



**Should Residential Water  
Meter Accuracy be Regulated  
in Canada?**

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For: Office of Consumer Affairs, Industry Canada

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## **Acknowledgments**

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## EXECUTIVE SUMMARY

The purpose of this policy paper is to present the position of Option consommateurs on the strategic direction of Measurement Canada in conjunction with the Water Trade Sector Review (WTSR). In this sector review, Option consommateurs's concern is to ensure that water metering accuracy and consumer confidence are preserved through suitable regulation of the industry by Measurement Canada.

In 1999, Measurement Canada adopted a new strategic direction aiming to optimize its resources and respond to new trade measurement market demands caused by the implementation of new technologies and the growing numbers of measuring devices. In this context, Measurement Canada embarked on a process of reviewing its intervention in trade measurement. In all, 39 trade sectors will be reviewed by 2013 to establish a level of intervention that allows for optimal use of the agency's resources, adaptation to technological and market changes, and consumer protection. The trade sector reviews will consult industry and consumer stakeholders as well as other interest groups in determining the changes to be made to the agency's intervention. Some of these reviews directly affect consumers, since they concern sectors in which a measured quantity of a product is sold directly to them. Option consommateurs has an interest in these reviews; it participated in the Electricity Trade Sector Review in 2001 and in the Natural Gas and Retail Food Trade Sector Reviews in 2002. This year, Option consommateurs is participating in the Retail Petroleum and Water Trade Sector Reviews.

The water trade sector is currently exempt from the application of the *Weights and Measures Act*; Measurement Canada's intervention in this sector is limited to conflict resolution between consumers and water utilities. For the purpose of this sector review, Measurement Canada surveyed 48 water utilities in order to build a portrait of their practices in regard to verification of water metering accuracy. This study revealed that most utilities purchase meters compliant with the standards of the American Waterworks Association (AWWA), inspect the meters before installation, and have consumer complaint handling procedures. However, the utilities' practices in regard to metering accuracy specifications, periodic inspection, and use of certified measurement standards for purposes of meter testing are uneven.

A study of practices in the United States showed that regulation of water measurement is more diversified than in traditional weights and measures sectors such as retail food or petroleum. In these latter sectors, the national standards developed by the National Institute of Standards and Technology (NIST) have by and large been adopted, but in the case of water measurement, NIST

standards coexist with others that are variously applied in different states. In fact, the NIST standards are less commonly used in public utility-dominated sectors such as electricity, natural gas and water. Our survey of several states found that they do not commonly assign responsibility for water measurement to their weights and measures authorities, which are covered by the NIST standards. This does not mean that no state regulates the water trade sector in this way, as our study of California regulations shows. The point is that our documentary research turned up other forms of regulation, including self-regulation and application of rules by a utility commission or regulatory board.

Our focus group participants stated their belief that weights and measures accuracy is regulated in Canada, but very few of them could name the regulatory body responsible. When they learned that Measurement Canada is the body in question, most of the participants felt reassured, though some doubted Measurement Canada's capacity to fulfil these functions.

The focus group participants assigned variable importance to their water bill and the accuracy of their water meters. This variation had to do with the cost of water, which is high in Edmonton, moderate in Toronto, and low in Montreal. In this last city, participants who have water meters pay a flat rate up to a ceiling, with a supplement for surplus consumption. As a result, the Montreal consumers assigned little importance to their bill and meter; few of them had ever exceeded the ceiling or paid the supplement. Overall, participants in all cities expressed their confidence in water meter accuracy, largely due to their inelastic consumption patterns, the simple technology used by these devices, and the fact that the meter is located in the consumer's home. The participants did not know that water meter accuracy is unregulated; in this regard, their reactions were divided. Some did not see the need for government intervention since their water utility was assumed to have implemented an inspection process. This reaction was most common in Montreal, where water prices are low. But participants in Edmonton, where water is expensive, felt that Measurement Canada's intervention would be desirable. Nevertheless, all participants stressed the need to establish uniform national standards due to the lack of uniformity between cities and the lack of inspection standards and measures in smaller localities. The participants felt that Measurement Canada should have approval authority for all meter types, limiting the costs of this program by allowing older, non-compliant ones to be phased out gradually ("grandfathering"). Measurement Canada should also perform spot inspections of meters and establish mandatory accuracy and inspection standards for municipalities. The fact that most measurement errors favour the consumer did not change this opinion, for the participants stressed that this type of error is costly to utilities and that these costs would be passed along to ratepayers. The Edmonton participants stressed that the prospect of water utilities being privatized heightens the need for regulation. Finally, the participants suggested that

the Government of Canada not automatically accept meter types just because they have been approved in other jurisdictions.

Option consommateurs also commissioned Environics to conduct a Canada-wide survey. The results: Respondents whose water is metered tend to be confident in metering accuracy, even though a majority of them think that their water utility is the responsible body. When informed that there are no regulations or national standards governing meter accuracy, the vast majority of respondents favoured regulatory intervention by Measurement Canada. These findings seem somewhat contradictory, but the respondents' opinion may have been greatly influenced by the significantly different practices from one utility to another.

On the basis of this research, Option consommateurs hereby puts forward the following recommendations. They will be presented at the meetings with the other water sector stakeholders where Measurement Canada attempts to build a consensus on the appropriate regulatory approach for this trade sector:

**Recommendation 1: That Measurement Canada rescind the water meter exemption provided by section 4 of the *Weights and Measures Regulation*.**

**Recommendation 2: That Measurement Canada implement a regulatory structure sensitive to water sector realities that keeps the costs to water utilities at a reasonable level.**

**Recommendation 3: That Measurement Canada's water metering accuracy standards be uniform for all of Canada.**

**Recommendation 4: That Measurement Canada study the possibility of adopting the AWWA C700 standard and/or IOLM standard R 49-1 for water meters, adapting them as necessary.**

**Recommendation 5: That Measurement Canada use a grandfathering policy for existing non-compliant meters, requiring gradual phase-out and replacement with compliant ones.**

**Recommendation 6: That Measurement Canada implement a type approval process for water meters. Testing should preferably be done by Measurement Canada but, if that is not possible, the agency could use external organizations under the Accreditation Program based on standard S-A-01:2002.**

**Recommendation 7: That if Measurement Canada uses external organizations for the type approval process, they should be required to submit their test results to the agency, which should retain responsibility for final approval.**

**Recommendation 8: That type approvals only apply to new meter prototypes and that existing types be grandfathered.**

**Recommendation 9: That all reference standards used to inspect water meters be approved by Measurement Canada.**

**Recommendation 10: That Measurement Canada make initial inspection mandatory and that organizations conducting inspection be accredited under the Measurement Canada Accreditation Program based on standard S-A-01-2002.**

**Recommendation 11: That Measurement Canada allow water utilities to perform sampling of new meters for inspection purposes, subject to the filing of an acceptable sampling plan with the agency.**

**Recommendation 12: That a 15-year security seal be affixed to every new meter upon installation.**

**Recommendation 13: That water utilities be allowed to reinspect a random sample of meters, subject to the filing of an acceptable sampling plan with Measurement Canada.**

**Recommendation 14: That water utilities and meter service companies conducting periodic inspection be accredited under the Measurement Canada accreditation program based on standard S-A-01:2002.**

**Recommendation 15: That Measurement Canada prohibit water utilities from charging fees in connection with complaints about metering accuracy.**

**Recommendation 16: That Measurement Canada's role as the final arbiter of complaints about metering accuracy be better known among consumers who complain to their water utilities.**

**Recommendation 17: That Measurement Canada ensure that all stages of the Water Trade Sector Review take place with the participation of consumer representatives.**

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## INTRODUCTION

Measurement Canada is an agency of the Ministry of Industry of Canada whose mission is to guarantee the accuracy of trade measurement through various means of intervention. Specifically, Measurement Canada is responsible for approving device types intended to be used in trade, performing initial inspection of devices before they are placed in service, periodically reinspecting and monitoring devices in service, verifying the net quantity content of products sold based on their measurement, and resolving measurement-related disputes and complaints.<sup>1</sup> The foundation for these activities is provided by two laws, the *Electricity and Gas Inspection Act* for the electricity and natural gas sectors and the *Weights and Measures Act* for all other sectors regulated by the agency. Measurement Canada intervenes in various trade sectors, some of which affect consumers directly, such as electricity, natural gas, retail food, and gasoline. For these sectors, Measurement Canada aims to preserve consumer confidence by guaranteeing consumers that the products they purchase are measured accurately and that the quantity sold is exactly the same as the quantity delivered.

