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Measurement Canada Water Trade Sector Review

*Recommendations for Establishing Measurement
Canada's Level of Intervention in the Sector*

May , 2004

Prepared for **General Distribution**

by

The Water Sector Review Team:

*Fair Measure
For All*



*La mesure ju:
pour tous*

Canada

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1.0 Introduction

1.1 Purpose of the Report

This report contains the recommendations for establishing an appropriate level of intervention for Measurement Canada (MC) in the water trade sector. The water trade sector review included extensive Canada-wide consultations with various water sector stakeholders. Stakeholders played the pivotal role in the development of these recommendations which promote the accurate measurement of water measuring devices while acknowledging the costs and risks associated with their implementation.

This report also summarizes the water sector stakeholder's thoughts and concerns on an array of important issues. This report provides Measurement Canada senior management with the supporting rationale and considerations behind each recommendation.

1.2 Structure of the Report

The report has been structured to:

- provide an understanding of the consultation process used for this project.
- identify the stakeholder groups who participated in the Water Trade Sector Review (WTSR) initiative.
- identify the different measurement applications within the sector.
- identify the current services and programs provided by Measurement Canada and those recommended by the stakeholders.
- identify the key considerations for the recommended programs.
- identify major stakeholder concerns and comments about matters pertaining to the WTSR.

1.3 Reference Material

A Water Trade Sector Review report entitled, *A Discussion Paper on Establishing an Appropriate Level of Intervention in the Water Trade Sector*, was published in February 2004. The WTSR team distributed this paper to all those parties who had previously shown interest in the initiative. The paper was also posted on the Measurement Canada's website. Meeting minutes were prepared and distributed to those stakeholder who attended one or more of the six (6) consultation meetings. These minutes and all other WTSR public documentation can be found on the Measurement Canada web site at <http://mc.ic.gc.ca> (under the Trade Sector Review section).

1.4 Methodology of Consultation

Since February 2003, the WTSR team contacted, met and solicited input from a large number of stakeholders from various areas of the water industry. The various methods used included:

- ▶ stakeholder information sessions
- ▶ one-on-one meetings
- ▶ presentations at industry conferences and policy forums
- ▶ telephone calls
- ▶ Measurement Canada website (<http://mc.ic.gc.ca> - sector review - water)
- ▶ email (h2o@ic.gc.ca)
- ▶ direct mail-outs
- ▶ stakeholder questionnaires, etc..
- ▶ focus groups and national surveys

The purpose of these contacts and events was to acquaint stakeholders with Measurement Canada's programs and the Trade Sector Review process. The WTSR team investigated the current trade measurement practices employed in this trade sector as well as actively soliciting views and comments from the stakeholders regarding what future measurement programs they would like to see in the industry and how these programs could be best provided. The information obtained from these meetings and other research formed the basis of the discussion paper and the areas of discussion at the consultation meetings.

The recommendations for this final report were formed at the following six (6) multi-stakeholder consultation meetings:

- ▶ Edmonton - Feb 17 & 18, 2004
- ▶ Toronto - March 2 & 3, 2004
- ▶ Vancouver - March 16 & 17, 2004
- ▶ Montreal - March 30 & 31, 2004
- ▶ Halifax - April 14 & 15, 2004
- ▶ Winnipeg - April 27 & 28, 2004

The WTSR team encouraged interested stakeholder to send related comments or concerns to one of the team members. All matters presented before May 15th, 2004 were considered for inclusion in the final recommendations. Other comments will continue to be welcome during the implementation stage of the WTSR.

1.5 Decision Making Criteria

Throughout the consultation process, the team strived to achieve a consensus among sector stakeholders for all recommendations. The following conditions were used to guide the discussions:

- general consensus of the vulnerable parties¹ must support all recommendations
- general agreement from all stakeholders on all recommendations; individual dissenting opinions were captured
- general support from third parties (those who are not parties to the trade transaction)
- all decisions/recommendations must be in line with MC's strategic direction
- all recommendations must be sustainable into the future
- the recommendations must be both practical and feasible and they must not deviate from international metrology standards in a manner that they could be construed as a barrier to international or North American trade agreements

The following term has been used to describe the introduction of recommendations in this report:

Consensus - general stakeholder agreement and the vulnerable parties are in complete agreement with the recommendation(s). Complete agreement of all stakeholders is not required. Stakeholders who opposed the recommendation had their opinion noted.

1.6 Impact of Recommendations on Other Trade Sector Reviews

Some recommendations contained within this report may impact on other trade sector reviews. The WTSR recommendations may be reviewed and possibly considered by other trade sector reviews for adoption, however, they will remain applicable only to the water sector.

¹Party who is the purchaser or seller of a product and who does not own or control the measurement equipment used in the transaction. The degree of vulnerability may vary from nil to high depending upon the capacity and ability of the vulnerable party to detect measurement errors, re-measure the product and have corrective measures taken where appropriate.

1.7 Stakeholder Reach

The Water Trade Sector Review has tried to ensure that the stakeholders who provided input or participated in the consultation meetings were representative of the sector. It was deemed essential to have the input of the vulnerable parties to the trade transaction and all viewpoints and comments were taken into consideration when deciding upon the recommendations.

Representation from the sector included:

- ▶ the water and wastewater associations
- ▶ water utilities (private, public and rural water cooperatives)
- ▶ municipalities (local and regional)
- ▶ ICI customers and trade associations
- ▶ consumer groups and citizen advocates
- ▶ public utility and public commission review boards
- ▶ provincial government water conservation agencies
- ▶ water meter manufacturers
- ▶ water meter service companies
- ▶ water meter dealers and auxiliary equipment sales companies
- ▶ water engineering consultants
- ▶ other federal regulatory bodies
- ▶ bulk and wastewater haulers

The team made a special effort to involve all types of vulnerable parties at every multi-stakeholder meetings. Unfortunately their participation at every meeting was not always possible.

1.8 Conclusion and Acknowledgements

The WTSR team would like to express their sincere thanks and appreciation to all stakeholders who participated in the process and attended the consultation meetings. The exchange of information and dialogue throughout the project was always done in a courteous and professional manner and the industry was very supportive of the process. The team is satisfied that it consulted with a sufficient number of sector stakeholders in order to solicit their opinion on what is the appropriate level of Measurement Canada intervention in the water trade sector. The WTSR team welcomes any comments, questions or clarifications on the contents of this report.

The WTSR team would like to thank their fellow Measurement Canada employees for both their support and the information they provided during the project. The team encourages Measurement Canada's *Senior Management Committee (SMC)* to review this report with the expectation of accepting and implementing the recommendations.

Finally, the team would like to acknowledge the Measurement Canada team stewards for their guidance and support during the review.

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2.0 Acronyms

A list of acronyms used in this document is provided below for the reader's reference.

ASDM	Alternative Service Delivery Mechanism
AWWA	American Water and Wastewater Association
BIPM	Bureau International des Poids et Mesures
CRD	Capitol Region District (Victoria, BC)
CWWA	Canadian Water and Wastewater Association
EC	European Commission
GVRD	Greater Vancouver Regional District
ICI	Industrial, Commercial and Institutional
ISD	Innovative Services Directorate (Measurement Canada)
ISO	International Standards Organization
JWG	Joint Working Group
MC	Measurement Canada
NIST	National Institute of Standards and Technology (U.S.)
NRC	National Research Council (Canada)
OIML	Organization internationale de la métrologie légale
PDD	Program Development Directorate (Measurement Canada)
PVWC	Pembina Valley Water Cooperative Inc. (Manitoba)
SA-01	Measurement Canada's Accreditation Standard
TSR	Trade Sector Review
WTSR	Water Trade Sector Review

3.0 Water Trade Sector Recommendations (Summary)

Water Utility Sub-sector

Approvals

A consensus of stakeholders and the WTSR team recommend that:

1. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, must be type approved (including updates and revisions) before they can be used in trade. This would apply at all levels of trade and a cost benefit analysis is to be performed before the program is launched.
2. The type approval process is to include provisions for evaluating a prototype water meter to ensure that it meets the applicable standard.
3. The type approval process is to only apply to water meter prototypes that are submitted for approval after a certain date (to be determined). Existing water meter models used in trade will continue to be exempt from the type approval process.
4. Measurement Canada is to form a joint working group to establish the details of the requirements for the type approval of water meters. Representation on the group will be from all applicable stakeholders groups.

Initial Inspections

A consensus of stakeholders and the WTSR team recommend that:

5. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, pass a mandatory initial inspection before being used in trade. Where applicable, Measurement Canada should recognize the use of a statistically valid sample testing plan when the mandatory initial inspection of water meters is performed. The initial inspection requirement should apply at all levels of trade.
6. The initial inspections of water meters may be performed by recognized and authorized organizations provided they meet established requirements. Initial inspections could be done at any recognized location (ex. factory, utility, service company or in-situ) as long as the devices comply to all established requirements before being used in trade.

7. The requirement for initial inspection should only apply to water meters that are put into service after a certain date (to be determined). Water meters already in-service will be exempt from the initial inspection requirement.
8. Municipalities or water utilities should be responsible for the inspection of the installation of water meters. Measurement Canada should work with the water industry to establish standard requirements for the installation of water meters at all levels of trade. The industry is to follow manufacturer specifications, local plumbing codes and any other requirements needed to ensure the meter is measuring accurately.
9. Measurement Canada is to form a joint working group to establish the details of the initial inspection requirements. The group is to include representation from all applicable stakeholders. A joint working group approach should also be used to establish the installation requirements. The joint working group is to perform a cost/benefit analysis before initial meter inspection is made mandatory.

