mixing zones*" are established in a manner which restricts the duration of exposure to organisms passing through the effluent plume to protect basin uses.

2. Chemical Specific and whole effluent toxicity

Limits that are based on meeting instream guidelines are either developed through "*chemical specific*" or "*whole effluent toxicity*" approaches. The *chemical specific* approach involves restricting individual substance

concentrations to meet associated instream guidelines, while the *whole effluent* approach involves restricting the toxicity of an entire effluent to the extent that no toxicity will occur instream. The *whole effluent* approach considers the aggregate effect of a complex mixture of substances. *Chemical specific* and *whole effluent* limits can be calculated based on projected stream and effluent flows and substance concentrations.

3. Biological

A third component to water quality based limits is the "*biological*" approach. The *biological* approach is more commonly associated with actual monitoring of the receiving stream to gauge and confirm the appropriateness of the existing limits. For example, benthic invertebrate monitoring upstream and downstream of the effluent discharge is done to assess the extent and acceptability of impact. Should that impact be judged unacceptable, in spite of instream guidelines otherwise being achieved, the effluent limits will have to be tightened.

Situations may arise when water quality based discharge limits cannot be met in some facilities, even with the most advanced wastewater technology. Two alternatives may then be pursued; a site-specific consideration of the applicable ambient guidelines[3], and/or a scheduled implementation of the water quality based limits over some reasonable time frame. Both scenarios assume that the facility has demonstrated all reasonable effort to meet the water quality limits. The final decision will be directly related to the degree of water quality impact observed or predicted, as such, under some circumstances a compromise may be denied.

Procedures for developing water quality based effluent limits are detailed in the Water Quality Based Effluent Limits Procedures Manual. It outlines the sequence of instream guidelines to be used, the approaches to determine the need for a water quality based limit, how to develop a wasteload allocation and the subsequent calculation of limits from the wasteload allocation.

[3] This site-specific assessment may also consider any mixing zone restrictions.

Policy 1-6: When developing effluent limits for treated municipal wastewater applied on land, AENV will consider limits based on the method of disposal, be it by irrigation, rapid infiltration, or wetlands.

Methods of land application for the treatment and/or disposal of wastewaters may include irrigation, high rate irrigation, rapid infiltration, and wetlands disposal. Although land application is site specific because of the wide range of design possibilities, the following general guidelines and standards are applicable to each of the following methods.

1. Wastewater Irrigation and High Rate Irrigation

Irrigation should be a disposal alternative in regions where additional moisture is required for optimum crop production. Application rates should be based on the net consumptive use of the crop taking into account moisture deficiencies, application efficiencies, and leaching requirements. The objective of wastewater irrigation is the maximization of crop production as well as the treatment and disposal of that wastewater.

The following steps should be taken when evaluating a possible project for land application of wastewater:

i. Assess land requirements. The land to be irrigated must meet all the setback requirements.

ii. Characterize the soil on the proposed irrigation site as per the procedure outlined in section 5.2.7.2(1) - Wastewater Irrigation, in the Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems.

iii. Analyze wastewater/effluent quality for the parameters identified in section 5.2.7.2(1) - Wastewater Irrigation, in the Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems.

iv. Determine application rate based on soil characteristics, wastewater/effluent quality and crops to be grown.

2. Rapid Infiltration

Rapid infiltration system should be designed in accordance with the joint Alberta Environment - City of Red Deer publication entitled Rapid Infiltration - A Design Manual. This process must be carefully engineered to ensure there are no deleterious effects on groundwater or surrounding surface water.

3. Wetlands Disposal

Natural wetlands or constructed/artificial wetlands may not form a part of the treatment process but could be used to receive secondary treated effluent on

a batch or continuous basis for water quality enhancement or to enhance/maintain existing wetlands in terms of water input. Wetlands should be designed in accordance with the requirements specified in the document Stormwater Drainage Design Guidelines.

Policy 1-7: ***When stormwater is discharged to a water body, consideration will be given to the development of strategies or options for improving the quality of stormwater and decreasing the impact it may have on receiving water quality. In some instances, alternatives to direct discharge of stormwater into a receiving body of water will be required.***

The owners should adopt an integrated approach to stormwater management, beginning at the watershed and sub-watershed levels and extending to the subdivision/site plan level with emphasis on stormwater quality and best management practices (BMP's), both structural and non-structural. Consideration should be given to stormwater conveyance controls and pre-release stormwater management facilities. The owner should select the BMP in the context of land use and environmental planning, taking into consideration the receiving water quality concerns, site conditions, and applicability of the selected BMP under the local conditions.

Guidelines and requirements specified in the Stormwater Drainage Design Guidelines should be followed, in planning and implementing surface drainage systems.

Summary

AENV recognizes the value of innovation and technology development, and encourages the development and application of new technologies. New and alternative treatment technologies may be acceptable provided that there is adequate engineering justification. However, unlike industrial operations, which can cease operations if problems with water supply or pollution control technologies arise, municipal water supply and sewage treatment are essential services and must remain operable under all foreseeable operating conditions. There is also a very direct, and often immediate, relationship between drinking water quality and health impacts. Therefore, there must be a high degree of certainty that the technologies and processes employed will work effectively; be reliable; and be operable by available/typical operators.

Also, most municipally owned waterworks and wastewater systems receive provincial financial assistance for capital works and it is necessary to ensure these funds are being spent on cost-effective systems. In general, these factors tend to lead to the use of proven technologies and processes.