In 1999, Measurement Canada adopted a new strategic direction aiming to optimize its resources and respond to new trade measurement market demands caused by the implementation of new technologies and the growing numbers of measuring devices. For this purpose, it embarked on a process of reviewing thirty-nine (39) trade sectors over a period extending up to 2013. The purpose of each trade sector review is to reassess Measurement Canada's level of intervention in each sector and to determine whether the current level of intervention should be adjusted to keep current with market conditions and the need for consumer protection.

In carrying out the reviews, Measurement Canada will strive to focus "on those areas where return to the Canadian taxpayer is greatest."<sup>2</sup> To do this, Measurement Canada established a method to "periodically assess measurement in all trade sectors, intervening only where necessary to ensure accuracy and equity in the marketplace, and developing criteria for determining its level of intervention in trade measurement. Stakeholders' informed views will be a key element in these decisions."<sup>3</sup>

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<sup>1</sup> MEASUREMENT CANADA, *Services*, online at [http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/h\\_lm02084e.html](http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/h_lm02084e.html).

<sup>2</sup> MEASUREMENT CANADA, *Measurement Canada's Assessment and Intervention Strategy for Canada's Marketplace*, online at <http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/lm01563e.html>.

<sup>3</sup> Ibid.

Each trade sector review is conducted separately and consists of a consultation of the relevant stakeholders. Generally, the teams responsible for the trade sector reviews bring together consumer and industry representatives as well as various public interest groups. The form of these consultations may vary from one review to another: in some cases, the team holds one or more meetings where the stakeholders attempt to reach consensus on the desirable changes to Measurement Canada's level of intervention; in others, the team meets with the interested groups individually and produces a synopsis of the opinions expressed. Following these consultations, the team submits recommendations to the Measurement Canada senior management team, which makes the final decision on them. Finally, Measurement Canada implements the changes approved by the senior management team.

As a consumer protection organization, Option consommateurs is involved in those trade sector reviews that involve the sale of products to individuals. In commercial transactions involving consumers, the latter are the vulnerable party. When purchasing a product whose price is established by measurement (e.g. gasoline sold by the litre, natural gas by the cubic metre, or cheese by the kilogram), consumers do not have the financial, legal and technical resources to verify that the quantity paid for is the quantity actually delivered. Likewise, they cannot defend their rights without assistance when they have reason to believe that a measurement is inaccurate. Therefore, consumers need a neutral and impartial body with no interest in the transaction to make and enforce trade measurement regulations. Measurement Canada plays this role in Canada and Option consommateurs intends to participate in the trade sector reviews with the goal of preserving it.

Option consommateurs participated in three trade sector reviews in 2001 and 2002: Electricity, Natural Gas and Retail Food. This participation has enabled our organization to acquire substantial knowledge and experience in the field of trade measurement as it concerns consumer protection. As a result, we were able to express our views authoritatively on the industry's demands for self-regulation in the electricity sector, the proposed changes for the establishment of requirements in the natural gas sector, and the problems created by the lack of regulation of scale service companies in the retail food sector.

This year Measurement Canada will conduct two trade sector reviews having a direct impact on consumers: Water and Retail Petroleum. Option consommateurs is taking part in the consultations for both reviews. This policy paper constitutes the position of Option consommateurs on the Water Trade Sector Review (WTSR). Our position, developed in the body of this report, is a composite of our established stance on regulatory affairs in general; the Measurement Canada documents; the findings of a study on US regulatory practices for water meters; the results of six focus groups held in Toronto, Edmonton and Montreal on May 29, May

31 and June 5, 2003 by Environics, and the results of a Canada-wide survey conducted by this specialized polling firm. The last section of the document summarizes Option Consommateurs's arguments and recommendations.

## **1- MISSION OF OPTION CONSOMMATEURS**

### **1.1- Purpose, Objectives and Scope of Intervention**

The mission of Option consommateurs is to advocate on behalf of consumers and promote their rights and interests. The purpose of these activities is to minimize or eliminate the injustices of which consumers are victims. To carry out this mission, the organization has a staff of about twenty employees assigned to five departments:

1. Budget Department
2. Legal Department
3. Media Relations Department
4. Research and Representation Department
5. Call and Support Centre.

The association was founded in 1983. In 1999, it merged with the Association des Consommateurs du Québec, a fifty-year-old organization with a mission similar to that of Option consommateurs. The goal of the merger was to increase work efficiency while cutting operating costs.

Option consommateurs is a cooperative formed under the Quebec provincial *Cooperatives Act*. It is directed by an annual assembly which votes on general strategy and orientation. This assembly is sovereign for certain decisions concerning the organization. The general assembly elects a board of directors whose principal mandate is to implement and develop these strategies. It is not responsible for routine management, a task that falls to the management team composed of six (6) employees.

### **1.2- Principal Regular Activities**

Over the years, Option consommateurs has developed expertise in numerous fields and is now acknowledged as an authoritative stakeholder in the area of consumer affairs. Each year we reach between 7,000 and 10,000 consumers directly; we conduct more than 400 interviews with

the media; we sit on various working committees and boards of directors; we carry out large-scale intervention projects with major partners; and we produce research reports, policy papers, consumer guides and a consumer information and action magazine called *Consommation*.

### **1.3- Research and Representation Department**

The Research and Representation Department (RRD) is responsible for Option consommateurs' relations with the agencies and crown corporations of the Quebec and federal governments. The RRD represents Option consommateurs before the Régie de l'énergie du Québec, the regulatory authority on matters of electricity, natural gas and retail gasoline sales in our province. The Department also represents Option consommateurs on committees relating to industries such as agri-food, financial services, energy, and property and personal insurance.

The RRD is responsible for the organization's research studies that are funded by government agencies, including Industry Canada's Office of Consumer Affairs. This research aims to develop Option consommateurs's expertise in various fields as well as to channel consumers' arguments to the governmental authorities so as to ensure that these are taken into account when public policy decisions are made. This paper is part of the research funded by this agency; its purpose is to advocate on behalf of consumers' interests in the context of the WTSR.

## **2- WATER SECTOR REGULATION IN CANADA**

### **2.1- Trade Measurement Regulation under the *Weights and Measures Act***

The obligations and powers of the Ministry of Industry relating to trade measurement in all sectors other than electricity and natural gas are established by the *Weights and Measures Act*. In enforcing this law and its regulations, Measurement Canada performs various tasks to ensure the accuracy of measuring devices.<sup>4</sup> When this report was written, the WTSR team had not yet published its consultation document. We therefore used some of the information provided to us last year in conjunction with the Retail Food Trade Sector Review. We consider this an acceptable approach since Measurement Canada's scope of intervention has not changed since then. We also updated certain information concerning the Measurement Canada Accreditation Program, which was slightly modified.

Before detailing Measurement Canada's intervention as such, we shall consider the Alternate Service Delivery (ASD) mechanisms being implemented by the agency through its Accreditation Program.

#### **2.1.1- Accreditation Program**

Currently, Measurement Canada intervenes directly in the market for some but not all of its activities. By means of Alternate Service Delivery (ASD) mechanisms, the agency has established partnerships with the private sector, contracting certain tasks to it through the Accreditation Program.