Re-verification Inspections

A consensus of stakeholders and the WTSR team recommend that:

10. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, be subjected to a mandatory re-verification inspection. Where applicable, Measurement Canada should allow the use of a statistically valid sample testing plan when the mandatory re-verification inspection of water meters is performed. The mandatory re-verification inspection should apply to all levels of trade except where a regional municipal authority is supplying water to its member municipalities. For this level of trade it is recommended that water meters be exempt from mandatory re-verification requirements but a “best practices” or “protocol” process should be established by the Regional Municipality to ensure the water meters are performing to the required standard.
11. Re-verification inspections may be performed by recognized or authorized organizations provided they meet the established requirements. Re-verification inspections could be conducted at any recognized location (ex. water utility meter shops, meter manufacturer test facilities, or 3rd party meter service organizations). Where it applies, re-verification inspections could also be conducted in-situ. Measurement Canada should consider sustainable alternatives to the existing accreditation and registration programs for meter re-verification in the water trade sector.
12. Measurement Canada is to form a joint working group to establish the details of the re-verification inspection requirements. The joint working group will include representation from all applicable stakeholders. The joint working group is to perform a cost-benefit analysis before re-verification is made mandatory. The details of the re-verification inspection requirements will include re-verification

periods, sampling plans, and the option of replacing the meter in lieu of a re-verification inspection. The requirements for re-verification inspections should be implemented over a period of years (phase-in) and take into account:

- ▶ the economics of a water meter inspection program;
- ▶ the composition of the water;
- ▶ the method of charging for water and sewer services (when based on water meter registration);
- ▶ the water and sewer rates.

Legislation

A consensus of stakeholders and the WTSR team recommend that:

13. Measurement Canada should establish and implement regulations and/or specifications for meters used by water utilities for customer billing or custody transfer . This will apply for all water meters at all levels of trade.
14. Measurement Canada is to form a joint working group to establish the details of the requirements for water meters. The joint working group will include representation from all applicable stakeholders. Areas to be discussed will include type approvals, initial inspection requirements, re-verification requirements, installation requirements and performance requirements. The joint working group is to look at existing legislation or standards when developing these requirements.

Physical Standards

A consensus of stakeholders and the WTSR team recommend that:

15. Measurement Canada is to establish and implement regulations for all trade measurement standards and test equipment used for the initial inspection and re-verification of water meters in Canada.
16. Measurement Canada is to certify physical standards and test equipment. Other organizations should also be allowed to certify standards provided they meet the established requirements and are authorized by Measurement Canada.
17. Measurement Canada is to continue to pursue the recognition of other

international standards laboratories.

18. Physical standards and test equipment used to test or certify water measuring devices will be subject to mandatory calibration intervals.
19. Measurement Canada is to form a joint working group to establish the rules and requirements for all trade measurement standards and test equipment used for the initial inspection and re-verification of water meters in Canada. The joint working group will include representation from all applicable stakeholders.

Complaints and Disputes

A consensus of stakeholders and the WTSR team recommend that:

20. Prior to involving Measurement Canada, all efforts should be made by the water utility to try and resolve customer complaints and disputes regarding water meters. Before Measurement Canada becomes involved in the complaint or dispute process, Measurement Canada will request that the water utilities and their customer try to resolve the water meter complaint or dispute. Measurement Canada will act as the 3rd party final arbiter for complaints and disputes regarding water meters which have not been resolved by the water utilities.
21. Measurement Canada is to establish a formal process to investigate consumer complaints and disputes regarding water meters.
22. Measurement Canada is to consult with all applicable stakeholders when establishing the rules and requirements for a formal process to investigate consumers complaint and disputes.

Marketplace Monitoring

A consensus of stakeholders and the WTSR team recommend that:

23. A marketplace monitoring process for the water trade sector should be determined during the implementation stage of the Water Trade Sector Review. Input from all applicable stakeholder groups should be obtained.
24. Measurement Canada is to consult with all applicable stakeholders groups when establishing the processes for the marketplace monitoring of the water trade sector.

Other Sub-sectors

Sub-metering

25. Measurement Canada's level of intervention in this sub-sector should be determined in consultation with stakeholders during the water trade sector review implementation.

Wastewater (Sewer)

26. Measurement Canada's level of intervention in this sub-sector should be determined in consultation with stakeholders during the water trade sector review implementation.

Bulk Water Sales - Bulk Water Outlets

27. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of water sales at bulk water outlets in Canada.
28. Measurement Canada will investigate complaints of bulk water outlets if the transaction is based on the quantity of bulk water sold.
29. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the sales of a stated quantity of bulk water is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the water being sold. These limits of error would be applied to the sales of bulk water by any form of trade measurement.

Bulk Water Sales - Bulk Water Delivery

30. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of water sales by tanker truck in Canada.
31. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of bulk water sold/delivered by tanker truck.
32. Measurement Canada will develop and implement limits of error (tolerances)

that can be used to determine whether the delivery/sales of a stated quantity of bulk water is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the water being sold/delivered. These limits of error would be applied to the sales/delivery of bulk water by any form of trade measurement.

Wastewater Removal and Hauling

33. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of wastewater removal and hauling in Canada.
34. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of wastewater removed/hailed by the wastewater hauler.
35. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the removal/hauling of a stated quantity of wastewater is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the waster being removed/hailed . These limits of error would be applied to the removal/hauling of wastewater water by any form of trade measurement.

Wastewater Disposal

36. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of wastewater disposal in Canada. This would only apply to measuring devices that are used exclusively to determine wastewater disposal charges.
37. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of wastewater disposed of at a wastewater disposal facility.
38. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the disposal of a stated quantity of wastewater is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the wastewater being disposed. These limits of error would be applied to the disposal of wastewater by any form of trade measurement.

4.0 Water Utility Recommendations (Detailed)

4.1 Approvals

Background:

Before any device can be used in trade in Canada, a prototype must receive approval from the Measurement Canada Approval Services Laboratory. This facility is located in Ottawa. The purpose of this approval is to ensure that this device is capable of measuring accurately throughout its service lifetime. The approval process involves the evaluation of one or more devices of a particular type in accordance with the relevant regulations and specifications for design, composition, construction and performance. The sample device(s) are subjected to comprehensive testing throughout their measuring ranges and at conditions which simulate the environment in which they are intended to operate. Once it has been determined that the instrument type complies with all specified approval requirements, pattern approval is granted and a notice of approval is issued by the Approval Services Laboratory.

Current:

Measurement Canada legislation currently **exempts water meters** from the approval process. The vast majority of the municipalities that have been consulted in the WTSR process have indicated that they purchase meters that are compliant with AWWA C700 series water meter standards. The AWWA has established written standards for the design, fabrication, and accuracy of water meters. The AWWA neither type approves individual meter models nor endorses any claims that designated meters conform to their standards. Meter manufacturer purport that their meters meet the AWWA standard but there is no testing by AWWA to ensure this statement is true. The requirement for water meter approval varies greatly amongst the world's industrialised countries.

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

1. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, must be type approved (including updates and revisions) before they can be used in trade. This would apply at all levels of trade and a cost benefit analysis is to be performed before the program is launched.
2. The type approval process is to include provisions for evaluating a prototype water meter to ensure that it meets the applicable standard.
3. The type approval process is to only apply to water meter prototypes that are submitted for approval after a certain date (to be determined). Existing water meter models used in trade will continue to be exempt from the type approval process.

4. Measurement Canada is to form a joint working group to establish the details of the requirements for the type approval of water meters. Representation on the group will be from all applicable stakeholders groups.

Key Considerations:

- Stakeholders agreed that Measurement Canada should not necessarily be the only device approval laboratory that conducts approval testing. Other authorized locations could be acceptable if they meet the established standard. Measurement Canada oversight would be required and Measurement Canada would be the organization that would make the final decision as to whether or not a given water meter is approved for use in trade in Canada. Only Measurement Canada would have the authority to grant an approval.
- Approval testing or evaluation in other jurisdictions should be considered if the method of testing or method of evaluating meet the established requirements (ex. California Type Evaluation Program (CTEP)).
- Stakeholders want Measurement Canada to ensure that the type approval process does not add significant costs, limit new technology or deter innovation. Stakeholders are concerned that the cost of type approval could be prohibitive for large meters because of the low number of meters in service. Meter manufacturers are primarily concerned about the approval testing of water meters models which are not widely sold in Canada. For these models, the cost of approval testing may be quite high when looked at on a cost per unit basis.
- The cost of approval testing/evaluation should not be so expensive that water meter manufacturers abandon the Canadian market.
- Meter manufacturers are also concerned with the uncertainty of not knowing what the future Measurement Canada requirements will be for water meters used in trade in Canada.
- Measurement Canada should consider approving certain types of trade measurement devices without requiring tests where a known volume of product is compared with the corresponding registration of the device. This would be done in instances where the quantity of product needed to test the devices is too large to make it physically practical to capture the product. In these cases the approval evaluation would be based on intrinsic testing as well as other supportive documentation provided by the approval applicant.
- It was recommended that approval testing requirements be performance based only.

- AWWA is the recommended criteria for approval testing but other standards (ex. OIML R 49-1, NIST Handbook 44, EC Common Position 51/2003) should also be considered.
- Existing standards may not cover all types of water meters that are used for trade in Canada.
- Stakeholders strongly believe that existing models should be exempt from the approval process. There should also be a phase-in period in which new meter models would require approval after a certain date. This date could be staggered for different types of meters.
- Measurement Canada will have to amend section 4(a) of the *Weights and Measures Regulations* as it applies for water utility meters.

Rationale:

The vast majority of stakeholders, who participated in the WTSR process agree, that a device type approval program should be established. This program should ensure that only high quality devices will be used in trade applications.