The purpose of this policy is to outline the general framework and guiding principles AENV will follow when reviewing waterworks and wastewater projects where the use of unproven, but innovative or alternative, technologies is proposed.

Policy Objectives and Goals

The objectives of this policy are to clearly outline to municipalities, municipal consultants, equipment suppliers, etc. the criteria and approach which will be used to evaluate any technologies/processes which are proposed for use waterworks and wastewater systems which are considered innovative but unproven. The goal of the policy is to maintain a level of certainty that approved systems will meet public health and environmental protection requirements while encouraging and facilitating innovation and advancement in public health and environmental protection technologies.

2.1 Definitions

1. "Unproven" technologies or processes are considered to fall into one or more of the following categories:

    i. a technology or process which has only undergone pilot or bench scale testing/evaluation;

    ii. a technology or process which has not had/experienced full scale application under conditions similar or comparable to those being encountered in the proposed application in Alberta. (Note: technologies/processes must be designed to perform under all foreseeable and "worst case" operating conditions.);

iii. a technology or process which has been applied in full scale application under comparable conditions but to which changes in design criteria, equipment and/or process control are proposed (or technologies and/or processes which individually have been successfully applied in full-scale applications under conditions similar to those being encountered but the proposed sequencing/configuration of the technologies/processes is unique);

iv. a technology or process which is in full-scale use in other jurisdictions but because of the different performance standards/criteria which apply in Alberta, there is some uncertainty regarding its ability to meet the performance requirements of AENV;

v. the technology or process has only seen full-scale application for a short period of time, and therefore an accurate assessment of its long-term reliability, performance, etc. cannot be made;

vi. the technology or process has not been operated on a long term or consistent basis by personnel with the level of qualifications or experience which is available to, or can be provided by, the owner of the facility; and

vii. the technology or process has been applied in Alberta, but consistent problems in meeting AENV's requirements have been encountered and are related to the design and/or operation of the technology or process.

2. "Innovative or alternative" technologies and processes are considered to be those that:

i. achieve the same or better levels of treatment than conventional technologies at lower capital and/or operating costs;

ii. produce less by-product wastes than conventional treatments;

iii. produce treated wastewaters or by-products which have reuse/recycle options that do not exist with the treated wastewaters or by-products from conventional technologies.

iv. are extremely reliable and require a minimum of operator attention;

v. can function effectively even under widely varying raw water quality conditions or significant fluctuations in wastewater strength/flow/temperature;

vi. are likely to have a high degree of public acceptance because they have minimum impact on the local environment, and little or no chemicals are used in the process;

vii. can be integrated into the local environment and have an environmental enhancement or sustainability component; and

viii. provide a very high degree of public health and environmental protection at a life cycle cost similar to that for conventional technologies.

These definitions are not intended to be definitive but generally define the criteria which will be used to assess whether or not a technology is considered "unproven" and whether or not it is considered "innovative or alternative."

2.2 Approval of an Unproven Technology or Process

1. Proponents of the waterworks and/or wastewater systems which incorporate unproven technologies/and/or processes shall provide the following information in order to have the project considered for approval:

    i. reason for selecting the technology/process over conventional technologies (e.g.: how is proposed technology/process "innovative or alternative");

    ii. an engineering/scientific assessment and evaluation of the proposed technology/process from the standpoint of effectiveness and reliability in the specific application for which it is being proposed;

    iii. a summary of all relevant performance and operating data on the proposed technology/process from bench, pilot and/or full scale operations;

    iv. an outline of the contingency measures or plan which will be followed in the event that the technology/process fails to meet performance/operational requirements that apply to the facility. (Note: these will generally be outlined in AENV's operating approval for the facility.); and

    v. a letter from the ultimate owner of the proposed system acknowledging the risks and possible consequences associated with the application of the unproven technology/process (note: owners should be aware that any non-compliance with regulatory or approval requirements will be subject to the appropriate enforcement action and this is a factor that should be considered by proponents of unproven technologies or processes).

2. In addition to these requirements, AENV may also require:

    i. bench or pilot testing of the technology/process under specified conditions to determine its likely performance in the proposed full-scale application;

    ii. performance/operational guarantees from the suppliers;

    iii. back-up systems or provisions for such systems incorporated into the design of the system; and

    iv. the design of the technology/process modified to provide a greater degree of assurance that the system will meet requirements.

These information requirements and safeguards are intended to ensure that the application of unproven, yet innovative or alternative, technologies is based on sound scientific and engineering principles, and that appropriate safeguards are implemented when such technologies are employed.

In general, the degree of risk considered acceptable, and therefore approvable, will be based on the level of benefit that may be achieved if the technology/process proves successful. Under no circumstances, however, will basic public health or environmental protection principles be compromised in approving the use of an innovative or alternative technology in a particular application.

It should be noted that the issuance of an approval for an innovative or alternative technology by AENV does not in any way represent a "guarantee" or "endorsement" of the technology and its ability to meet environmental or public health requirements. The proponent/owner of the facility is considered to be the person responsible for the success or failure of the technology.

Introduction

The major reasons for bypasses and spills at wastewater treatment facilities are high flows associated with wet weather or spring runoff; or emergencies such as pipeline breakage, and accidental spills. Wastewater treatment systems are designed with plant and/or process bypasses to prevent site flooding and loss of treatment process. (Note: treatment systems are generally designed with multiple process units operated in parallel to allow for routine maintenance of individual units without the need to bypass flows around an entire process.) Bypass works are, therefore, generally considered an integral part of any wastewater treatment facility and are also an initial system safeguard and emergency response option in the event of unforeseen problems or circumstances.