Accreditation has existed since 1979, when the Electricity and Gas discipline of the Legal Metrology Branch (now Measurement Canada) decided to resort to this service delivery mechanism as a means of coping with resource cutbacks. In March 1988, the Legal Metrology Branch accredited its first organization for the verification of single-phase electricity meters. The Weights and Measures component of the Accreditation Program came about as a result of the

formation of an accreditation working group in 1994. The group was comprised of members from the scale and fuel dispenser industries as well as the Legal Metrology Branch. The group was tasked with developing a strategy to implement and administer a private industry accreditation program for factory initial inspections. In May of 1995, *Accreditation of Organizations to Perform Factory Initial Inspections Pursuant to the Weights and Measures Act* was issued. In January of 1999, Measurement Canada accredited its first client to perform factory initial inspections of gasoline and diesel fuel dispensers. In July 1999, Measurement Canada harmonized the existing accreditation programs with the international standard ISO 9002:1994 in order to increase efficiency and effectiveness in the delivery of the program. S-A-01, *Criteria for Accreditation of Organizations to Perform Inspections Pursuant to the Electricity and Gas Inspection Act and the Weights and Measures Act*, was issued on 27 July 1999 as the result of a review of the Measurement Canada accreditation programs, the integration of the two existing accreditation standards and the harmonization with international standards. In the preparation of S-A-01, Measurement Canada made extensive use of existing quality assurance standards issued by the International Organization for Standardization (ISO) and the Canadian Standards Association. The first revision to S-A-01 further expands the use of international standards by including references to ISO 9001:2000 and ISO/IEC 17025:1999. The revised standard is numbered S-A-01:2002.<sup>5</sup>

Organizations seeking accreditation must implement a complete quality assurance program in compliance with S-A-01:2002. The organization must specify the operation type (initial inspection or periodic inspection) and device type for which it seeks accreditation.<sup>6</sup> In the application process, the organization must develop a quality manual describing the procedures it intends to use to perform the tasks for which it seeks accreditation. The application is studied by Measurement Canada, which audits the applicant. After reviewing the quality manual, Measurement Canada's auditors make an accreditation decision which is valid for a three-year period. If accreditation is granted, the accredited organization inspects the weighing and measuring devices for which it is accredited in accordance with Measurement Canada's requirements. Thereafter, Measurement Canada no longer plays an inspection role for these devices but, rather, a surveillance role, which it fulfils through surveillance and product audits. Surveillance audits take place annually. They consist of an audit of the quality manual and field operations of the accredited organization. Product audits consist of verification of measuring

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<sup>4</sup> MEASUREMENT CANADA, *Trade Sector Review. Retail Foods (RFSR). A Presentation to Retail Food Stakeholders (Industry and Consumer)*. Ottawa, 2002.

<sup>5</sup> MEASUREMENT CANADA, *S-A-01:2002 Authorization*, online at <http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/Im02496e.html>.

<sup>6</sup> MEASUREMENT CANADA, *Accreditation Program*, online at <http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/Im01807e.html>.

devices approved by the accredited organization. Their frequency varies according to the type of device and the problems detected previously. Where there are problems relating to the work performed by the accredited organization, Measurement Canada's auditors may take action ranging up to suspension or revocation of accreditation. When accreditation expires, the organization must file a renewal application, and Measurement Canada then conducts audits to determine whether renewal should be granted.<sup>7</sup>

The following sections describe Measurement Canada's current role and the changes under consideration for all trade sector reviews.

### **2.1.2- Development of Metrological Standards**

Measurement Canada's Program Development Division is responsible for the development of standards, regulatory changes, policies and procedures governing weighing and measuring devices. When a new metrological technology appears on the market, it is approved and inspected with reference to applicable regulatory standards and test procedures. The standards are developed in consultation with industry representatives.<sup>8</sup>

Measurement Canada intends to pursue its direct intervention in this sector and will not be using ASD mechanisms.<sup>9</sup>

### **2.1.3- Maintenance and Calibration of Measurement Standards**

Measurement Canada, through its Calibration Services Laboratory, owns and maintains measurement (reference) standards that are traceable to the National Research Council primary base units of measurement. Standards of mass, length, volume, temperature, pressure, and electricity are calibrated and certified. These reference standards are used by government inspectors and recalibrated annually.<sup>10</sup>

Measurement Canada is willing to assess the possibility of using ASD mechanisms for verification of industry standards used to inspect and certify measuring devices.<sup>11</sup> This means that

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<sup>7</sup> Benoît MONTPETIT, MEASUREMENT CANADA auditor, interview conducted 29 July 2002 in Montreal.

<sup>8</sup> MEASUREMENT CANADA, *Retail Food Sector Review: a Discussion Paper on Measurement Issues in the Retail Food Industry of Canada*, Ottawa, September 2002, 49.

<sup>9</sup> MEASUREMENT CANADA, *Background Information*, online at <http://strategis.ic.gc.ca/epic/internet/inmc-mc.nsf/vwGeneratedInterE/Im02773e.html>.

<sup>10</sup> Luciano BURTINI, Team Manager, Measurement Canada Retail Food Sector Review, e-mail received 7 June 2002; MEASUREMENT CANADA, *Retail Food Sector Review: a Discussion Paper*, 49.

<sup>11</sup> MEASUREMENT CANADA, *Retail Food Sector Review: a Questionnaire for the Retail Food Industry of Canada*, Ottawa, 2002, 17.

Measurement Canada is set to withdraw from direct intervention in this area and to contract the relevant tasks out to external organizations. This could be done through the Accreditation Program.

### **2.1.4- Approval of New Measuring Device Types**

Measurement Canada, through its Approval Services Laboratory, approves all weighing and measuring devices intended for trade use in Canada. All new and modified devices are examined and tested with respect to legislative requirements for design, composition, construction, and performance. When a device type is approved, it receives an approval number, and the documentation regarding the approval is available to inspectors. Measurement Canada is a partner in a Mutual Recognition Program with its US counterparts in order to harmonize requirements for the approval of measuring devices in both countries. Thus, Measurement Canada recognizes the results of tests performed by four government laboratories under the US National Type Evaluation Program (NTEP) for a certain class of devices. Based on the evaluation and results of the NTEP tests, Measurement Canada may approve a device if it complies with Canadian regulations, which differ from those of the United States.<sup>12</sup>

As part of its strategic direction, Measurement Canada raises the possibility of contracting this task out to external laboratories through an ASD mechanism.<sup>13</sup> This could be done through the use of the Accreditation Program based on S-A-01:2002 or by extension of recognition of test results performed by external laboratories.

### **2.1.5- Initial Inspection of New Devices**

Measurement Canada, through its regional inspection staff and its accredited inspectors, inspects weighing and measuring devices before they are used in trade (initial inspection), except where an exemption exists under the Act and the Regulation. This measure is designed to ensure that devices meet the approval criteria, that they are correctly installed, and that they operate within the prescribed tolerances before they are put into service. Thus, all measuring devices must be given an initial inspection. The inspection may be performed at the factory or on the site where the device is used, if installation has an effect on how it operates.<sup>14</sup>

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<sup>12</sup> MEASUREMENT CANADA, *Retail Food Sector Review: a Discussion Paper*; Jean-Gilles POIRIER, member, Measurement Canada Retail Food Sector Review team, e-mail received 5 September 2002; Luciano BURTINI, e-mail received 7 June 2002.

<sup>13</sup> MEASUREMENT CANADA, *Background Information*.

<sup>14</sup> Luciano BURTINI, e-mail received 7 June 2002; MEASUREMENT CANADA, *Retail Food Sector Review: a Questionnaire*, 49-50; Jean-Gilles POIRIER, e-mail received 5 September 2002.

Initial inspection is the area in which ASD is used most extensively, and Measurement Canada is considering this type of intervention in all trade sectors.<sup>15</sup>

### **2.1.6- Periodic Inspection**

Devices used to measure quantities of mass or volume pursuant to the requirements of the *Weights and Measures Act* are verified on an ad hoc basis throughout their lifetime to ensure that they are properly maintained, continue to measure accurately, and are not used in a fraudulent manner.<sup>16</sup>

Previously, in all retail trade sectors, Measurement Canada conducted surprise inspections on business premises. Inspectors based at about 20 offices managed to inspect all measuring devices in the market approximately every two years (more often in urban areas and less often in remote areas). Recently, with the significant drop in the number of inspectors, this coverage is no longer adequately assured and in certain regions, devices are no longer inspected after the initial inspection. Periodic inspection is done only by Measurement Canada; there are no accredited organizations.<sup>17</sup>

Measurement Canada is considering the use of ASD in this area of intervention.<sup>18</sup> In the water sector, utilities could be accredited to conduct periodic inspections, as is the case for electricity and natural gas companies. However, the fact that water meters are covered by the *Weights and Measures Act*, under which periodic inspection of devices is not mandatory, makes water utilities little inclined to apply for accreditation in this area.