Stakeholders do not want type approval requirements which are primarily based on the design and composition of the meter. Measurement Canada should try to minimize these requirements and concentrate more on performance based criteria.

Accepting approval testing results from other organization or other jurisdictions may shorten the time it takes for some devices to receive approval. It may also reduce the cost of the obtaining the Notice of Approval for the device approval applicant.

Most water meters used in Canada are manufactured to the AWWA standards. This standard should therefore be the starting point for establishing Measurement Canada water meter approval evaluation requirements. OIML R-49-1 and other water meter standards should also considered since new meters, manufactured outside of North America, are currently be introduced into the Canadian marketplace.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop the necessary specifications, procedures and policies governing the type approval process for water meters.

Long Term (2 to 5 years) - Measurement Canada has a process in place to conduct approval testing and/or is able to recognize the approval testing of water meters performed by other organizations or jurisdictions.

Measurement Canada will implement the necessary regulatory reform for the type approval of water meters.

4.2 Initial Inspections

Background:

Weights and Measures Devices

Unless exempted by the Weights and Measures Regulations, a device intended to be used in trade must be of an approved type and, prior to being sold, must be initially verified by a Weights and Measures inspector or Authorized Service Provider. This inspection ensures that the devices are properly configured and calibrated before being used. The device must operate within the appropriate limits of error as prescribed by the *Weights and Measures Act and Regulations* or applicable specifications. Depending on the complexity of the device, this inspection may take place at the manufacturers premises, service company shop or on-site after installation. Inspection results will determine if the instrument is certified.

Electricity and Natural Gas Meters

Before any meter can be placed into service for billing purposes, it must be verified to ensure that the meter conforms to pattern approval, functions correctly and has acceptable metrological characteristics. Verification involves inspection by a government inspector or an accredited meter verifier either by inspecting each meter individually or, where possible, by forming meters into lots and performing statistical analysis on the inspection results of a selected sample of meters. Each tested meter is subjected to tests at points throughout its operating range. Verification is normally indicated by a government or accredited meter verifier seal, which also serves as a deterrent to tampering, and is accompanied by a certificate attesting to the meter's status.

Current

Water Meters

Current Measurement Canada legislation **exempts** water meters from the requirement of passing an initial inspection prior to being used in trade. There are also no limits of error for water meters prescribed in the *Weights and Measures Act and Regulations*. Most water meters are tested at the meter manufacturers test facilities before they are sold to the water utilities. Some large meters can only be tested after they have been installed at the customers premises. This test is usually done by either a meter manufacturer's representative, the water utility or by a water meter service company. Most meters used in Canada have been tested as per the applicable AWWA requirements. Some, but not all, municipalities inspect ICI installations before the meter is put into service. Residential water meter installations are not commonly inspected prior to the commencement of water services.

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

5. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, pass a mandatory initial inspection before being used in trade. Where applicable, Measurement Canada should recognize the use of a statistically valid sample testing plan when the mandatory initial inspection of water meters is performed. The initial inspection requirement should apply at all levels of trade.
6. The initial inspections of water meters may be performed by recognized and authorized organizations provided they meet established requirements. Initial inspections could be done at any recognized location (ex. factory, utility, service company or in-situ) as long as the devices comply to all established requirements before being used in trade.
7. The requirement for initial inspection should only apply to water meters that are put into service after a certain date (to be determined). Water meters already in-service will be exempt from the initial inspection requirement.
8. Municipalities or water utilities should be responsible for the inspection of the installation of water meters. Measurement Canada should work with the water industry to establish standard requirements for the installation of water meters at all levels of trade. The industry is to follow manufacturer specifications, local plumbing codes and any other requirements needed to ensure the meter is measuring accurately.
9. Measurement Canada is to form a joint working group to establish the details of the initial inspection requirements. The group is to include representation from all applicable stakeholders. A joint working group approach should also be used to establish the installation requirements. The joint working group is to perform a cost/benefit analysis before initial meter inspection is made mandatory.

Key Considerations:

- The stakeholders agreed that the major meter manufacturers will probably conduct the majority of water meter initial inspections. They also expressed their belief that any person or organization should be allowed to perform initial inspections provided that the established requirements are met. Measurement Canada will have to establish the criteria used to recognize the individuals or organizations who will perform these inspections.
- All stakeholders recognized that there could be additional costs if the initial inspection requirement is overly onerous or significantly different from existing

meter calibration/testing. Meter manufacturers expressed their concerns about the cost of the initial inspection and the fact that any additional costs would be passed on to the water utilities. Their concern was mainly caused by the fact they did not know what the new requirements would be. Their concerns would be lessened if the initial inspection procedure was in-line with the current procedure they use for the calibration and testing of a new water meter.

- Measurement Canada should ensure that the process of testing water meter registers separately from the meter body does not adversely effect accuracy of the assembled product.
- The cost of initial inspections should not result in current manufacturers abandoning the Canadian market.
- Stakeholders raised concerns about the need for Measurement Canada to recognize original testing and/or initial inspection of the meter when it takes place outside of Canada. Measurement Canada should recognize the testing that is done at these facilities if they can meet the Canadian requirements.
- Measurement Canada may have to consider sustainable alternatives to the existing accreditation and registration programs for the initial inspection of water utility meters. This should be done in consultation with applicable stakeholders. The alternative could be that no inspection “on behalf of the Canadian Government” would be required but the water utility would have the responsibility to ensure that the recognized testing is conducted.
- Stakeholders agreed that the option of using an acceptable statistically valid sample testing plan should be considered.
- As with approval testing, Measurement Canada realizes that there are large water meters, used to sell water between two parties, which have such high operating flow rates that it is not practical and/or possible to inspect them with a known volume of water. For these reasons, Measurement Canada should consider initial inspections based on other methods besides the direct comparison of a known volume and the corresponding meter registration.
- Stakeholders stated that the incorrect installation of an ICI meters can have a huge impact on accurate measurement. Stakeholders want Measurement Canada to establish water meter installation specifications which are based on the manufacturer’s requirements. The Infrastructure Canada’s Best Practices Guide “*Establishing a Metering Plan to Account for Water Use and Loss Water*” should be used as a guideline when developing water meter installation specifications. The utilities would ensure that the water meters installations are in compliance with these specifications.
- Stakeholders are concerned as to what would constitute an initial inspection and whether or not an initial inspection would be required if a register was replaced.

There was also the concern of whether an installation inspection would be required if a replacement meter was put into an existing water service or what will happen when a new customer moves into an existing building and the new customer has a significantly different water usage. Will water meter sizing be included in the regulations? These are some of the areas that the joint working group will have to consider when developing water meter specifications.

- Measurement Canada will have to amend section 4(a) of the *Weights and Measures Regulations* as it applies to water utility meters.

Rationale:

The vast majority of stakeholders who participated in the WTSR process agree that a mandatory initial program should be established. This should ensure that only accurate measuring devices will be put into service. Only a few stakeholders expressed their belief that water meters should not require a mandatory initial inspection before they are put into trade use. Stakeholders do not want the initial inspection requirements to be overly onerous or costly.

The meter manufacturers will conduct the majority of these inspections. When the joint working group develops the initial inspections procedures, the meter manufacturers want them to consider the current methods that they are using to test the meters. The Canadian marketplace accounts for a small percentage of total meter sales and any radical initial inspection requirements may not be feasible for the meter manufacturers to implement.

Stakeholders need the assurance that new water measuring devices are installed according to MC and manufacturer's requirements. They feel that it is best left to the individual water utility or municipality to conduct the inspection of the water meter installation. They may also have the option to choose one of their representatives to perform this task.

Most water meters used in Canada are initially tested at the manufacturer's factory or test facility. The tests are conducted in accordance with all, or most of, the AWWA standards. This standard should therefore be the starting point for establishing Measurement Canada water meter initial inspection requirements. OIML R-49-1 and other water meter standards should also be considered since new meters, manufactured outside of North America, are currently being introduced into the Canadian marketplace.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop the necessary specifications, procedures and policies governing the initial inspection process for water meters.

Long Term (2 to 5 years) - Measurement Canada will develop a process to recognize the individuals or organizations who will have the authority to conduct water meter initial inspections. Measurement Canada will implement the necessary regulatory reform for the initial inspection of water meters in Canada.

4.3 Re-verification Inspections

Background:

Weights and Measures Devices

Measurement Canada periodically inspects weighing and measuring devices throughout their service lifetime to ensure they continue to measure accurately and are not used in a fraudulent manner. Appropriate corrective action is initiated for those measuring instruments which are not in compliance with the appropriate regulations and specifications. Currently, there are no prescribed mandatory requirements for the in-service inspection of weighing and measuring devices in the *Weights and Measures Act and Regulations*. Measurement Canada scheduled in-service inspections are based on priorities and available resources. It should be noted that other Trade Sector Reviews have included recommendations making subsequent inspections mandatory.

Electricity and Natural Gas Meters

Periodic re-verification ensures that previously verified meters, which have been in use for some period of time, continue to measure accurately. Re-verification is performed through either 100% inspection or sampling inspection. Previously verified meters may be removed from service, reworked and re-calibrated and then submitted for re-verification. Re-verification may also take place while the meters are still in service through inspection of a representative sample of these meters. The sample meters are tested and the performance results are statistically analysed. The re-verification interval (seal period) for the meters in the lot is dependent on the performance results of the sample meters.

Current:

Water Meters

The *Weights and Measures Act and Regulations* exempts water meters from the requirement to be approved and initially inspected before being used in trade. Under the current legislation:

- ▶ There are no provisions that specifically exempt water meters from re-verification inspections. Measurement Canada has not made it a practice to inspect these devices.
- ▶ There are no requirements that water meters must be re-verified or tested after a specific time period.
- ▶ There are also no limits of error for water meters prescribed in the *Weights and Measures Act and Regulations*.