3.1 Sanitary Sewer System

While sanitary sewers should be designed and operated to minimize the amount of infiltration and inflow (I/I) of non-sanitary wastewater, there are many circumstances/situations which can lead to excessive I/I which can in turn result in wastewater treatment system bypasses. These include:

1. Heavy rainfall - large storm events that result in either local or general flooding can result in submerged manholes, elevated groundwater levels and large weeping tile flows. (Note: in many areas the weeping tile around houses is connected to the sanitary sewer system, which can all contribute large volumes of I/I resulting in the hydraulic capacity of the treatment plant being exceeded.); or

2. System problems - sagging manholes, poor manhole design, cross-connections between sanitary and storm systems at household level, inter-connections between the sanitary system and storm systems within the system, poor lot grading and roof leader downspout positioning, and poor stormwater management can all result in excessive sanitary sewer flows that cannot be handled by the wastewater treatment system.

In general, a well-designed sanitary sewer system utilizing the pollution prevention approach, should have minimum I/I and, therefore, plant bypasses due to excessive flows should be a rare occurrence.

3.1.1 Policy Options

Bypasses and spills can be dealt with in a number of ways from a facility approval standpoint. These are:

i. Unless a provision is made in the operating approval of the facility for sewer overflows and plant bypasses, plant or entire process bypasses and spills can be considered a prohibited release and subject to the prohibited release provisions of EPEA and to an associated enforcement response;

ii. All plant and process bypasses and spills can be monitored in the same manner as normal plant discharges and considered to be part of total plant discharge in terms of allowable discharge concentration/loadings for various substances; or

iii. Circumstance specific, e.g. a certain intensity of storm or a certain type of emergency/problem, can be established in which a bypass would not be considered an unauthorized release.

Because it would be very difficult to predict or define all the circumstances under which bypasses might occur or be acceptable, option (iii) is not considered a practical approach. While option (ii) appears to be consistent with the general philosophy associated with approving discharges, i.e. allowing a certain concentration/amount of substances to be released to the environment, the nature of raw or partially treated wastewater is different from fully treated wastewater. Therefore more comprehensive effluent limits would have to be developed if this option were to be pursued. Since bypasses and spills should be an infrequent occurrence and may or may not be justified based on the specific circumstances, option (i) is considered the best approach because the appropriateness of acceptability of the use of bypass works would be evaluated on a case-by-case basis.

3.1.2 Policy

Unless provision is made in the operating approval of the facility for sewer overflows and plant bypasses, they will be designated as a prohibited release subject to the associated notification/reporting requirements of EPEA Operating Approval. The same rule applies to emergencies such as pipeline breakage or accidental spills.

An exception would be a combined sewer system engineered to carry both storm and wastewater with plant and secondary bypasses during wet weather conditions.

At other facilities without a combined sewer system, where frequent justified bypasses occur as determined by enforcement staff, the approval for said facility will be amended to authorize the bypasses while measures can be taken to monitor them and establish a plan to mitigate or eliminate the need for, or cause of, the bypasses.

3.2 Combined Sewer System

One municipality in the province, i.e., City of Edmonton, has a portion of its drainage system that is combined. A combined system is designed to carry stormwater as well as wastewater. During dry weather, the wastewater flow consists of sanitary sewage only and is treated at the treatment works. During wet weather periods, the total sewer flows consist of both stormwater and sanitary sewage that often exceed the capacity of the treatment works, necessitating either bypasses or wastewater storage.

The City's combined system is extensive (covering about 5000 ha and 900 km of sewers) and a policy is necessary to provide direction on how the environmental impacts of combined sewer overflows should be addressed. In the United States, the Environmental Protection Agency (USEPA) has issued a national policy statement entitled, "Combined Sewer Overflow (CSO) Control Policy." The USEPA policy represents a comprehensive national strategy to ensure that municipalities, state regulatory authorities and the public engage in a coordinated planning effort to achieve cost effective CSO controls that meet the appropriate health and environmental objectives.

3.2.1 Policy

1. No new combined sewer systems or additional combined sewer overflows will be allowed in Alberta. The AENV's policy is to encourage the development of a comprehensive, cost-effective control strategy that will result in minimizing the environmental impacts of the City of Edmonton's combined sewer system. This may include immediate separation on a limited and opportunistic basis. Separate storm and sanitary sewers are to be used for new systems. AENV policy is to encourage ultimate, i.e. 50 to 100 years, elimination of CSOs or measures that would result in an equivalent or better level of environmental protection than would be achieved by complete separation.

2. Existing combined systems should be separated where possible, as old sewers are replaced or upgraded. It is recognized that a program extending over decades may be required. Alternative mitigative measures (e.g. storage, satellite treatment, relief sewers, etc.) should be used to control CSO impacts to acceptable levels.

3. Existing combined systems will be allowed to continue on an interim basis provided a CSO control strategy is developed to determine what interim treatment or reduction of CSOs is desirable in the near term, i.e. 5 to 25 years. A long term, i.e. 25 to 50 years, CSO mitigation strategy must also be developed and include public consultation and receiving stream environmental assessments. As a minimum, the City should:

    - determine methods to eliminate any dry weather overflows and implement immediately;
    - characterize the CSO quantity and quality;
    - determine the areal extent and the storm conditions beyond which Alberta Ambient Surface Water Quality Guidelines cannot be met;
    - evaluate mitigation methods to achieve water quality objectives;
    - evaluate non-structural best management practices for CSOs and implement cost effective controls;
    - determine methods to eliminate any dry weather overflows and implement immediately;

- outline an implementation plan to cost effectively mitigate CSO impacts in the long term, i.e. 25 to 50 years; and

- establish general timelines and schedules to achieve ultimate, i.e. 50 to 100 years, control objectives that either involve complete separation or have control measures that achieve an equivalent or better level of environmental protection than would be achieved through complete separation.