### **2.1.7- Net Quantity Verification**

In the trade sectors under the jurisdiction of the *Weights and Measures Act*, which include the water sector, Measurement Canada verifies the net quantities of products sold, in addition to its inspection of measuring devices. The agency's inspectors make visits to businesses in order to verify that the quantity charged for corresponds to the real quantity delivered. Such inspections are usually conducted only where the agency has reason to believe a problem exists with net

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<sup>15</sup> MEASUREMENT CANADA, *Background Information*.

<sup>16</sup> MEASUREMENT CANADA, *Retail Food Sector Review: a Discussion Paper*, 49.

<sup>17</sup> Luciano BURTINI, e-mail received 7 June 2002; MEASUREMENT CANADA, *Retail Food Sector Review: a Questionnaire*, 8; Jean-Gilles POIRIER, e-mail received 5 September 2002.

<sup>18</sup> MEASUREMENT CANADA, *Background Information*.

quantities sold in a given business. This explains the compliance rate of only 65% for net quantity verification.<sup>19</sup>

Measurement Canada is considering the possibility of using ASD in this area of intervention, in particular through the Accreditation Program based on S-A-01:2002.<sup>20</sup> It will have to be seen whether the water sector lends itself well to this type of intervention, since water is distributed directly in consumers' homes, not in stores like food and gasoline.

### **2.1.8- Complaint Investigation and Dispute Resolution**

Measurement Canada, through its field inspection staff, investigates complaints and advises affected parties of the result of the investigation, including any corrective action instituted where warranted.<sup>21</sup> Measurement Canada is the ultimate authority in resolving disputes and investigating complaints, and the agency considers this role to be non-negotiable in all the trade sector reviews.

### **2.1.9- Accreditation of Organizations to Inspect Approved Devices**

An organization may be invested with the power to perform initial inspection, periodic inspection and certification of trade weighing and measuring devices on behalf of Measurement Canada if it meets the program's requirements.<sup>22</sup> A description of the Accreditation Program is given in section 2.1.1. Measurement Canada has not put any proposals on the table to modify the Accreditation Program.

This summarizes the scope of Measurement Canada's surveillance of trade measurement. Of course, this description is merely a summary; it does not describe the agency's strategic orientation, nor does it present a complete listing of the regulations for which it is responsible. The water sector has one peculiarity that will be described in the following section.

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<sup>19</sup> Luciano BURTINI, e-mail received 7 June 2002; MEASUREMENT CANADA, *Retail Food Sector Review: a Questionnaire*, 23.

<sup>20</sup> MEASUREMENT CANADA, *Background Information*.

<sup>21</sup> MEASUREMENT CANADA, *Retail Food Sector Review: a Discussion Paper*, 50.

<sup>22</sup> Ibid.

## **2.2- Particular Context of Water Measurement**

Unlike electricity and natural gas utilities which bill consumers based on metered use, not all drinking water utilities meter their product. In many municipalities, residents pay a uniform flat rate regardless of individual consumption. Measurement Canada data indicates that approximately 50% of drinking water connections are metered. Among municipalities with populations over 1,000, 27% meter all users, 21% only some users (33% of users on average), and 52% do not meter water at all. The prevalence of metering varies among Canada's regions: 70% of Prairie municipalities meter all users; 18% of British Columbia, Quebec, New Brunswick and Newfoundland municipalities do so, and the proportion of municipalities metering all users ranges from 25 to 50% in Ontario, Nova Scotia and Prince Edward Island. In all, Measurement Canada estimates the number of water meters in Canada at 4–6 million, with 50% of households being so equipped.<sup>23</sup>

Furthermore, and unlike the trade sectors reviewed previously, drinking water is currently exempt from the provisions of section 8 of the *Weights and Measures Act* and section 4 of the *Weights and Measures Regulation*. This means that water meters are exempt from all Measurement Canada regulations except regarding conflict resolution between consumers and water utilities. Specifically, water meters are not subject to type approvals, measurement accuracy standards, or mandatory initial inspection and periodic reinspection. Measurement Canada's intervention in these areas is minimal. Essentially, this sector is self-regulated, and water utilities, which are almost exclusively municipal or inter-municipal, are free to verify water metering accuracy within their jurisdiction as they see fit. A study of the practices of water utilities as regards metering accuracy will be presented in the next chapter.

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<sup>23</sup> James WELSH, member, Measurement Canada Water Sector Review Team, e-mail received 23 October 2002.

## **3- METER INSPECTION BY WATER UTILITIES**

With water meters currently exempt from Measurement Canada regulations, there is no legal framework for their accuracy. Each utility establishes its own regulations for meter types, initial and subsequent inspection procedures, error tolerances, replacement criteria, and installation configuration. In 2001, Measurement Canada conducted a survey of 45 water utilities serving residential customers in Canada in order to obtain a portrait of their water measurement practices.

### **3.1- Billing Methods**

About half of the utilities meter water consumption, while the other half charge a flat rate for each user category. The table below illustrates the different billing practices for residential customers.

It may be noted that the total number of utilities suggested by this table exceeds the number of utilities surveyed. This is because each utility may use more than one billing method for its residential customers. A look at a table of the practices of all municipalities with populations over 1,000 in Canada shows us that several municipalities use more than one billing method, some residents paying a flat rate and others having a water meter.<sup>24</sup>

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<sup>24</sup> MEASUREMENT CANADA, *Meter Use*, Ottawa, 1999.

**Table 1 – Billing Practices of Water Utilities**

Billing type	Number of utilities
Flat rate <sup>25</sup>	20
Constant rate <sup>26</sup>	26
Declining block rate <sup>27</sup>	11
Increasing block rate <sup>28</sup>	5
Seasonal rates <sup>29</sup>	1
Sewer rate <sup>30</sup>	19

Source: MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, Ottawa, Measurement Canada, 2002, 4.

### 3.2- Traceability of Reference Standards

Slightly over half the water utilities (25 out of 45) do not possess reference standards for meter testing purposes. As we shall see below, some of them either do not conduct periodic meter inspection or contract this work to an outside firm. For those possessing standards, a very small number of these are traceable<sup>31</sup> to Measurement Canada standards or those of another

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<sup>25</sup> No meter in homes; billing is largely by diameter of water supply pipes.

<sup>26</sup> Meters are installed in homes and the rate does not vary according to consumption. Some utilities bill a flat charge equivalent to a base level of consumption plus an additional charge for consumption exceeding that level.

<sup>27</sup> Meters are installed in homes and water is billed in constant blocks, with a declining charge for each additional block (e.g., \$0,60/m<sup>3</sup> for the first 1000 m<sup>3</sup> plus \$0,50/m<sup>3</sup> per additional 1000 m<sup>3</sup>).

<sup>28</sup> Meters are installed in homes and water is billed in constant blocks, with an increasing charge for each additional block (e.g., \$0,50/m<sup>3</sup> for the first 1000 m<sup>3</sup> plus \$0,60/m<sup>3</sup> per additional 1000 m<sup>3</sup>).

<sup>29</sup> Meters are installed in homes and water is billed on a seasonal basis, often with a higher rate in summer when consumption is higher (pools, lawn watering, car washing).

<sup>30</sup> The charge for wastewater collection and treatment. This fee is most often included in the total water bill and is almost always calculated as a function of water consumption, whether metered or not.