Individual water utilities or municipalities make the decision whether or not to re-verify (test) their water meters. Surveys have shown that a minority of these organizations re-verify or replace their residential meters after a specified time period. In contrast, a majority of the surveyed utilities indicated that they re-verify their ICI meters after a specified time period or after a specified volume throughput. The re-verification (testing) is usually performed by either a meter manufacturer’s representative, the water utility or by a water meter service company. Most of the meters are re-verified in accordance with the applicable AWWA requirements. The requirements and procedures for water meter re-verification vary greatly throughout the industrialised world.

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

10. Measurement Canada is to require that all customer billing or custody transfer water meters, used by water utilities, be subjected to a mandatory re-verification inspection. Where applicable, Measurement Canada should allow the use of a statistically valid sample testing plan when the mandatory re-verification inspection of water meters is performed. The mandatory re-verification inspection should apply to all levels of trade except where a regional municipal authority is supplying water to its member municipalities. For this level of trade it is recommended that water meters be exempt from mandatory re-verification requirements but a “best practices” or “protocol” process should be established by the Regional Municipality to ensure the water meters are performing to the required standard.
11. Re-verification inspections may be performed by recognized or authorized organizations provided they meet the established requirements. Re-verification inspections could be conducted at any recognized location (ex. water utility meter shops, meter manufacturer test facilities, or 3rd party meter service organizations). Where it applies, re-verification inspections could also be conducted in-situ. Measurement Canada should consider sustainable alternatives to the existing accreditation and registration programs for meter re-verification in the water trade sector.
12. Measurement Canada is to form a joint working group to establish the details of the re-verification inspection requirements. The joint working group will include representation from all applicable stakeholders. The joint working group is to perform a cost-benefit analysis before re-verification is made mandatory. The details of the re-verification inspection requirements will include re-verification periods, sampling plans, and the option of replacing the meter in lieu of a re-verification inspection. The requirements for re-verification inspections should be implemented over a period of years (phase-in) and take into account:
 - ▶ the economics of a water meter inspection

program;

- ▶ the composition of the water;
- ▶ the method of charging for water and sewer services (when based on water meter registration);
- ▶ the water and sewer rates.

Key Considerations:

- An overlying concern with any re-verification requirements are the costs to the municipality and their taxpayers. It was felt that many of the larger municipalities are already re-testing their meters and the costs would be minimal. Smaller municipalities may not have the resources to be able to re-test their meters. Most water meters in Canada are located inside the customers premises. Most utilities are concerned with the costs and logistics of gaining access to residential dwellings when the meters have to be removed for testing.
- There is widespread stakeholder concern that mandatory re-verification inspections may drive some municipalities to introduce a flat rate price structure or to abandon water metering for residential services. This will be exacerbated if the cost of the re-verification program far outweighs the increase in revenues that the municipality derives from the implementation of the program.
- At the Halifax and Montreal meeting, the stakeholders agreed that when the requirements for re-verification inspections are established, the joint working group should give special consideration to residential water meters which are used in situations where the water rates are low and the sewer charges are not based on the amount of water consumed. The WTSSR team suggest that any special consideration will strictly be limited to limits of error and not re-verification periods or the requirement for a mandatory re-verification.
- Several stakeholders expressed belief that the vast majority of utilities would out-source the meter testing (re-verification inspections) to other recognized organizations.
- The joint working group will decide on the time periods or volumes that will necessitate a re-verification of in-service water meters. At several meetings, a twenty (20) year re-verification period was recommended for residential meters. The re-verification periods for all meters types are to be determined by the joint working group. The joint working group is to consult with applicable stakeholders on this matter.
- The joint working group should include representation from all regions in Canada.

- The recommendation for the mandatory re-verifications of water meters in Canada is contingent on the need for extensive consultation with all stakeholders on the details developed by the joint working group prior to the implementation of any mandatory re-verification inspection requirements.
- Stakeholders agreed that the option of using an acceptable statistically valid sample testing plan should be considered.
- Stakeholders want the option of replacing a meter instead of having it re-verified.
- As with approval testing, Measurement Canada realizes that there are large water meters, used to sell water between two parties, which have such high operating flow rates that it is not practical and/or possible to inspect them with a known volume of water. For these reasons, Measurement Canada should consider re-verification inspections based on other methods besides the direct comparison of a known volume and the corresponding meter registration.
- Stakeholders wanted to know if meters, which are already in-service, would be grand fathered from re-verification. They also wanted to know if all residential meters needed a re-verification after 20 years, would the municipalities have to immediately remove all of the meters in question. These are areas which the joint working group will need to discuss and the vulnerable parties would have to agree with the decisions made. The final decision on this matter would ultimately be made by Measurement Canada.
- Changes to legislation will be required to facilitate the request for the mandatory re-verification of water meters in Canada.
- Measurement Canada will have to consider sustainable alternatives to the existing accreditation and registration programs for the re-verification of water utility meters. This should be done in consultation with applicable stakeholders. The alternative could be that no inspection “on behalf of the Canadian Government” would be required but the water utility would have the responsibility to ensure that the recognized testing is conducted.

Rationale:

The overwhelming majority of stakeholders, who participated in the WTSR process, agree that a mandatory re-verification program should be established. This should ensure that only accurate measuring devices will remain in service. Stakeholders clearly stated that they do not want the initial inspection requirements to be overly onerous or too costly.

Some stakeholders expressed their belief that water meters should not require a mandatory re-verification inspection. Other re-verification options and opinions that were put forward and discussed during the WTSR process include:

- ▶ re-verification performed by the individual water utility or municipality on a voluntary/best practices basis.
- ▶ re-verification testing should initially be done on a voluntary /best practices basis and regulations should only be put in place if an insufficient number of municipalities were adhering to this option.
- ▶ requiring mandatory re-verification inspections is a drastic change which could have a dramatic impact on small utilities. It was suggested that Measurement Canada should first introduce voluntary guidelines with a slow transition to the use of mandatory regulations if the situation so warrants it.
- ▶ Measurement Canada should set minimum re-verification requirements. An individual water utility or municipality should then have the option of submitting an alternative inspection plan which will be considered by Measurement Canada.
- ▶ the individual water utility should be required to file a plan with Measurement Canada detailing their re-verification program. This plan would be in the public domain and it would not require Measurement Canada's acceptance. This would be similar to the CEPA program that was implemented by Environment Canada.
- ▶ perhaps re-verification is not a regulatory issue but it is more of a local issue. Mandatory re-verification periods could be established but it should be left up to the local municipality to develop the criteria for how often the meters should be tested. The criteria would be influenced by the feedback received from the utility's customers.

The water utilities, meter service companies or meter manufacturers will conduct the majority of the re-verification inspections. When the joint working group develops the re-verification inspections procedures, the stakeholders want them to consider the current methods that they are using to test the meters.

Most water meter tests are conducted in accordance with all, or most of, the AWWA standards. This standard should therefore be the starting point for establishing Measurement Canada water meter re-verification requirements. OIML R-49-1 and other water meter standards should also be considered since new meters, manufactured outside of North America, are currently being introduced into the Canadian marketplace.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop the necessary specifications, procedures and policies governing the re-verification inspection process for water meters.

Long Term (2 to 5 years) - Measurement Canada will consider developing a process to recognize the individuals or organizations who will have the authority to conduct water meter re-verification inspections. Measurement Canada will implement the necessary regulatory reform for the re-verification inspection of water meters in Canada.

4.4 Legislation

Background:

Measurement Canada

Under Section 91, subject 17, of the *Constitution Act of Canada*, the exclusive legislative authority of the Parliament of Canada extends to all matters coming within the subject of Weights and Measures. At one time there was an Act of Parliament which pertained to water meters. The *Water Meter Inspection Act* was in force in Canada until its revocation in 1944. This act required that meters be inspected every 6 years and the tolerance was $\pm 3\%$ for accuracy. Since 1944 there has been no federal regulations which pertain to the trade measurement use of water meters in Canada.

Current:

Water Meters

The *Weights and Measures Act and Regulations* currently exempts water meters from the requirement for type approval and mandatory initial inspection before being used in trade. There are also no limits error established for water meters nor any other requirements for their design, installation, use and performance.

Many water utilities in Canada purport to follow all or part of the American Water and Wastewater Association (AWWA) Standard C 700 series as well as applicable operation manuals. However, there are no AWWA standards developed for certain types of customer billing meters (ex. magnetic flow meters). A few Water Utilities in Canada have also indicated that they use ISO specifications for their water meter program.

Canada is a participating member of the International Organization of Legal Metrology (OIML). This organization develops and maintains international standards for a multitude of weighing and measuring devices. OIML has developed a recommended standard (R-49-1) for water meters entitled: "*Water meters intended for the metering of cold potable water*".

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

13. Measurement Canada should establish and implement regulations and/or specifications for meters used by water utilities for customer billing or custody transfer. This will apply for all water meters at all levels of trade.
14. Measurement Canada is to form a joint working group to establish the details of the requirements for water meters. The joint working group will include representation from all applicable stakeholders. Areas to be discussed will include type approvals, initial inspection requirements, re-verification requirements, installation requirements and performance requirements. The joint

working group is to look at existing legislation or standards when developing these requirements.