Introduction

AENV's mandated requirement is to protect and improve public health and the environment by ensuring that municipal water supply and wastewater treatment systems are properly planned, designed, constructed and operated.

The following is the general framework and guiding principles that AENV will follow when reviewing, for possible approval, the proposed construction or operation of waterworks and wastewater systems serving private municipal developments.

For the purpose of this policy, a private municipal development is either a "privately owned development" or a "municipal development" as defined in EPEA. "Owner" means, in accordance with EPEA, the collection of individual lot owners located in a "municipal development" that is served by the water, wastewater or storm drainage system; and in the case of a system serving "privately owned development" located in a MD, County or ID, the owner of the privately owned development.

The objective of AENV, with respect to its review of waterworks and wastewater services servicing private developments, is to ensure that the residents of these developments have a reliable and safe water supply system and an environmentally acceptable wastewater treatment and disposal system. This objective can only be achieved by ensuring that these systems are properly planned, designed, constructed, and operated.

All qualifying private developments must obtain approval from AENV for all components of a waterworks or wastewater system; and the system shall meet AENV standards and guidelines for municipal waterworks, wastewater and storm drainage systems.

For existing private municipal developments which are being expanded, or when a new private development is proposed to connect to an existing system(s), it is the policy to request that the existing facilities be upgraded over a specified period of time, if necessary, to meet current standards. This is the approach followed with the approval of all municipal facilities and the practice will continue.

Prior to environmental approval of private municipal waterworks and wastewater systems, it is important to ensure that potential property owners are aware that ultimate ownership of the system and responsibility for system operation and maintenance rest with them. Private multi-parcel systems, "municipal developments", are usually proposed and designed by developers whose interests and responsibilities are relatively short-term compared to the design life of the development. In general, it is not usually the developer's intent to be involved in the long-term operation of water and wastewater facilities. The situation places an onus on the rural municipality and AENV to try and represent and protect the long-term interests of the ultimate owners/operators of the water and wastewater systems during planning, design and construction phases of the development. Individual property owners are often not aware or appreciative of the responsibilities and duties associated with owning and operating water and/or wastewater facilities and do not possess the knowledge, or have the experience, necessary to operate and maintain such facilities. The situation is further complicated by the fact that the majority of the condominium or property owner associations are reluctant to budget or set aside funds for any work other than routine maintenance of the facilities. This creates problems if a severe system failure occurs, or if major system upgrading is necessary.

AENV has identified a number of water and wastewater facilities servicing private municipal developments which either were constructed without obtaining proper approvals or were not

constructed in accordance with the plans submitted for approval. In many cases the property owners inherit these faulty or inadequate facilities and are unable to operate them in accordance with legislated requirements.

These ownership and operational issues can best be addressed through a facility review and approvals process which involves input from the rural municipality (i.e. County, MD or ID) in which the private municipal development is located. Rural municipalities can also play an important and effective role in terms of assisting with the operation and maintenance of water and wastewater facilities serving these developments. In general, the experience of AENV indicates that problems and incidents of non-compliance with requirements at private municipal waterworks and wastewater systems occur more frequently in areas where the rural municipalities have not taken an active role in the planning and/or operation of such systems.

4.1 Policy

To address the foregoing concerns and issues, AENV takes the following approach and policy with respect to its approval of waterworks and wastewater systems serving private municipal developments:

1. Involvement of Rural Municipality

Every effort will continue to be made to have rural municipalities take an active role in reviewing projects. In the case of multi-parcel developments, rural municipalities will be encouraged to obtain approvals for waterworks and wastewater systems on behalf of the ultimate property owner to ensure facilities are properly planned and constructed. Rural municipalities will also continue to be encouraged to take a lead role in both the operation of the system and in undertaking any upgrading/improvements required at these facilities.

2. Requirement for On-Site Servicing of Multi-Parcel Developments

In the absence of a commitment by the rural municipality to assume any role in, or responsibility for water and/or wastewater servicing of developments, AENV will not approve communal waterworks or wastewater treatment facilities, and will advise the developer to construct individual wells and subsurface wastewater disposal systems or pump-out tanks so that each and every lot is individually serviced. This approach puts responsibility for the operation and maintenance of water and wastewater facilities on each lot owner and eliminates the problem of operation and maintenance of a large and often complex central facility.