<sup>31</sup> The term "traceable" refers to the concept of "traceability" used by Measurement Canada and all of the world's legal metrology agencies. This term means that a reference standard used to test trade measurement devices will indicate the same quantity as the standard kept by the legal metrology agency, in this case Measurement Canada, within a minute margin of error (about ±0.1%). Traceability is established by an inspection in which the standards used to inspect measuring devices are compared to the agency's standard. Measurement Canada's standards are themselves traceable to international standards. For example, the 1 kilogram standard is kept in Sèvres, France, and Measurement Canada's primary 1 kilogram standard is calibrated to it in order to establish its traceability. Measurement Canada has secondary standards of 1 kilogram and other weights whose traceability is established by comparison with the primary standard.

certification agency. For example, the former city of Sainte-Foy uses an uncertified “homemade” tank. In fact, only the cities of Ottawa, Belleville and Edmonton use Measurement Canada-certified standards.<sup>32</sup>

### **3.3- Quality Standards and Meter Accuracy**

Utilities using meters purchase them directly from suppliers who manufacture all their devices in accordance with American Waterworks Association (AWWA) standard C700. This standard defines meter specifications in terms of design, manufacture, and accuracy.<sup>33</sup> The AWWA is a private non-profit US scientific and educational organization of 50,000 members, including 4,000 North American water utilities. Its mandates go beyond water measurement to issues of water quality, public health, and supply.<sup>34</sup>

It should be specified that AWWA only establishes meter standards but does not approve types, as does Measurement Canada. AWWA does not endorse any meter manufacturer claiming to adhere to its standards, nor does it test meter types to ascertain the truth of manufacturers' compliance claims. It is also important to specify that only North American manufacturers build meters to this standard. The utilities currently purchase their meters exclusively from such companies, but the situation could change as the World Trade Organization requires the elimination of trade barriers. This would open up the market to foreign meters built to a different standard, such as that of the International Organization for Legal Metrology (IOLM).<sup>35</sup>

### **3.4- Initial Inspection of New Meters**

Initial meter inspection is a widespread practice, with 45 of the 48 utilities stating that their meters are inspected at the outset. In addition, a majority of utilities stated that all of their meters are inspected. Most of the utilities (43) count on the initial inspection conducted at the factory, but 8 of them inspect upon delivery and in 6 of these latter cases, the inspection is additional to the manufacturer's.<sup>36</sup>

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These secondary standards are then used to calibrate reference standards which, in turn, serve to inspect trade measuring devices. Thus the concept of a “chain of calibration,” in which each link is traceable to the next link in the chain.

<sup>32</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, Ottawa, 2002, 39-46.

<sup>33</sup> *Ibid.*, 19.

<sup>34</sup> AMERICAN WATER WORKS ASSOCIATION, *Who we are*, online at <http://www.awwa.org/About/>.

<sup>35</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, 19-20.

<sup>36</sup> *Ibid.*, 21.

This data illustrates the different initial inspection practices in effect; specific examples provide further illustration. Saskatoon inspects a random sample of residential meters but has no sampling program. London has no formal initial inspection procedure but conducts spot inspections of new meters. The Regional Municipality of Ottawa-Carleton inspects a sample of 5% of meters received from manufacturers. Calgary requires all meters to be inspected by the manufacturer and, additionally, tests 10% of small meters and all large meters. Winnipeg only purchases factory-inspected meters and conducts further testing on 5% of them.<sup>37</sup>

The utilities' metering accuracy requirements were surprising or seemingly contradictory in some cases. The manufacturers stated that all meters meet the AWWA error tolerance standard of  $\pm 1.5\%$ .<sup>38</sup> However, of the 36 utilities who answered this survey question, only 25 stated that their requirements were those of AWWA. Among the 11 utilities who gave a different response, the accuracy requirements varied greatly, from  $\pm 0.1\%$  to  $\pm 5\%$ . Such discrepancies should not exist, since all meters are supposed to meet AWWA standards. It is very surprising that some utilities require greater accuracy than the AWWA (e.g., Saint-Lambert,  $\pm 0.1\%$ , Vancouver,  $\pm 0.5\%$ ), while others tolerate a larger margin of error (e.g. New Glasgow,  $\pm 4\%$ , Charlottetown,  $\pm 5\%$ ).<sup>39</sup>

### **3.5- Periodic Meter Inspection and Replacement**

The use of seal periods for periodic inspection or replacement after a given number of years in service is a minority practice, with a little more than 40% of utilities reporting it. Typically, the replacement or periodic inspection frequency is determined by the number of years in service, this being much shorter for meters measuring larger volumes.<sup>40</sup> The table below illustrates several examples for 5/8-inch and 3/4-inch residential meters. We see that the duration varies from one utility to another.

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<sup>37</sup> Ibid., 22.

<sup>38</sup> James WELSH, Team Manager, Measurement Canada Water Sector Review Team, e-mail received 3 June 2003.

<sup>39</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, 23-25.

<sup>40</sup> Ibid., 26.

**Table 2 - Seal Period**

<b>Utility</b>	<b>5/8"</b>	<b>3/4"</b>
Halifax	<b>15</b>	<b>15</b>
Fredericton	<b>15</b>	<b>n/a</b>
New Glasgow	<b>15</b>	<b>15</b>
Trent Hills	<b>10</b>	<b>8</b>
Kingston	<b>12</b>	<b>12</b>
St. Catharines	<b>15</b>	<b>15</b>
Windsor	<b>15</b>	<b>15</b>
Winnipeg	<b>20</b>	<b>20</b>
Saskatoon	<b>End of useful life</b>	<b>End of useful life</b>
Calgary	<b>Sampling</b>	<b>Sampling</b>
Edmonton	<b>25</b>	<b>25</b>
Moose Jaw	<b>10</b>	<b>10</b>

Source: MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, Ottawa, Measurement Canada, 2002, 27.

Whereas electricity and natural gas meters can have their seal period extended depending on the results of periodic inspection, this is not everywhere the case for water meters. Some meters are replaced without further inspection. Many utilities use both methods simultaneously; 36 stated that they replace their meters while 30 may replace or revalidate depending on the inspection. In general, utilities tend to replace low-volume (residential) meters automatically while inspecting large-volume meters. The following are some examples of practices for residential meters:

- Halifax replaces all its residential meters at the end of the seal period.
- New Glasgow only purchases meters with a manufacturer's warranty of 15 years, replacing them after this period.

- London has a replacement program for 90% of meters after 15 years of service.
- Niagara Falls replaces old meters requiring major repairs.
- St. Catharines replaces 75% of meters at the end of the seal period and conducts an inspection to extend the validity of the remaining meters.
- Toronto replaces meters on an individual basis depending on the cost of repair and the perceived inaccuracy of the device.
- Regina has no periodic inspection or replacement program and tests are performed at consumers' request.<sup>41</sup>

Slightly more than 60% of utilities have some subject meter revalidation to inspection at the end of the seal period. For 55% of utilities, inspections are conducted by meter service companies; inspections are conducted on utilities' premises (for themselves and/or other utilities) in 28% of cases, 33% of utilities conduct inspections on the consumer's premises, and only 6% send their meters to the manufacturers for servicing. Some utilities inspect a portion of their meters themselves and have the remainder inspected by meter service companies.<sup>42</sup>

A little more than half of the water utilities (26 of 45) stated that they use error tolerances for periodic meter inspection. It is interesting to note that 4 utilities conducting periodic inspections did not answer this question. Of the utilities with error tolerances, 17 stated that they use AWWA standard C700 yet, curiously, the WTSSR team members stated that the AWWA C700 standard does not deal with the margin of error for periodic meter inspection. This leads us to believe that these utilities use the same standard as for initial inspection,  $\pm 1.5\%$ .<sup>43</sup> The 9 other utilities have established standards ranging from  $\pm 0.1\%$  to  $\pm 10\%$ . Here again, we note that some utilities' standards are stricter than AWWA (Saint-Lambert,  $\pm 0.1\%$ ), while others are much more lax (Charlottetown,  $\pm 5\%$ , Thunder Bay,  $\pm 10\%$ , Edmonton,  $-10\%$  to  $+3\%$ ).<sup>44</sup>

### **3.6- Consumer Complaint Resolution**

When consumers of 87% of utilities believe that their meters are inaccurate, there is a complaint department for them to call. Of the 42 utilities in question, 37 test the suspect meter, 29 give

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<sup>41</sup> Ibid., 30-32.