Key Considerations:

- Stakeholders asked Measurement Canada, through the joint working group, to conduct a cost assessment of the requirements and programs for type approval, initial inspections, re-verifications, and ASD programs. The cost assessment should be done before launching programs and establishing the new requirements and stakeholders should be consulted. This is to ensure that there is a consensus that the added costs are justified and the programs will be sustainable.
- Stakeholders are concerned that the implementation of new water meter trade measurement requirements that are overly onerous or too costly could discourage some municipalities from embarking on a water metering program. Some municipalities could also choose to discontinue water metering if they are overwhelmed by costly regulations.
- Water utilities and meter manufacturers are concerned that any burdensome requirements are unfair in light of the fact that there are no federal requirements for mandatory water meter use at all water services in Canada. It was suggested that the issue of legislating mandatory water meter usage should be addressed by the Canadian Council of the Environment. Measurement Canada should be encouraged to work closely with other government agencies to encourage universal water metering in Canada.
- Stakeholders are concerned that Measurement Canada will introduce water meter regulations but then not have the resources to be able to follow up on the enforcement of the regulations.
- Several stakeholders suggested that if Measurement Canada does establish regulations for water meters they should take into consideration the relatively low cost of water in Canada.
- Stakeholders stated that existing AWWA standards were a good starting point for water meter requirements but they did not cover all aspects of every type of water meter. Other water meter standards (ex. OIML R49-1, NIST Handbook 44, EC Common Position 51/2003 and ISO) should also be considered.
- It should be remembered that the Canadian market represents a small portion of total water meter sales in North America. Different requirements in Canada may cause meter manufacturers to rethink their investment in the Canadian marketplace.

- One water utility stakeholder expressed some concerns about how far the WTSR team and Measurement Canada would go with establishing and implementing water meter legislation. The water utility industry has a fear of giving Measurement Canada a blank cheque on this matter. They also did not want Measurement Canada or the Federal Government to get heavily involved in how they conduct their business. This is especially true with how they set-up the tariffs for their water and sewer charges.
- The recommendation for the establishment of water meter regulations is contingent on the need for extensive consultation with all stakeholders on the details developed by the joint working group prior to the implementation of any regulations.
- It was recommended that regional municipalities, which have special operating structures (ex. GVRD, PVWC and CRD), should be considered as needing a lower level of Measurement Canada intervention. The final requirements are to be determined by a joint working group. The level of intervention will consider initial inspections, re-verification inspections and type approvals.
- If Measurement Canada adopts an existing standard then they should have a process in place to influence any revisions that may be made to that standard.
- The final requirements are to be determined by a joint working group. They will consider initial inspections, meter installations, re-verification inspections, test standards and test equipment and type approvals.
- All joint working groups should include applicable stakeholders and there should be representation from the different regions in Canada.
- The joint working group should be looking at cost/benefit when setting tolerances for water meters. The amount of inequity that the consumers would accept should also be considered when establishing water meter accuracy tolerances. Consumers should be surveyed to see if they would be agreeable to the additional costs that may be a result of the implementation of the WTSR recommendations.
- Measurement Canada should not regulate electronic Automatic Meter Reading (AMR) devices provided that water meters are equipped with a primary indicator. The primary register could be used as legal indication in case of complaints. The only exception would be if the AMR device was physically integrated into the meter in such a manner that could influence the accuracy of the meter. A stakeholder requested that water meter AMR devices should not be subjected to annual reads by Measurement Canada. If Measurement Canada is not directly involved with AMR or telemetering devices, it will still be incumbent upon the water utility to ensure that any registration used in billing shall be in agreement with the primary register.

- Changes to Measurement Canada legislation will be needed to address the recommendations that have been agreed upon by the stakeholders during the WTSR.
- Measurement Canada will have to ensure that all aspects of the water industry are made aware of any new regulatory requirements for water meters in Canada.

Rationale:

The overwhelming majority of stakeholders, who participated in the WTSR process, agree that Measurement should establish regulations for water meters in Canada. The adoption of these regulations should ensure accurate trade measurement in the water trade sector. Stakeholders have indicated that they do not want the regulatory requirements to be so onerous that they will discourage some municipalities from using water meters or cause other municipalities to abandon the use of water meters.

Some stakeholders expressed their belief that water meters should not be regulated by Measurement Canada and the testing of water meters should be performed by the individual water utility or municipality on a voluntary/best practices basis.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop all necessary regulations, procedures and policies relating to the trade measurement use of water meters in Canada.

Long Term (2 to 5 years) - Measurement Canada will implement the necessary regulatory reform for the trade measurement use of water meters in Canada.

4.5 Physical Standards

Background:

Measurement Canada

Any test standard, used by a Measurement Canada inspector or Measurement Canada Authorized Service Provider to certify devices under the Weights and Measures Act and Regulations or Electricity and Gas Inspection Act and Regulations must be calibrated and certified by Measurement Canada. This requirement applies to test standards owned by Authorized Service Providers or Measurement Canada.

Current:

There are no mandatory calibration and certification requirements for test tanks, provers, test weights or other types of test equipment that are used for the general calibration and testing of water meters by parties other than Measurement Canada or Measurement Canada Authorized Service Providers.

Through conversations with various water meter manufacturer representatives and detailed searches of web site publications it would appear that the meter manufacturers use precise testing equipment which are periodically certified in relation to traceable international standards. The same general scenario also applies to the various Canadian water meter service companies who test and calibrate water meters. Surveys, investigations and discussion with various water utilities have shown that only a small minority of water utility test facilities are using traceable test standards and test equipment which has been periodically certified in relation to traceable international standards. .

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

15. Measurement Canada is to establish and implement regulations for all trade measurement standards and test equipment used for the initial inspection and re-verification of water meters in Canada.
16. Measurement Canada is to certify physical standards and test equipment. Other organizations should also be allowed to certify standards provided they meet the established requirements and are authorized by Measurement Canada.
17. Measurement Canada is to continue to pursue the recognition of other international standards laboratories.
18. Physical standards and test equipment used to test or certify water measuring devices will be subject to mandatory calibration intervals.

19. Measurement Canada is to form a joint working group to establish the rules and requirements for all trade measurement standards and test equipment used for the initial inspection and re-verification of water meters in Canada. The joint working group will include representation from all applicable stakeholders.

Key Considerations:

- The joint working group should look at other jurisdictions or organizations when developing new regulations or specifications for physical standards and test equipment. This could include, but not be limited to, AWWA, OIML, NIST and ISO.
- Measurement Canada is to recognize physical standards which have been certified with standards traceable to the National Institute for Science and Technology (NIST) in the USA. Similar consideration should be given to physical standards certified in other jurisdictions if they have been certified with standards that are traceable to the Bureau International des Poids et Mesures (BIPM) and they have procedures in place to ensure proper certifications.
- At this time, very few companies (in any trade sectors) have expressed interest in certifying test standards or test equipment. Measurement Canada continues to be the primary source of test standard and test equipment certifications.
- Some stakeholders also wanted to impress upon Measurement Canada that the requirements for test standards and test equipment used to inspect water meters should not be as rigid or rigorous as those that are in place for the testing of petroleum meters.
- When software is used in the process of testing a water meter, Measurement Canada should only evaluate the effect the software has on the test results. Measurement Canada staff should not study the software to see how it does the calculations.

Rationale:

Physical measurement standards that are reliable, accurate and traceable to national (National Research Council) or international (NIST, BIPM) standards is the basis for any sound metrological control program. Any significant uncertainties or calibration errors impact directly on trade measuring device accuracy. Even small inaccuracies may result in significant financial loss for the participants in the trade transaction. It is vital that rules for measurement standards are established and applied.

In order to have a uniform, reliable, national measurement system, uncertainties of standards must be established, standards must be maintained and used in accordance with sound

procedures and must be suitable for the intended use. Stakeholders feel that Measurement Canada is in the best position, with the necessary authority, to accomplish this goal for the water trade sector.

Laboratories with acceptable procedures and reference standards that have an unbroken traceability to recognized national standards may provide the same level of reliability and accuracy as the calibration done by Measurement Canada.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop the necessary specifications, procedures and policies governing the use of physical measurement standards used for the calibration and inspections of water meters.

Long Term (2 to 5 years) - to change the legislation which will allow for traceability to other national and international standards.

4.6 Complaints and Disputes

Background:

Weights and Measures Devices and Transactions

Buyers or sellers of goods or services who suspect they have received inaccurate measurement and who have been unable to resolve their concern with the other party to the transaction may contact the nearest Measurement Canada office and request that their complaint be investigated. Complaint investigations may include:

- ▶ device inspection
- ▶ net quantity verification of pre-packaged goods
- ▶ undercover test purchases or test sales of a product or service
- ▶ trader education

Electricity and Natural Gas Devices

When, a buyer or seller of electricity or natural gas is dissatisfied with the condition or registration of a meter or installation and cannot resolve the difference with the other party of the contract. The dissatisfied party may then request to have the matter investigated and resolved by a government inspector via Measurement Canada's Dispute Resolution Process which is administered under *Sections 23 and 24 of the Electricity and Gas Inspection Act*. Dispute resolution investigations may include:

- ▶ meter inspection
- ▶ installation inspection
- ▶ billing records investigation

At the conclusion of the dispute resolution investigations process, Measurement Canada provides all parties with a statement of findings. This will include the test findings as well as a summary of adjustment to the account if inequities exceed the allowable legal limits of error (3%). The vast majority of the disputes are initiated by the customer. Most of the customers who complain to Measurement Canada about their meter or utility bill are referred to the agency by the utility.

Current:

Water Meters

Measurement Canada does not customarily investigate water utility water meter complaints or billing concerns. In the past, local Measurement Canada offices have received a small number of complaints regarding water meters. Water utility representatives have told the WTSR team that generally they do not receive a large number of complaints from their customers regarding water meter accuracy. Most of the complaints are usually resolved without having to test the meter. In some cases, a meter test is performed and the results will dictate if compensation is provided to the complainant. The meter test may be performed at a third party meter test facility.