3. Conditions for Approval of Communal Water and/or Wastewater Systems

If the rural municipality will not accept any responsibility for these systems and the developer can demonstrate (by providing technical and engineering documentation) that a separate individual services concept is not feasible, AENV will consider approval of communal water and/or wastewater systems to service private developments provided that:

i. The proposed communal water and wastewater system is designed in accordance with AENV standards and guidelines for municipal systems, with provision to accommodate any planned or foreseeable expansions and it is employing reliable technologies that require a minimum of operation and maintenance. (Note: the purpose of this requirement is to ensure that the ultimate owners of these works have systems that are both reliable and easy to maintain and operate.);

ii. The developer undertakes the commitment to establish a long-term framework for the administration, management and operation of the waterworks and wastewater systems, prior to selling the subdivided parcels. This framework may take the form of: utility co-operatives, limited companies, condominium associations, etc..

iii. A Restrictive Covenant is registered against the Certificate-of-Title for each and every subdivided lot, stating that: the individual lot owners are responsible for operation and maintenance of the waterworks and/or wastewater system as outlined in the operating approval for the system(s); the lot owner must become a member/shareholder in the association that owns and operates the water and/or wastewater system(s). (Note: the wording of the Covenant will be provided by AENV on a case-by-case basis. The purpose of this requirement is to ensure that prospective property owners clearly understand their obligations and responsibilities with respect to the water supply and wastewater systems serving the development.);

iv. The bylaws of the Condominium/Homeowners Association include clauses that:

a. indicate that all members are responsible for proper operation and maintenance of the water and/or wastewater facilities servicing the development;

b. state that the Association undertakes operation of the facilities only on behalf of the membership;

c. require that Association and/or service fees be established in such a way that approximately five percent of the capital cost of the water and/or wastewater facility(ies) will be annually accumulated in a trust fund. These funds will only be used to carry out repair and upgrading work approved under the environmental legislation. (Note: such a fund will help ensure that systems are well maintained and can be upgraded as required in a timely manner.);

d. indicate that any changes to the sections of the by-laws associated with water and wastewater services should be reviewed by AENV;

e. as part of the Development Agreement with the rural municipality, the developer, must agree to operate the waterworks and wastewater facilities for a minimum defined period of time in accordance with both the development agreement and the operating approval for the facility. During this "warranty" period, the developer must rectify any system deficiencies before transferring ownership of the facility(ies) to the association. It will be recommended to the rural municipality that a performance bond be obtained from the developer to cover this "warranty" period. (Note: the purpose of this operation and facility warranty period is to ensure that the ultimate facility owners receive a system that has been "debugged" and is operating in accordance with requirements.)

v. In cases where the developer proposes to retain ownership of the water and/or wastewater system(s) serving multi-parcel private municipal developments, and become a "private utility" as defined in EPEA, approval will be granted to the developer only if the rural municipality grants a franchise to the developer to provide that service.

In approving this type of development arrangement, the rural municipality is in essence granting a service franchise to the developer, and such a franchise should be formalized to afford rate protection/control through the Energy and Utilities Board to those being serviced.

COMMUNICATION AND ACTION PROTOCOL FOR FAILED BACTERIOLOGICAL RESULTS IN DRINKING WATER

FOR

ALBERTA ENVIRONMENT APPROVED WATERWORKS SYSTEMS

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Communication and action protocol for failed bacteriological results in drinking water for Alberta Environment approved waterworks systems

Discussion:

Providing clean water has become a challenge with new knowledge and information about emerging pathogens in source waters. Water treatment systems must be designed and operated to ensure microbiologically safe drinking water even under the worst possible raw water quality scenario. Effective particle removal and efficient disinfection are the two principal treatment measures for ensuring microbiologically safe drinking water. Turbidity and disinfection residual measurements are therefore, the two most important ongoing tests related to microbiological water quality. The testing for bacteria in drinking water is an important component for ensuring microbiologically safe drinking water. A positive coliform test or high plate counts may indicate a system failure requiring immediate action. This protocol is intended to ensure that test results that exceed the bacteriological criteria as described in the latest edition of the *Guidelines for Canadian Drinking Water Quality* are transmitted to the appropriate parties so that follow-up action can be taken immediately.

Information / Database

1. Alberta Environment (AENV) Data Base

AENV will develop and maintain an electronic database to contain:

i) a list of the regulated waterworks systems under its jurisdiction; the waterworks system operator / contact person and his/her telephone and fax numbers;

ii) the AENV regional offices; each regional contact person and his / her telephone and fax numbers; and the 24 hour AENV complaint / emergency section telephone numbers;

iii) the Regional Health Authority (RHA) offices; each regional contact person and his / her telephone and fax numbers; and the 24 hour emergency contact pager number if available; and

iv) Alberta Health and Wellness regular work hours telephone numbers, and the Provincial Health Officer or the Deputy Provincial Health Officer 24 hour pager number.

AENV will make this information available to the Alberta Public Health Laboratory (APHL) and the RHAs. AENV will also update this list, and notify PLPH and RHAs if a new waterworks system is approved.

AENV database forms a part of this protocol.

2. Bacteriological Quality Database

APHL, EPCOR, and the City of Calgary will independently maintain <u>all</u> analytical results for the tests carried out by them in an electronic database. This information will be made available to AENV, Alberta Health and Wellness, Health Canada and the RHAs as requested.

Compliance requirement for bacteriological quality

1. Sampling

Bacteriological samples should be collected from representative points after treatment and throughout the distribution system after the first service connection.

The owner/operator of the waterworks systems in consultation with the APHL will ensure that they have an adequate supply of sampling bottles to meet the bacteriological quality monitoring requirement in the Approval. The owner/operator of the waterworks systems will be responsible for completing the requisition form, attaching the identification sticker to each sample bottle, and collecting and shipping of the samples to reach APHL within 24 hours. In collecting the samples, care shall be taken to wash hands before sampling, remove tap screens, and disinfect outside of the tap with alcohol or bleach. All water samples shall be transported in coolers with ice packs (not loose ice) to preserve the quality of the samples. APHL will reject samples not received within this period.