<sup>42</sup> Ibid., 33.

<sup>43</sup> James WELSH, e-mail received 3 June 2003.

<sup>44</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, 36-38.

refunds in case of error, and 20 charge inspection fees, which may be refunded if the meter is out of tolerance.<sup>45</sup> The table below summarizes these fees.

**Table 3 –Meter Inspection Fee**

<b>Utility</b>	<b>Fee</b>	<b>Refund</b>
Brossard	<b>\$140</b>	Yes, if meter faster than permitted margin of error
Fredericton	<b>\$50</b>	Yes, if meter faster than permitted margin of error
New Glasgow	<b>\$30</b>	Yes, if meter exceeds permitted margin of error
Cochrane	<b>\$125</b>	Yes, if meter exceeds permitted margin of error
Moose Jaw	<b>\$40</b>	Yes, if meter exceeds permitted margin of error
Saskatoon	<b>\$30</b>	Yes, if meter exceeds permitted margin of error

Source: MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, Ottawa, Measurement Canada, 2002, 47-50.

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<sup>45</sup> Ibid., 47.

## **4- REGULATION IN THE UNITED STATES**

A comparison between the Canadian regulatory framework and that of other countries enables us to put our practices in the area of water meter accuracy inspection into perspective. We have chosen to illustrate this comparison with the example of the United States, Canada's principal trading partner. Despite its reputation for a laissez-faire economic approach, the United States is acknowledged for its long-standing tradition of regulating the accuracy of trade measuring devices. The United States has created both public and non-profit standardization bodies of international renown, including the National Institute of Standards and Technology (NIST) and the National Conference on Weights and Measures (NCWM). For the water sector specifically, the AWWA plays an important role.

One peculiarity of the US regulatory system for weights and measures is that responsibilities are shared between the federal and state governments. The United States has no central regulatory agency analogous to Measurement Canada. National standards on specifications, traceability of measurement standards, pattern (type) approval, and supervision of external service companies are established by the above-mentioned federal and non-profit bodies. The states are free to adopt the national standards for measuring devices or set their own standards. This situation is due to the fact that the national agencies do not play the same role as Measurement Canada. They are not regulatory bodies as such but, rather, advisory bodies to the states, which are sovereign in this area.

Due to this sharing of trade measurement responsibilities, the situation in the United States is complex, with attempts at standardization and aspects particular to each state. To illustrate this complexity, Option consommateurs researched the regulatory practices for water meter accuracy of both the national agencies and those of the state of California. Before turning to these findings, we shall provide some background on the US national trade measurement standards bodies, the public NIST and the private, non-profit NCWM and AWWA.

## **4.1- National Standards Bodies**

### **4.1.1- National Institute of Standards and Technology (NIST)**

Founded in 1901, NIST is a non-regulatory federal agency within the US Commerce Department's Technology Administration. NIST's mission is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life. With an annual budget of US \$864 million, NIST employs 3,000 scientists, technologists, and administrators, as well as 1,600 guest researchers. In addition, NIST partners with 2,000 manufacturing specialists and staff at affiliated centres around the country.<sup>46</sup>

Trade measurement standardization is only part of NIST's mandate. It is also involved in various spheres of the economy and technology through a cooperative approach embodied in four programs:

- the Baldrige National Quality Program, which promotes performance excellence among manufacturers, service companies, educational institutions, and health care providers;
- the Manufacturing Extension Partnership, offering technical and business assistance to small manufacturers;
- the Advanced Technology Program, which accelerates technological development by co-financing R&D initiatives with the private sector;
- the NIST Laboratories Program, whose mandate is to meet the measurement, data, and technology needs of industry and state governments.<sup>47</sup>

The weights and measures role of the NIST Laboratories Program is to provide trade measurement services through the Measurement Services Division, which ensures the traceability of measurement standards.<sup>48</sup> We shall delve further into the role of NIST in the sections on development of metrological standards (4.3.1) and traceability of measurement standards (4.3.2).

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<sup>46</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *General Information*, online at [http://www.nist.gov/public\\_affairs/general2.htm](http://www.nist.gov/public_affairs/general2.htm).

<sup>47</sup> Ibid.

<sup>48</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Measurement Services Division*, online at <http://ts.nist.gov/ts/htdocs/230.htm>.

NIST also provides technical assistance to the states, including one- to two-week metrology seminars for their weights and measures experts. The service is offered by the NIST Laboratories' Technology Services lab.<sup>49</sup>

#### **4.1.2 National Conference on Weights and Measures (NCWM)**

NCWM is a private non-profit organization supported by NIST for partial fulfillment of its statutory responsibility to cooperate with the states on standardization of their weights and measures laws and inspection procedures. Its membership consists of representatives of regulatory and industry bodies. NCWM plays an active role in the area of water meter accuracy by setting standards. It accomplishes its mission through four committees:

- Specifications & Tolerances Committee: Addresses specifications, tolerances and technical requirements for commercial measuring devices, which are published in Handbook 44, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices* (Appendix 3).
- Laws and Regulations (L&R) Committee: Develops and interprets uniform laws and regulations and commodity inspection and regulation standards. Results are published in NCWM Handbook 130, *Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality* (see Appendix 1), which includes recommendations for state adoption on legal metrology.
- Administration and Public Affairs (A&P) Committee: Addresses consumer affairs and safety issues and promotes awareness of weights and measures activities among the general public.
- National Type Evaluation Committee: Oversees the operation of NTEP and establishes the *Uniform Regulation for National Type Evaluation* (see Appendix 2), a national type approval standard. This program will be explained in more detail in the section on measuring device type approval. This committee sets the goals and objectives as well as operating policies and procedures of this program. In addition, it authorizes the participating laboratories' and sponsors' technical subcommittees to develop technical test procedures and evaluation criteria.<sup>50</sup>

NCWM makes decisions by consensus of its members. Generally, the subjects on the committees' agendas are brought forward by the regional NCWM associations, although individual parties may also do so.<sup>51</sup>

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<sup>49</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Laboratory Metrology Training and Schedule*, online at <http://ts.nist.gov/ts/htdocs/230/235/labtraining/TRAIN503.htm>.

<sup>50</sup> NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, *NCWM: The Organization*, online at <http://www.ncwm.net/organization.html>.

<sup>51</sup> NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, *NCWM: The Decision-Making Process*, online at <http://www.ncwm.net/process.html>.

### **4.1.3- American Water Works Association (AWWA)**

The AWWA is a non-profit organization involved in the drinking water utility sector. Its varied activities include education, lobbying, technology development support for utilities, water quality, and development of standards in the drinking water sector. It has 50,000 members, including 4,000 North American water utilities.<sup>52</sup>

The AWWA is also a standards body in the water utility sector for a wide range of water supply equipment, including filters and pipes. It has adopted a water meter quality and accuracy standard, AWWA C700, which was renewed in 2002 (C700–02). This standard requires meter accuracy of  $\pm 1.5\%$  for intermediate and maximum flows and  $-5\%$  to  $+1\%$  for minimum flows.<sup>53</sup> The AWWA, it should be said, only establishes meter standards and does not approve types as does Measurement Canada. It does not endorse any manufacturer claiming to produce meters to its standards, nor does it test meter types with a view to ascertaining the truthfulness of manufacturers' compliance claims. Also of importance is the fact that only North American manufacturers build meters to this standard.

## **4.2- The Water Sector: A Special Case**

The other weights and measures sectors, such as retail food and gasoline, are characterized by a degree of uniformity among state regulations. This uniformity is fostered by a set of national standards published by NIST, such as the *Uniform Weights and Measures Law*, the *Uniform Regulation for National Type Evaluation* and the *Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices*. In these sectors, regulatory authority is generally held by a specialized weights and measures body under a government department with responsibility for consumer affairs or agriculture.

From another perspective, the “public utility” nature of the water sector has led a number of state authorities to treat it differently from other, more commercial sectors. There is, furthermore, less uniformity in the regulation of water meters, with three major regulatory modes in evidence in the United States. First, certain states entrust the regulation of trade measurement to a public utilities commission or board. This is true of New Jersey, where water meters are regulated by the New Jersey Board of Public Utilities (BPU), the agency responsible for regulatory supervision of public

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<sup>52</sup> AMERICAN WATER WORKS ASSOCIATION, *Who we are*.