Some ICI customers interviewed by the WTSR team have expressed a concern that they did not always feel that their water meter accuracy concerns have been addressed by their local water utility.

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

20. Prior to involving Measurement Canada, all efforts should be made by the water utility to try and resolve customer complaints and disputes regarding water meters. Before Measurement Canada becomes involved in the complaint or dispute process, Measurement Canada will request that the water utilities and their customer try to resolve the water meter complaint or dispute. Measurement Canada will act as the 3rd party final arbiter for complaints and disputes regarding water meters which have not been resolved by the water utilities.
21. Measurement Canada is to establish a formal process to investigate consumer complaints and disputes regarding water meters.
22. Measurement Canada is to consult with all applicable stakeholders when establishing the rules and requirements for a formal process to investigate consumers complaint and disputes.

Key Considerations:

- Concerns were raised as to whether water utilities would have to follow the same process for handling complaints as Measurement Canada. It was explained that utilities would not have to follow the same process.
- Measurement Canada should consider the low cost of water when they establish limits of error for the inspection of a water meters that are subject of a customer complaint.
- Measurement Canada should consider developing a dispute resolution mechanism for water meters that is based on the model that is currently used for electricity and natural gas meters.
- Measurement Canada will need to make provisions to either inspect or witness the testing of disputed meters.
- Measurement Canada should also be prepared to investigate a number of disputes because small municipalities may just pass their water complaints directly to Measurement Canada.
- The utility stakeholders commented that many measurement complaints about the accuracy of in-service ICI meters can be attributed to the installation of the meter. If Measurement Canada plans to investigate ICI water meter complaints

they will need to acquire expertise in water meter installations.

- It was explained to the stakeholders, that as a minimum, Measurement Canada will be the final arbiter of customer complaints regarding water meters. To be able to perform this task, Measurement Canada will establish limits of error that will be used by Measurement Canada when a disputed water meter is inspected. This limit of error will supercede any municipal by-law which outlines the tolerances used for the testing of disputed water meters.

Rationale:

The vast majority of municipalities and water utilities have resolution mechanisms which allow their customers to dispute the accuracy of their meters. Most stakeholders agree that generally these mechanisms are working to their satisfaction. The vulnerable parties have some concern that the dispute meter tests are conducted by the water utility or a third party which is selected by the water utility.

Measurement Canada's mandate and strategic direction requires that Measurement Canada be involved in any complaints and disputes that cannot be resolved by the parties to the trade transaction. As a minimum, Measurement Canada will provide technical advice and /or inspection services that could lead to a resolution. As the final arbiter of any water meter complaint or dispute, Measurement Canada should be viewed as being totally independent by all parties to the trade transaction.

This recommended level of Measurement Canada intervention in water meter complaints and disputes should give the disputing parties a neutral investigative ruling which can be used in cases where measurement disputes cannot be resolved by current means.

Priority: High

Time line: Medium Term (1 to 2 years) - to develop the necessary regulations, specifications, policies and procedures governing the investigation of water meter complaints and disputes by Measurement Canada.

Long Term (2 to 5 years) - to change the legislation which will allow Measurement Canada to develop a formal dispute resolution mechanism for water meters in Canada.

4.7 Marketplace Monitoring

Background:

Measurement Canada's strategic direction is to monitor compliance within the reviewed trade sectors to ensure that established levels of intervention are adequate to maintain stakeholder confidence. To facilitate this, Measurement Canada will need to establish performance indicators to measure sector compliance. Historically, performance indicators were mainly compliance rates for device and commodity inspections. These rates were determined from results obtained by Measurement Canada inspectors during periodic inspection cycles. In the water trade sector, Measurement Canada has traditionally not been inspecting water meters and therefore only has limited in-service meter test results. This data has been supplied by a small number of Canadian water utilities.

Measurement Canada may choose to conduct future follow-up sector reviews of the water trade sector should marketplace monitoring raise major concerns. The purpose of these reviews would be to ensure that any implemented programs continue to meet the needs of all stakeholders. These follow-up reviews would be similar to this review but probably much narrower in scope and of far shorter duration. The follow-up review will be in addition to ongoing monitoring and any urgent issues which will be dealt with as required.

Recommendations:

A consensus of stakeholders and the WTSR team recommend that:

23. A marketplace monitoring process for the water trade sector should be determined during the implementation stage of the Water Trade Sector Review. Input from all applicable stakeholder groups should be obtained.
24. Measurement Canada is to consult with all applicable stakeholders groups when establishing the processes for the marketplace monitoring of the water trade sector.

Key Considerations:

- Measurement Canada will establish key indicators to be used in the ongoing marketplace monitoring of the water trade sector. These key indicators will be developed during the implementation stage of the water and stakeholders will be consulted.
- Concern was voiced by stakeholders regarding whether Measurement Canada would have the resources to conduct sufficient monitoring.
- For the purposes of marketplace monitoring, reporting by utilities and other organizations will likely be required if these entities are performing inspection work on behalf of Measurement Canada.

- It was suggested that national meter performance information should be made available to all stakeholders and it should be published in aggregate form.
- Stakeholders suggested that Measurement Canada should establish a national data bank to collect water meter test results. The information could show problems or trends within the water industry.
- Consideration should be given to develop a system which will allow the required data to be electronically inputted by the municipalities using a Measurement Canada designed template.
- Measurement Canada should consider contacting Environment Canada to request that information pertinent to marketplace monitoring be included in future Municipal Water Utilities Database (MUD) Surveys.

Rationale:

Measurement Canada needs to have mechanisms in place to ensure that the programs resulting from the trade sector review are working effectively and to determine if the needs of the stakeholders and Measurement Canada are being met.

It is important for Measurement Canada to keep the stakeholders aware of the state of trade measurement in the water trade sector and keep them advised of the effectiveness of the implemented programs. Measurement Canada must be careful not to publish information that could damage the reputation of stakeholders and of the industry.

Priority: Medium

Time line: Medium Term (2 to 3 years) to develop the necessary policies and procedures needed for monitoring the water trade sector marketplace.

5.0 Sub-metering Recommendations

Background:

Sub-metering refers to the metering of water for billing purposes using a meter or meters owned by an organization or individual such as a commercial or residential property owner or management organization. (ex. an apartment building, office or shopping centre owner or property manager). A sub-metering organization's main line of business is not the selling or providing water to its tenants. The water utility charges the property owner/manager for the total amount of water consumed by the businesses or individuals on the property. Sub-metering simply allows the property owner or manager to apportion a percentage of the total cost of the water to each individual tenant based on the quantity of water they consume.

Current:

The practice of sub-metering is quite common in certain areas of the United States. It is used in both commercial and residential applications. Sub-metering is still not that popular in Canada. The WTSR team has been informed that this scenario is likely to change in the future.

Recommendations:

25. Measurement Canada's level of intervention in this sub-sector should be determined in consultation with stakeholders during the water trade sector review implementation.

Key Considerations:

- The stakeholder consultation meetings focussed on water utility metering. The topic of sub-metering was only briefly mentioned. Stakeholders, who are the sellers of water, were invited to participate in several of the stakeholder consultation meetings. Unfortunately none of them chose to attend any of the meetings. The recommendations for sub-metering sub-sector should therefore be decided upon during the implementation stage of the WTSR. The sellers of the water would again be given an opportunity to provide input on the recommendations. It should be noted that the vulnerable parties in sub-metering are of a similar type that are found in water utility metering.

6.0 Wastewater (Sewer) Recommendations

Background:

The *Weights and Measures Act and Regulations* currently exempts water meters from the requirement for type approval and mandatory initial inspection before being used in trade. There are also no limits error established for water meters nor any other requirements for their design, installation, use and performance. Measurement Canada regards wastewater as a form of water and therefore wastewater meters are also currently exempt from the requirement for type approval and mandatory initial inspection.

Current:

The practice of using wastewater meters to determine sewer charges is not that common in Canada. A number of the larger municipalities have wastewater meters installed at some of their high water consumption customers. The intent of installing wastewater meters is to allow customers the opportunity to reduce the fee paid for sewer charges. A good example of where a wastewater meter might be installed is when a customer is using the water as a primary ingredient of the product that is being produced. In this scenario, the volume of wastewater that leaves the premises will be significantly less than the volume of water that is delivered to the premises. Often the wastewater meter is owned by the customer and not the municipality. In order for the municipality to accept the wastewater meter readings, they often require the customer to have the meter tested at the frequency that is recommended by the meter manufacturer.

Recommendations:

26. Measurement Canada's level of intervention in this sub-sector should be determined in consultation with stakeholders during the water trade sector review implementation.

Key Considerations:

- The stakeholder consultation meetings focussed on water utility metering. The topic of wastewater meters, which are used to determine sewer charges, was only briefly mentioned. The recommendations for this type of wastewater metering will therefore be decided upon during the implementation stage of the WTSR. The stakeholders involved with this type of trade transaction will be given an opportunity to provide input on the recommendations. The same opportunity will also be made to the wastewater meter manufacturers and organizations who service this type of device.

7.0 Bulk Water Sales - Bulk Water Outlets Recommendations

Background:

Bulk water sales are defined as the selling or delivering of water by individual loads. This would include the selling of water at public and private bulk water outlets. Bulk water haulers are the primary customers. There are many methods used for the sales of water at bulk water outlets. Examples of methods of water sales at bulk water outlet include:

- ▶ meters
- ▶ timers
- ▶ cardlocks/keylocks
- ▶ flat rate
- ▶ honour system
- ▶ by permit (annual fee)
- ▶ volume - estimated
- ▶ other measuring devices

Background:

Measurement Canada has historically had very little intervention in sales of water at bulk water outlets and this organization has received a limited number of complaints from vulnerable parties in this sub-sector. While investigations have shown that there are no standard trade measurement practices in this sub-sector, the use of water meters is more prevalent in this sub-sector as compared to the bulk water hauling sub-sector. Most transactions are based solely on the amount of the water sold/delivered.