Minimum frequency of sampling, to be evenly distributed in the sampling period, is based on the following table:

Population Served	Number of Samples per Month
up to 5 000	4
5 000 to 90 000	1 per 1 000 population
more than 90 000	90 + (1 per 10 000 population)

Additional sampling will be required if poor water quality is suspected or Maximum Acceptable Concentration (MAC) for bacteriological quality is exceeded. Less frequent sampling may be allowed based on site-specific conditions, at the discretion of the AENV Approvals Manager.

2. Analysis

Analysis for compliance monitoring is to be done at the government owned APHL. Exception to this requirement is the compliance monitoring for distribution system within the boundary of Cities of Edmonton and Calgary, where a minimum of 50 % of the compliance monitoring must be done at the APHL.

3. Maximum Acceptable Concentration (MAC)

The MAC for coliforms – both total and faecal – in drinking water is zero organisms detectable per 100 mL. Because coliforms are not uniformly distributed in water and are subject to considerable variation in enumeration, drinking water that fulfils the following conditions will be considered to be in compliance with the coliform MAC:

i) No sample should contain more than 10 total coliform organisms per 100 mL, none of which should be faecal coliforms;
ii) No consecutive sample from the same site should show the presence of coliform organisms; and

iii) For community drinking water distribution systems:

(a) not more than one sample from a set of samples taken from the community on a given day should show the presence of coliform organisms; and
(b) not more than 10% of the samples based on a minimum of 10 samples should show the presence of coliform organisms.

Notification for presence of microorganisms (initial and repeat samples)

If total or faecal coliform organisms are detected from a single sample; or if the sample contains either a heterotrophic plate count (HPC) of more than 500 colony forming units (cfu) per milliliter, or background colonies of more than 200 on a membrane filter, the following notification procedures apply:

1. APHL will fax a copy of the results on the same day the results are known to the:

(i) owner/operator of the waterworks system where the sample was collected;
(ii) regional office of the RHA where the waterworks system is located; and
(iii) regional office of the AENV where the waterworks system is located.

2. Outside of regular work hours (between 3:30 p.m. and 8:00 am on week days and at all times during the weekends), in addition to the fax notification, APHL will also telephone the 24 hour complaint / emergency section of AENV, and the 24 hour emergency contact pager number of RHAs.

Note: AENV Database, appended to this protocol, contains all the contact names, and the telephone and fax numbers

Follow-up procedure and intervention

As soon as the fax or telephone notification is received by AENV, the Enforcement and Monitoring Section (E&M) of the Regional Office, in collaboration with the Regional Approvals Engineer and the RHA, will plan a strategy and take the following actions:

1. Corrective actions

The owner/operator will conduct a detailed check of the plant performance, disinfection dosages and residuals, the finished water quality (turbidity, particle counts, etc.), and any spill events or main breaks in the distribution system. AENV will verify that the owner / operator of the system:

i) optimizes the treatment process for surface water systems, if turbidity exceeds 0.5 NTU;
ii) increases disinfectant dosage and monitoring frequency for residual chlorine; and/or
iii) flushes water mains until chlorine residual is detected.

2. Repeat samples

AENV will verify that:

(i) the system owner/operator collects and submits for analysis a set of repeat samples, consisting of three repeat samples for every sample in which the presence of coliforms are detected; or the HPC is greater than 500 cfu/mL; or the background growth is greater than 200 colonies on a membrane filter. One sample from each of the following sites for a total of three repeat samples should be collected after localized flushing:

(a) at the site of previous sample; and
(b) within 5 active services upstream of the site of previous sample, or at the potable water reservoir for small systems; and
(c) within 5 active services downstream of the site of previous sample.

These samples shall be clearly identified as "Repeat Samples" on the requisition forms, which accompany samples to the laboratory.

(ii) all samples in a set of repeat samples are collected and submitted for analysis within twenty-four hours after notification by APHL. In the event the repeat sampling is conducted on a Thursday or Friday, the owner/operator would inform the APHL that weekend analysis is required, and advise AENV and RHAs accordingly. Shipping and pick-up of samples should be co-ordinated to ensure QA/QC is maintained. APHL will submit all results of repeat samples, both passed and failed, to AENV and RHAs, by faxing immediately to the respective offices.

(iii) when repeat samples have coliform detected; or contain a HPC of more than 500 cfu / mL, or background colonies of more than 200 on a membrane filter, one additional set of repeat samples for each of these incidents should be collected. Based on the magnitude and the extent of the problem, AENV may revise this procedure on a site-specific basis, but the sampling will be continued until the problem is resolved.

(iv) chlorine residual and turbidity (for surface waters only) are also monitored at each sampling site, and recorded.

Public health intervention

1. Boil water order

i) An executive officer of a RHA may issue an immediate boil water order if in his/her opinion a condition presents itself as a potential public health concern that requires immediate intervention to safeguard the public's health. Such conditions include but are not limited to:
   a) structural or equipment malfunction or concerns exist within the water plant or distribution system;
   b) one or a combination of physical, bacteriological or chemical analyses that in his opinion presents a public health concern;

c) exceedance of the health based turbidity limit for the water entering the distribution system; or
d) increase in number of cases of illnesses in the community.

ii) Notwithstanding the above, if the repeat samples taken under 2(i) contain faecal coliforms, then a boil water order is to be issued to the community served by the waterworks system.
If re-sampling confirms the presence of total coliforms in the absence of faecal coliforms, the degree of response will depend largely on the circumstance, magnitude and the extent of the problem. If the presence of total coliforms is linked to a main break, or the count is low (less than 10 organisms per 100 mL) and confined to a small area, then corrective actions as detailed earlier should be continued. If the total coliform count is high (greater than 10 organisms per 100 mL) and the problem is widespread, then a boil water order is to be issued.

iii) RHAs will ensure that boil water order notice is communicated to the consumers, especially to *high risk facilities* such as child care centres, long term care facilities, hospitals, hotels, ice manufacturers, etc.

iv) RHAs will notify officials of Alberta Health and Wellness (Environmental Health Strategies during regular work hours and the Provincial Health Officer or the Deputy Provincial Health Officer outside regular work hours) as soon as practical of any boil water notice carried out pursuant to this protocol.