<sup>53</sup> James WELSH, e-mail received 3 June 2003.

utilities including water, electricity, telecommunications, and natural gas. The BPU sets public utility rates, guarantees user safety, responds to consumer complaints, and encourages energy efficiency. This role is similar to that of energy regulatory authorities in the Canadian provinces such as the Régie de l'Énergie du Québec and the Ontario Energy Board.<sup>54</sup> This is also the case of California, where meters linked to private utilities are regulated by the California Public Utilities Commission (CPUC), an agency with mandates similar to that of its New Jersey counterpart.<sup>55</sup> The CPUC's regulation of meters is based on a regulation on the conditions of water service called *Rules Governing Water Service Including Minimum Standards for Design and Construction*. This regulation includes other aspects of water utility regulation such as connections and disconnections, service, water quality, and water supply equipment standards.<sup>56</sup>

In several states, water meter accuracy is unregulated, and public utilities monitor device accuracy themselves. Several utilities in these states are essentially self-regulating and implement their own metering accuracy programs. This self-regulation often involves the application of the AWWA standards, as is the case in Canada. Our research did not establish the extent of this situation, but a Measurement Canada study of the practices of several US cities<sup>57</sup> and our exploration of several state regulatory systems leads us to believe that at least some meters are unregulated in several US states. For example, California does not regulate meters owned by municipalities, mutual water utilities (in which each customer owns one share of stock) or homeowners' associations.<sup>58</sup>

Finally, certain states entrust at least part of their regulatory responsibilities to their weights and measures authority. These regulations are similar to those applied to other measuring devices such as scales and gasoline pumps. In these cases, the regulations often refer to the NIST standards. California is in this situation for regulation of meters used for sub-metering.<sup>59</sup> These are regulated by the California Department of Food and Agriculture's Division of Measurement Standards (DMS), which regulates other trade measurement sectors such as retail food scales and gasoline pumps. These regulations are, in part, applied by each of the 56 counties under the

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<sup>54</sup> NEW JERSEY BOARD OF PUBLIC UTILITIES, *About the BPU*, online at <http://www.state.nj.us/bpu/home/about.shtml>.

<sup>55</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Water*, online at <http://www.cpuc.ca.gov/static/industry/water/index.htm>; Ken LAKE, Division of Measurement Standards, California Department of Food and Agriculture, e-mail received 16 June 2003.

<sup>56</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Rules Governing Water Service Including Minimum Standards for Design and Construction*, San Francisco, 1994.

<sup>57</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector In Service Water Meter Performance Report*, Ottawa, 2002, 8-11.

<sup>58</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Water*, online at <http://www.cpuc.ca.gov/static/industry/water/index.htm>; Ken LAKE, e-mail received 16 June 2003.

<sup>59</sup> Sub-metering means that each individual user is connected to a main meter which is, in turn, connected to the water supply system. The user pays the main meter's owner for the water consumed. This is the case of tenants in an apartment building whose owner bills them for water individually; it also exists in trailer parks, marinas, and campgrounds.

supervision of the DMS. The state does not employ inspectors for purposes of initial meter inspection and reinspection, since this is a county responsibility. The number of inspectors for each county varies according to its population; Del Norte County has only one inspector, while Los Angeles County has 122.<sup>60</sup>

### **4.3- Components of the Regulatory Framework**

This section examines the various components of the regulatory framework for water metering accuracy. The study considers the national standards in effect as well as the regulatory framework for the state of California. The reason we chose California for this study is that this state uses all three major regulatory modes existing in the United States, which are divided according to the different modes of meter usage:

- CPUC regulation of meters owned by private utilities;
- non-regulation of meters owned by public utilities, mutual utilities or a homeowners' association;
- DMS regulation of meters used for sub-metering.

#### **4.3.1- Development of Metrological Standards**

##### **4.3.1.1- National Standards**

Metrological standards are developed by two national bodies, NIST and AWWA.

NIST publishes an annual metrological standard on mandatory specifications for trade measuring devices. The standard, titled Handbook 44, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, contains various sections, including section 3.36, "Water Meters" (see Appendix 3). Though NIST publishes this standard, it is developed and adopted annually by the NCWM Specifications and Tolerances Committee. This standard contains the following elements:

- units of measure;

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<sup>60</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, *Measurement Standards*, online at <http://www.cdffa.ca.gov/dms/>; CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, *Staffing List, County Agricultural Commissioners and County Sealers of Weights and Measures*, online at <http://www.cdffa.ca.gov/exec/cl/Documents/Staffing%202003.pdf>.

- graduations;
- indicators;
- sealing;
- compliance tests;
- error tolerances ( $\pm 1.5\%$  for intermediate and maximum flows,  $-5\%$  to  $+1.5\%$  for minimum flows).<sup>61</sup>

The section 3.36 standards are suggested to the states for their regulation of measuring device specifications. It is important to note that the Handbook 44 standards are very similar to those of AWWA.<sup>62</sup>

The AWWA sets and updates standard C700, which regulates water metering accuracy. This standard is used by many municipal water utilities, especially in states that do not regulate metering accuracy.

#### **4.3.1.2- California**

##### ***4.3.1.2.1- Meters Owned by Private Utilities***

The CPUC develops metering accuracy standards based on those of the AWWA and the DMS. The minimum, normal, and maximum flow rates it uses to test meters are those of the AWWA: 0.5 US gallons per minute for minimum flow and 1–20 US gallons per minute for normal to maximum flows. The accuracy required is as for the DMS ( $\pm 1.5\%$  for intermediate and maximum flows,  $-5\%$  to  $+1.5\%$  for minimum flows). The CPUC also requires all meters to be affixed with a security seal that is broken when adjustments are made.<sup>63</sup>

##### ***4.3.1.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations***

Water meters owned by public utilities, mutual utilities, or homeowners' associations are not required to comply with metrological standards since this sector is self-regulated, but most utilities use AWWA-compliant meters.<sup>64</sup>

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<sup>61</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, section 3.36, "Water Meters," *Technology Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*, Gaithersburg, 2003, 3–63-66.

<sup>62</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Uniformity of Laws and Regulations*, Gaithersburg, 2003, 13.

<sup>63</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Rules Governing Water Service*, 22.

<sup>64</sup> Ken LAKE, e-mail received 16 June 2003.

#### **4.3.1.2.3- Meters Used for Sub-metering**

Water meters used for sub-metering and regulated by the DMS must comply with section 3.36 of Handbook 44 (2003 edition). The DMS adopts the annual amendments to Handbook 44 for all its metrological standards.<sup>65</sup>

### **4.3.2- Traceability of Measurement Standards**

#### **4.3.2.1- National Standards**

In the United States, all reference standards used by the states to regulate water meter accuracy must be traceable to NIST standards. In states where water utilities are unregulated, they are not required to use such standards and can do so as they see fit.

Where standards traceable to NIST are used, the NIST Laboratories program provides a complete a range of traceability services to state or private entities. This program offers calibration services, reference standards, proficiency evaluation materials, test methods for measuring devices, measurement quality assurance programs, and laboratory accreditation services.<sup>66</sup>

The Office of Measurement Services (OMS), part of the NIST Laboratories Program's Technological Services Laboratory, is responsible for applying NIST policy on traceability. This policy consists of the following points:

- develops, maintains and disseminates national standards for basic measurement quantities and for many derived measurement quantities.
- assesses the uncertainties associated with the values assigned to these measurement standards
- provides its customers with the tools they need to establish traceability of their measurement results, and
- provides its customers with the tools they need to assess the claims of traceability made by others.<sup>67</sup>

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<sup>65</sup> STATE OF CALIFORNIA, *California Code of Regulations. Title 4 – Business Regulations. Division 9 – Division of Measurement Standards, Department of Food and Agriculture*, online at [http://www.calregs.com/cgi-bin/om\\_isapi.dll?clientID=183566&infobase=ccr&softpage=Browse\\_Frame\\_Pg42](http://www.calregs.com/cgi-bin/om_isapi.dll?clientID=183566&infobase=ccr&softpage=Browse_Frame_Pg42).