Recommendations:

27. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of water sales at bulk water outlets in Canada.
28. Measurement Canada will investigate complaints of bulk water outlets if the transaction is based on the quantity of bulk water sold.
29. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the sales of a stated quantity of bulk water is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the water being sold. These limits of error would be applied to the sales of bulk water by any form of trade measurement.

Rationale:

From the onset of the consultation process, the vulnerable parties in the bulk water outlet sub-sector have shown minimal interest in the WTSR. A bulletin outlining the proposed recommendations was sent to over forty bulk water haulers in October 2003. The response to the bulletin was limited but those stakeholders, who responded to the bulletin, were overwhelmingly in favour of the recommendations. An additional number of bulk water haulers were also contacted by phone and they were asked for their comments on the recommendations. Measurement Canada has received very few complaints in this sub-sector. Regulating these types of devices and transactions on a proactive basis would be:

- ▶ not justified given the lack of interest shown by vulnerable parties
- ▶ resource intensive for Measurement Canada
- ▶ costly for the industry and their customers

It is the recommendation of the WTSR team that bulk water outlet water meters should continue to be exempt from the approval and mandatory initial inspection requirements. The introduction of limits of error (tolerances) for the sale of a stated quantity of bulk water would provide Measurement Canada with the ability to investigate any bulk water outlet water complaints received from vulnerable parties.

Priority: **Low**

Time line: **Medium Term (1 to 2 years) - to develop the necessary regulations, specifications, policies and procedures governing the investigation of bulk water outlet complaints by Measurement Canada.**

Long Term (2 to 5 years) - to change the legislation which will allow Measurement Canada to introduce limits of error (tolerances) for the sales of a stated quantity of bulk water in Canada.

8.0 Bulk Water Sales - Bulk Water Delivery Recommendations

Background:

Bulk water sales are defined as the selling or delivering of water by individual loads. This would include the selling/delivery of water by tanker trucks. Stakeholders in this sub-sector include, but may not be limited to, the following:

- ▶ bulk water haulers
- ▶ road construction associations
- ▶ apartment owner associations
- ▶ provincial agricultural associations
- ▶ cottage owner associations
- ▶ home owner associations

There are many methods used for the sales/delivery of bulk water by tanker truck. Examples of methods of sales for truck delivered water include:

- ▶ using nominal tank sizes
- ▶ flat rate fees (time and/or distance)
- ▶ meter
- ▶ volume - estimated
- ▶ other measuring devices.

Background:

Measurement Canada has historically had very little intervention in bulk water hauling and has received no recent complaints from vulnerable parties in this sub-sector. Investigations have shown that there are no standard trade measurement practices in this sub-sector. Meters are rarely used and a per load charge is the most common practice. Transactions are normally based on an estimate rather than a measured volume of water. The cost of the water is normally a small component of the cost of having the water delivered.

Recommendations:

30. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of water sales by tanker truck in Canada.
31. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of bulk water sold/delivered by tanker truck.
32. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the delivery/sales of a stated quantity of bulk water is acceptable. The limits of error will be based on stakeholder input,

recognized international and industry standards, and the relative cost of the water being sold/delivered. These limits of error would be applied to the sales/delivery of bulk water by any form of trade measurement.

Rationale:

From the onset of the consultation process, the bulk water haulers and vulnerable parties have shown minimal interest in the WTSR. A bulletin outlining the proposed recommendations was sent to over forty bulk water haulers in October 2003. The response to the bulletin was limited but those bulk water haulers, who responded to the bulletin, were overwhelmingly in favour of the recommendations. An additional number of bulk water haulers were also contacted by phone and they were asked for their comments on the recommendations. The WTSR team contacted a significant number of bulk water customers and they are satisfied with the trade measurement practices used by Canadian bulk water haulers. Measurement Canada has received no recent complaints from vulnerable parties in this sub-sector. Regulating the various types of measuring devices and trade transactions on a proactive basis would be:

- ▶ not justified given the lack of interest shown by vulnerable parties
- ▶ resource intensive for Measurement Canada
- ▶ difficult to enforce given the large number of bulk water haulers
- ▶ costly for the industry and their customers

It is the recommendation of the WTSR team that bulk water measuring devices should continue to be exempt from the approval and mandatory initial inspection requirements. The introduction of limits of error (tolerances) for the sale/delivery of a stated quantity of bulk water would provide Measurement Canada with the ability to investigate any bulk water hauling complaints received from vulnerable parties.

Priority: **Low**

Time line: **Medium Term (1 to 2 years) - to develop the necessary regulations, specifications, policies and procedures governing the investigation of bulk water hauling complaints by Measurement Canada.**

Long Term (2 to 5 years) - to change the legislation which will allow Measurement Canada to introduce limits of error (tolerances) for the sales/delivery of a stated quantity of bulk water in Canada.

9.0 Wastewater Removal and Hauling Recommendations

Background:

Wastewater removal and hauling is defined as the process of removing and/or hauling wastewater by truck and charging a fee for that service. Stakeholders in this sub-sector include, but may not be limited to, the following:

- ▶ wastewater haulers
- ▶ road construction associations
- ▶ food services
- ▶ cottage owner associations
- ▶ home owner associations

There are many methods used for charging for this service. Examples of charging methods include:

- ▶ by the load
- ▶ flat rate fees (time and/or distance)
- ▶ by weight (ex. on-board weighing)
- ▶ volume - estimated
- ▶ volume -using nominal tank size
- ▶ volume - by sight glass
- ▶ other measuring devices.

Background:

Measurement Canada has historically had very little intervention in wastewater measurement and has received a limited number of complaints from vulnerable parties in this sub-sector. While investigations have shown that there are no standard trade measurement practices in this sub-sector, the use of a per load charge is the most common practice. Most transactions are based on an estimated rather than a measured volume of wastewater.

Recommendations:

33. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of wastewater removal and hauling in Canada.
34. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of wastewater removed/hailed by the wastewater hauler.
35. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the removal/hauling of a stated quantity

of wastewater is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the waster being removed/hailed . These limits of error would be applied to the removal/hauling of wastewater water by any form of trade measurement.

Rationale:

From the onset of the consultation process, the wastewater haulers and vulnerable parties have shown minimal interest in the WTSR. A bulletin outlining the proposed recommendations was sent to thirty five wastewater haulers in December 2003. The response to the bulletin was limited but those wastewater haulers, who responded to the bulletin, were unanimously in favour of the recommendations. An additional number of wastewater haulers were also contacted by phone and they were asked for their comments on the recommendations. The WTSR team contacted a number of wastewater customers and they are satisfied with the trade measurement practices used by Canadian wastewater haulers. Measurement Canada has received no recent complaints from vulnerable parties in this sub-sector. Regulating the various types of measuring devices and trade transactions on a proactive basis would be:

- ▶ not justified given the lack of interest shown by vulnerable parties
- ▶ resource intensive for Measurement Canada
- ▶ difficult to enforce given the large number of wastewater haulers
- ▶ costly for the industry and their customers

It is the recommendation of the WTSR team that wastewater measuring devices should continue to be exempt from the approval and mandatory initial inspection requirements. The introduction of limits of error (tolerances) for the removal/hauling of a stated quantity of wastewater would provide Measurement Canada with the ability to investigate any wastewater removal/hauling complaints received from vulnerable parties.

Priority: Low

Time line: **Medium Term (1 to 2 years) - to develop the necessary regulations, specifications, policies and procedures governing the investigation of wastewater removal/hauling complaints by Measurement Canada.**

Long Term (2 to 5 years) - to change the legislation which will allow Measurement Canada to introduce limits of error (tolerances) for the removal/hauling of a stated quantity of wastewater in Canada.

10.0 Wastewater Disposal Recommendations

Background:

Wastewater disposal is defined as the off-loading of wastewater from a truck and charging a fee for that service. Stakeholders in this sub-sector include, but may not be limited to, the following:

- ▶ wastewater haulers
- ▶ municipal, regional and private wastewater disposal sites This service could be provided by public or private wastewater handling facilities.

There are many methods used for charging for the wastewater disposal service. Examples of different charging methods include:

- ▶ by the load
- ▶ flat rate
- ▶ by permit (annual fee)
- ▶ volume - estimated
- ▶ volume-using tank size
- ▶ volume - by sight glass
- ▶ by weight - truck scale
- ▶ by meter
- ▶ or other measuring device

Background:

Measurement Canada has historically had very little intervention in wastewater measurement and has received a limited number of complaints from vulnerable parties in this sub-sector. While investigations have shown that there are no standard trade measurement practices in this sub-sector, the use of a per load charge is the most common practice. Most transactions are based on an estimated rather than a measured volume of wastewater.

Recommendations:

36. Measurement Canada will not require the approval, initial inspection and periodic inspection of measuring devices that are used in trade transactions of wastewater disposal in Canada. This would only apply to measuring devices that are used exclusively to determine wastewater disposal charges.
37. Measurement Canada will investigate complaints received if the fee/charges are based on the quantity of wastewater disposed of at a wastewater disposal facility.
38. Measurement Canada will develop and implement limits of error (tolerances) that can be used to determine whether the disposal of a stated quantity of

wastewater is acceptable. The limits of error will be based on stakeholder input, recognized international and industry standards, and the relative cost of the wastewater being disposed. These limits of error would be applied to the disposal of wastewater by any form of trade measurement.