Note: I) If there exists a *Public Health Intervention Protocol* for a particular waterworks system, or a new one developed, that is:
- endorsed by the RHA, AENV and the system owner;
- not in conflict with any of the procedures stipulated in this protocol; and
- more stringent than the procedures stipulated in this protocol, then RHAs may follow that protocol for public health intervention.

II) For large systems, serving greater than 20,000 people, at the discretion of RHAs, the boil water order may be confined only to those areas directly affected by the distribution network, and not necessarily the whole community served by the distribution system.

II) If a positive bacteriological sample can be distinguished as an internal building / complex problem, then, at the discretion of the RHAs, the boil water order may be confined to that building / complex.

2. Rescinding a boil water order

The boil water order will be rescinded when the regional health authority is satisfied that a risk to public health no longer exists. This may be determined according to the following criteria:

i) the treatment or distribution malfunction has been corrected and sufficient water displacement has occurred in the distribution system to eliminate any remaining contaminated water;
ii) turbidity, disinfection residual or particle counts of the treated water have returned to acceptable levels;
iii) at least two consecutive sets of samples collected in two consecutive days have no coliform; and the HPC is less than 500 cfu / mL, and background growth is less than 200 colonies on a membrane filter;
iv) any other actions or verifications deemed necessary to assure that public health is being protected.

Establishing the cause of contamination

E&M will co-ordinate the effort by the owner/operator of the system to determine the cause of the microbial contamination, and ensure that measures are put in place so that the incident will not be repeated. The owner/operator will follow up with a written report of the incident to AENV and RHAs within seven days of discovery of the problem.

Alberta Health and Wellness

The Regional Health Authorities may contact Alberta Health and Wellness:

i. During work hours: Environmental Health Strategies at 780-427-8118, 780-415-2758 or 780-427-2643.
ii. After work hours and on holidays and weekends: The Provincial Health Officer or the Deputy Provincial Health Officer at the 24-hour pager number 780-419-9339.

ISSUE: Application of stormwater management guidelines from a quality standpoint

Background:

Stormwater management activities require Alberta Environment's (AENV) approval, both under the *Environmental Protection Act* and under the *Water Act*. AENV has developed stormwater management guidelines, and these guidelines form the basis for stormwater management in the province. This regulatory responsibility involves working with municipalities on a project specific basis.

Traditionally, stormwater has been managed from a quantity rather than quality standpoint. Stormwater systems have been designed to handle certain rainfall events in order to minimize the potential of flooding and flood damage to both those served by the storm system and those adjacent to the water body receiving the storm runoff. Stormwater quantity management practices such as on site property grading and dry/wet storm ponds have evolved both to reduce the quantity of stormwater runoff generated and to control the rate of release of runoff.

There has now been an increasing recognition that in certain circumstance stormwater discharges can adversely impact receiving water quality. This recognition has lead to efforts to better understand what factors influence the quality of stormwater and to the development of strategies or options for improving the quality of stormwater.

The potential for contaminants to be present in stormwater and to impact the receiving environment is very site specific. Unlike wastewater systems that operate under relatively steady state conditions, there is little control over the operation of a storm drainage system. For this reason, it is impractical to set specific end-of-pipe stormwater quality standards. Though AENV's guidelines provide practical and specific guidance, the issue is how and when these guidelines should be applied. There must be flexibility to account for site specific conditions when applying these guidelines.

A chronological order of events or actions relevant to the regulation of stormwater management include:

i. The Clean Water Act (1972) which legislated the construction and not the operation of piped stormwater systems.
ii. Stormwater Guidelines (1978).
iii. Stormwater Management Guidelines for the Province of Alberta (March 1987).
iv. Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Facilities (March 1988).
v. The Environmental Protection and Enhancement Act (September 1993).
vi. The Water Resources Act (April 1931).
vii. The Water Act (January 1999).
viii. Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems (December 1997).
ix. Stormwater Management Guidelines for the Province of Alberta (January 1999).

Issues

Since finalizing the *Stormwater Management Guidelines for the Province of Alberta*, there have been a number of queries from the Approval Writers and some of the municipalities as to how the guidelines will be applied with respect to stormwater quality.

Development of a stormwater management policy takes into consideration the following key issues:

i) Regulatory Consistency - There should be general consistency across the municipalities and the Regional Offices in terms of when and how the policy should be applied. The policy shall be applied to all municipalities involved in land development, at the watershed planning stage.

ii) Minimum Quality Standards - Storm outfalls without due consideration for water quality improvement shall not be allowed. Stormwater management techniques to improve water quality shall be included to effect a minimum of 85% removal of sediments of particle size 75 µm or greater. Additional quality management measures shall be required, based on site-specific conditions.

iii) Stormwater Management Plan - All municipalities will be required to develop a stormwater management plan with emphasis on stormwater discharge controls and possible quality management options (i.e. both immediate and ultimate plans to protect the receiving waters). Regions will work with the municipalities to develop a Master Drainage Plan to address both the quantitative and qualitative problems. Where appropriate, this process should be integrated into the Drainage System Approval for the municipalities, i.e. if the Approval is issued that incorporate the "total loading concept".

iv) Receiving Water Quality Assessment - Municipalities may not be required to undertake a water quality assessment to estimate the impact of stormwater on receiving body of water, however, receiving water quality concerns and specific site conditions should be taken into account in developing the stormwater management plan.