Rationale:

From the onset of the consultation process, the wastewater haulers have shown minimal interest in the WTSR. A bulletin outlining the proposed recommendations was sent to thirty five wastewater haulers in December 2003. The response to the bulletin was limited but those wastewater haulers, who responded to the bulletin, were unanimously in favour of the recommendations. An additional number of wastewater haulers were also contacted by phone and they were asked for their comments on the recommendations. Measurement Canada has received no recent complaints from vulnerable parties in this sub-sector. Regulating the various types of measuring devices and trade transactions on a proactive basis would be:

- ▶ not justified given the lack of interest shown by vulnerable parties
- ▶ resource intensive for Measurement Canada
- ▶ difficult to enforce given the large number of wastewater disposal sites
- ▶ costly for the industry and their customers

It is the recommendation of the WTSR team that wastewater measuring devices, located at disposal sites, should continue to be exempt from the approval and mandatory initial inspection requirements. The introduction of limits of error (tolerances) for the disposal of a stated quantity of wastewater would provide Measurement Canada with the ability to investigate any wastewater disposal complaints received from vulnerable parties.

Priority: **Low**

Time line: **Medium Term (1 to 2 years) - to develop the necessary regulations, specifications, policies and procedures governing the investigation of wastewater disposal complaints by Measurement Canada.**

Long Term (2 to 5 years) - to change the legislation which will allow Measurement Canada to introduce limits of error (tolerances) for the disposal of a stated quantity of wastewater in Canada.

Appendix A

Over 600 individuals and organizations were contacted and offered the opportunity to provide input into the WTSR process. The WTSR team made every effort to ensure that a cross-section of stakeholders were contacted. A the list of the participants who attended the six (6) Multi-Stakeholder Consultation Meetings are shown in the following tables. A list of all the stakeholders identified by the WTSR team is available upon request.

Edmonton

Name	Company
Bernhardt, Bob	City of Saskatoon
Brandell, Bruce	EPCOR Water Services Inc
Gillespie, Ted	City of Camrose
Grueber, Greg	City of St.Albert Public Works
Harris, Doug	Town of Lacombe
Heck, Mike	Federation of Alberta Gas Co-ops Ltd.
Johnston, Keith	Alberta Federation of Rural Water Co-operatives Ltd.
Korpesho, Mike	Measurement Canada
MacKinnon, Don	Sturgeon County
Martel, Marg	Aquatera Utilities Inc.
Morin, Mike	EPCOR Water Services Inc.
Perreault, Claude	Neptune Technology Group
Powell, Dave	Town of Lacombe
Reed, Genevieve	Option consommateur
Reid, Terry	Measurement Canada
Shepherd, Bob	City of Spruce Grove
Simon, Denis	Measurement Canada
Stoddart, David	Neptune Technology Group
Stouros, Sam	Measurement Canada
Vinet, Gilles	Measurement Canada
Walker, Jeff	Town of Rocky Mountain House
Walsh, John	Johlin Measurement
Wardner, Ron	City of Red Deer
Welsh, James	Measurement Canada
Wright, Larry	Regional Municipality of Wood Buffalo

Toronto

Name	Company
Barrie, Ernie	City of Thunder Bay
Best, Ralph	City of Ottawa
Cripps, Steven	City of Barrie
Donato, Cosmo	City of Toronto
Engler, Fritz	Engler & Associates
Ethier, R.G. (Bob)	Sensus Metering Systems
Fields, Bob	Norfolk County
Flieler, Barb	Quinte West Water& Sewer
Grosvenor, Barry	City of Toronto, Water Supply
Hall, Terry	Norfolk County
Hermant, Mike	Measurement Canada
Hummell, H. Butch	City of Niagara Falls Canada
Jefferson, Catherine	Canadian Water and Wastewater Association
Kavanagh, Shaun	Coulter Water Meter Service
Kropf, Steve	City of Kitchener
Lee, Bob	Regional Municipality of Durham
LoConsolo, Antonio	Regional Municipality of Peel
Miller, Wayne	Windsor Utilities Commission
Mills, Warren	Wamco Municipal Products
Nash, Barry	City of Kitchener
Orpana, Tom	Neptune Technology Group
Pinkney, Mark	Town of Midland
Reed, Genevieve	Option Consommateurs
Richard, Joyce	City of Ottawa
Robins, Lisle	Measurement Canada
Roussy, Sonia	Measurement Canada
Siblock, Ron	Regional Municipality of Durham
Simon, Denis	Measurement Canada
Smith, Randy	City of Toronto

Name	Company
Stoddart, David	Neptune Technology Group
Stouros, Sam	Measurement Canada
Welsh, James	Measurement Canada
Were, Earl	EWWA Consulting
Young, Robert	Measurement Canada

Vancouver

Name	Company
Allegretto, Richard	City of Surrey
Cochrane, Bill	Measurement Canada
Bie, Lloyd	City of Richmond
Both, Ray	Elster Metering
Bronsro, Allan	Kerr Wood Leidal Associates Ltd., Consulting Engineers
Bround, Chris	City of Burnaby
Bowmen, Ron	Terasen Utilities Services
Davis, Barry	City of Burnaby
DeLeeuw, Brent	City of Penticton
Innes, David	Fred SurrIDGE Ltd
Johnston, Alan	Measurement Canada
King, Fernando	City of Surrey
Lalonde, Vince	City of Surrey
Li, K. K.	City of Surrey
Mark, Gordon	Measurement Canada
Merchant, Chester	White Rock Utilities
Miller, Pat	Sun Peaks Utilities Co., Ltd.
Mirfatahi, Lisa	Greater Vancouver Regional District (GVRD)
Montpetit, Benoit	Measurement Canada
Moxley, Peter	Terasen Utility Services
Nichol, Brian	Terasen Utility Services
Perreault, Claude	Neptune Technology Group
Reed, Genevieve	Option Consommateurs
Roberts, Guy	Greater Vancouver Regional District (GVRD)
Simon, Denis	Measurement Canada
Stein, Leonard	City of Abbotsford
Stouros, Sam	Measurement Canada
Swanson, David	City of Vancouver

Name	Company
Swartzkopf, Olga	Consumer from North Vancouver
Grant Tesar	City of Burnaby
Van Niekerk, Jan	Capital Regional District (Victoria)
James Welsh	Measurement Canada
Zapp, Angela	Neptune Technology Group
Zhan, Wayne	Greater Vancouver Regional District (GVRD)

Montreal

Name	Company
Brossault , Stéphane Ing.	City of Montreal
Carrière , Louis-François	Saint-Laurent Borough of Montreal
Coderre , Serge	Enviroservices
Efstatos , Georges	Badger Meter Inc.
Lacoste, Serge	Spécialité d'Aqueduc du Québec
Lauret, Jean-Claude	Cyber Data inc.
Langlois, Daniel	Les compteurs d'eau du Québec
Lecomte, François	Les compteurs Lecomte Ltée
Montpetit, Benoit	Measurement Canada
Reid, Geneviève	Options Consommateurs
Richard, Carmen	Quebec City
Simon, Denis	Measurement Canada
Stouros, Sam	Measurement Canada
Tremblay, André	St-Laurent Borough, Montreal
Tremblay, Edith CMA	City of Montreal
Vinet, Gilles	Measurement Canada
Watters, Jeff	Measurement Canada
Welsh, James	Measurement Canada
Zapp, Angela	Neptune Technology Group

Halifax

Name	Company
Cameron, Tom	Scotia Tech Fluid Services Ltd.
Clack, John	City of Saint John
Hanlon, Peter J.	City of Saint John
Kavanaugh, James	Measurement Canada
Keachie, Bruce	Neptune Technology Group
Lawler, John	Halifax Regional Water Commission
LeBlanc, Ronald H.	City of Moncton
Leonard, Debby	Halifax Regional Water Commission
MacIntosh, Heidi	Nova Scotia Utility Review Board
McGrail, K.W. (Tim)	K.W. McGrail Co. Ltd.
Moffatt, Gord	Elster Metering
Reed, Genevieve	Option Consommateurs
Rideout, Doug	Measurement Canada
Rooney, Blaine	Halifax Regional Water Commission
Roussy, Sonia	Measurement Canada
Simon, Denis	Measurement Canada
Stoddart, David	Neptune Technology Group
Stouros, Sam	Measurement Canada
Welsh, James	Measurement Canada
Whamond, Ken	City of Fredericton
Wvand. Harland	Town of Bridgewater

Winnipeg

Name	Company
Barron, Gerry	Manitoba Public Board
Beattie, Dennis	Measurement Canada
Bernhardt, Bob	City of Saskatoon
Campbell, Douglas	City of Portage la Prairie
Clark, Bill	Accu-Flo Meter Services
Enns, Jason	City of Winnipeg
Kaupp, Doug	City of Lethbridge Water Utility
McNichol, Darlene	Neptune Technology Group
Murdock, Dave	City of Winnipeg
Palidwor, Bill	Measurement Canada
Pheifer, John	Measurement Canada
Reed, Genevieve	Option Consommateurs
Rutledge, Bill	City of Brandon
Scott, Dale	City of Selkirk
Shannon, Christopher	Terasen Waterworks
Simon, Denis	Measurement Canada
Stawychny, Nick	City of Brandon
Stouros, Sam	Measurement Canada
Sveinson, Keith	Elster Metering
Vinet, Gilles	Measurement Canada
Welsh, James	Measurement Canada
Weins, Ken	City of Regina
Zacharias, Bill	City of Winkler
Zapp, Angela	Neptune Technology Group