POLICY

This policy applies to "storm drainage collection system" and "storm drainage treatment facility" as defined in the *Wastewater and Storm Drainage Regulation*.

Regions will ensure that the municipalities, in planning and implementing surface drainage, adopt an integrated approach to stormwater management, beginning at the watershed and sub-watershed levels and extending to the subdivision/site plan level with emphasis on stormwater quality and best management practices (BMPs), both structural and non-structural. All municipalities will be required to develop a Master Drainage Plan, within a span of five years from the time this policy takes effect. The plan shall incorporate stormwater management techniques to effect a minimum of 85% removal of sediments of particle size 75 µm or greater. Regions will work with the municipalities to develop a Master Drainage Plan, and this process shall be integrated into the Drainage System Approval for the municipalities. Receiving water quality concerns and specific site conditions should be taken into account in developing the stormwater management plan, which may result in higher than 85% removal of sediments. Consideration shall be given to stormwater management measures, including stormwater lot level controls, stormwater conveyance controls and pre-release stormwater management facilities. The municipalities shall select the BMP in the context of land use and environmental planning, taking into consideration the receiving water quality concerns, site conditions, and applicability of the selected BMP under the local conditions.

Note: It should be noted that reducing the impact from existing developments is difficult and has limited effect; thus, this policy is aimed at new developments.

ISSUE: Guiding Principles and Implementation Procedure for the recognition and approval of Environmental Technology Verification (ETV) program certified technologies in Alberta

BACKGROUND:

It is difficult for new and innovative technologies to gain acceptance in both domestic and foreign marketplaces. Frequently, suppliers of technologies need to undergo repeated performance tests in different jurisdictions in Canada, because of the cautious approach usually taken by the regulators in reviewing and approving new and innovative technologies. Buyers often find it difficult to evaluate competing claims of technology suppliers. All these arguments led to the launching of the ETV program in 1997.

The ETV program is a national initiative by Environment Canada and Industry Canada designed to foster the growth and marketability of Canada's environment industry, by providing validation and independent verification of performance claims for new and innovative technologies. Through this process, the program provides both buyers and regulators with an assurance that the vendor's claims of performance for an environmental technology are valid, credible and supported by suitable test information.

A key issue in this initiative is the formal recognition of the ETV program by the provincial governments. Provincial acceptance would provide significant benefit not only to technology vendors but also the provinces. For vendors, the program may reduce the need for repeating costly demonstrations if provinces agree to mutual acceptance of technology evaluations/verifications completed using standardized protocols. For the provinces, the program can streamline the technology evaluation process and thereby reduce the time and cost required for regulatory staff to evaluate and assess technology performance claims that are part of the approval process.

After a careful and detailed evaluation of the ETV program, Alberta Environment (AENV) has accepted it as a credible program, and that it will benefit the department as a regulatory agency. AENV has also signed a Statement of Recognition to make use of the ETV program in the approval process. The program should assist AENV in the timely completion in approving a project, but does not replace or circumvent the provincial approval process. As is the case with other projects, for ETV certified technologies, it is the applicant's responsibility to identify regulatory requirements or standards in force in Alberta when making an application for regulatory approval of a project. There may be site-specific considerations pertaining to a particular technology application and regulatory approval, which go beyond the scope of a given ETV verification. Under this scenario, AENV may require additional information on testing of the proposed application of the technology before issuing an approval

GUIDING PRINCIPLES

AENV commits to recognize and approve ETV program certified technologies in the following manner:

1. To use the ETV verification results provided by an applicant in assessing the acceptability of a technology in a particular application, in order to assist the regulatory approvals process for that technology and, therefore, reduce efforts and costs incurred by the applicant and AENV;

2. To acknowledge the verification certificate and the verification report as reliable information and only require additional information on testing of the proposed application of the technology, if:

    i. it falls outside the scope identified in the ETV verification;
    ii. there are inconsistencies between the scope or application presented for ETV verification and for regulatory approval;
    iii. there is a requirement to demonstrate ongoing regulatory compliance consistent with requirements for competing technologies.

IMPLEMENTATION PROCEDURE

1. The proponent files a complete application with AENV for approval of the activity under the Environmental Protection and Enhancement Act.

2. AENV undertakes a technical review of the application to determine whether the general and overall impact on the environment of the activity is in accordance with the Act and the Regulations.

3. As part of the technical review, the Approval Writer will consider the ETV verification results provided by the applicant in assessing the acceptability of the technology for the proposed activity.

4. The Approval Writer will request for additional verification information, if:
    - if the ETV verification results provided by the applicant fall outside the scope identified in the ETV verification;
    - there are inconsistencies between the scope or application presented for ETV verification and for regulatory approval;
    - there is a requirement by AENV to demonstrate ongoing regulatory compliance consistent with requirements for competing technologies.

5. The Director makes the decision whether an approval will be issued. If the Director decides to issue an approval, the approval will contain the terms and conditions that must be followed. If the Director decides not to issue an approval, the applicant will be advised of his decision as to why the application was rejected.