<sup>66</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *NIST Policy on Traceability*, online at <http://www.nist.gov/traceability/nist%20traceability%20policy-external.htm>.

<sup>67</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Traceability – NIST Policy and Supplementary Materials*, online at <http://www.nist.gov/traceability/>.

This traceability policy is applied through three programs: the Standard Reference Materials program, the Calibrations program and the Standard Reference Data program. According to NIST, the first two programs are the largest and most successful measurement traceability programs in the world. These programs aim to meet the measurement standard traceability needs of NIST clients, i.e., local and state governments, federal agencies, companies, and members of the scientific community.<sup>68</sup>

#### **4.3.2.2- California**

##### **4.3.2.2.1- Meters Owned by Private Utilities**

Meter tests are not performed by the CPUC but by the water utility itself, a metrology service provider, or another water utility equipped to do so. The CPUC does not specifically require measurement standards used for testing to be traceable to NIST, but its other requirements are tantamount to such a requirement. To wit, the CPUC requires these measurement standards to be certified by a county weights and measures laboratory (which certifies that the standards are traceable to NIST) or another certification laboratory. In this case, the CPUC reserves the right to validate the certificate of conformance.<sup>69</sup>

In addition, the CPUC establishes testing rules specifying an error tolerance of 0.3% for equipment used to verify meter accuracy.<sup>70</sup>

##### **4.3.2.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations**

Since this measurement sector is unregulated, utilities are free to use standards traceable to NIST as they see fit.

##### **4.3.2.2.3- Meters Used for Sub-metering**

The traceability of meters used for sub-metering is guaranteed by the Metrology Program of the DMS. The Metrology Program guarantees the traceability of reference standards through the State Metrology Laboratory, which offers the following services:

- certification of standards used by the state, the counties, and measuring device service companies;

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<sup>68</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Office of Measurement Services*, online at <http://ts.nist.gov/ts/htdocs/230.htm>.

<sup>69</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Rules Governing Water Service*, 21.

<sup>70</sup> *Ibid.*

- maintenance of recognized certification standards traceable to NIST;
- provision of calibration services to industry.<sup>71</sup>

The State Metrology Laboratory also recognizes external calibration agencies whose standards are traceable to theirs. Among these agencies are nine counties and four private companies equipped with metrology laboratories whose standards are traceable to those of the State Metrology Laboratory. They are equipped to calibrate standards used to verify water meter accuracy.<sup>72</sup>

### **4.3.3- Approval of Meter Types**

#### **4.3.3.1- National Standards**

Type approvals are performed by the states where this is mandatory. However, NCWM offers a type approval service for all measuring devices, including water meters. This service is offered through the twelve NTEP laboratories. States regulating water meters can refer to these laboratories for meter type approvals. Water meter types passing the approval tests receive an NCWM certificate of conformance indicating that the type meets trade measurement requirements for the whole United States. Any certified meter type is automatically approved for use in NTEP-participating states.<sup>73</sup>

NCWM encourages all states to join NTEP and adopt the *Uniform Regulation for National Type Evaluation*. NTEP, as we have seen, accredits laboratories to approve measuring devices in conformity with NIST Handbook 44.

In states where type approval is not mandatory or water metering accuracy is unregulated, water utilities can use the meter type of their choice. One option for unregulated utilities is to choose a meter compliant with AWWA C700–02, the latest standard in the series.

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<sup>71</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *Metrology Program*, Sacramento, 2003, 2.

<sup>72</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *Service Agency Standard Certification Sources*, online at <http://www.cdfa.ca.gov/dms/pdfs/Servagtlst.pdf>.

<sup>73</sup> NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, *NTEP for National Standards*, online at <http://www.ncwm.net/standards.html>.

### **4.3.3.2- California**

#### **4.3.3.2.1- Meters Owned by Private Utilities**

The CPUC does not approve meter types, nor does it specify which meter types can be used by water utilities. They are free to choose a type as they see fit.

#### **4.3.3.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations**

Water utilities are not required to use approved meter types. As mentioned previously, these utilities generally use AWWA C700-compliant meters.<sup>74</sup> However, as is the case in Canada, these meters do not undergo AWWA type approval and this organization does not endorse manufacturers' claims that their devices meet the standard.<sup>75</sup>

#### **4.3.3.2.3- Meters Used for Sub-metering**

Meters used for sub-metering must follow the same type approval process as other trade measurement device types regulated by the DMS. The state authority has set up a type approval program resembling NTEP. Manufacturers seeking meter type approvals apply to the Department of Food and Agriculture, which conducts a series of tests according to the following parameters:

- design;
- technical characteristics;
- accuracy;
- reliability;
- resistance to fraudulent use.<sup>76</sup>

For meter types passing the evaluation, the State of California issues a certificate of approval allowing the device to be used throughout the state. The state also authorizes the use of uncertified meters if they are NTEP-certified. As an NTEP participant, California recognizes all

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<sup>74</sup> Ken LAKE, e-mail received 16 June 2003.

<sup>75</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector Water Meter Survey*, 19-20.

<sup>76</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *California Type Evaluation Program*, Sacramento, 2003, 2.

water meter types certified in other states under the program, and other participating states do likewise, so that California's DMS can certify device types for use in other states.<sup>77</sup>

The type approval process normally takes three to six months between the application and the issuance of the certificate. If no problems occur during the process, it may take as little as two to three months.<sup>78</sup>

#### **4.3.4- Initial Inspection of Meters**

##### **4.3.4.1- National Standards**

In states where water metering accuracy is regulated, the state is responsible for carrying out this task and establishing regulations, which include error tolerances. However, there is a national error tolerance standard included in section 3.36, "Water Meters" of Handbook 44. This national standard is  $\pm 1.5\%$  for maximum and intermediate flow tests and  $-5\%$  to  $+1.5\%$  for minimum flow tests.<sup>79</sup>

##### **4.3.4.2- California**

###### **4.3.4.2.1- Meters Owned by Private Utilities**

The CPUC requires all meters to be inspected before being put into service. There is no sampling program allowing only a certain proportion of meters to be tested. This inspection is not performed by the authority itself, which is not equipped for the purpose. Instead, the CPUC stipulates that inspection must be conducted either by the utility, the manufacturer, or a reliable organization equipped to test meters adequately. The authority does not require inspector certification or accreditation. It does provide some oversight by requiring utilities, manufacturers, and meter service companies to keep test data on file for five years. For each meter tested, data must include device identification number, model and size, test date, test type, meter reading prior to test, percentage error observed by the test, and percentage error after the test if an adjustment was made.<sup>80</sup>

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<sup>77</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *California Type Evaluation Program*, 3; NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Uniformity of Laws and Regulations*, 10.

<sup>78</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *California Type Evaluation Program*, 5.

<sup>79</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, "Water Meters," 3–65-66.

<sup>80</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Rules Governing Water Service*, 22-23.

The error tolerance for new meters is that of the DMS:  $\pm 1.5\%$  for intermediate and maximum flow tests and  $-5\%$  to  $+1.5\%$  for minimum flow tests.

#### **4.3.4.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations**

Initial meter inspection is not required. Where utilities do conduct initial inspection, it generally complies with AWWA standards ( $\pm 1.5\%$  for intermediate and maximum flows and  $-5\%$  to  $+1.5\%$  for minimum flows).<sup>81</sup>

#### **4.3.4.2.3- Meters Used for Sub-metering**

Initial inspection of all water meters is mandatory; there is no sampling program. This inspection is under the responsibility of the DMS, but the authority's role is limited to supervising inspections, which are actually performed by the competent weights and measures agencies in each of the 58 counties. The Division uses section 3.36 of Handbook 44, which means that the error tolerance is  $\pm 1.5\%$  for intermediate and maximum flow tests and  $-5\%$  to  $+1.5\%$  for minimum flow tests.<sup>82</sup>

### **4.3.5- Periodic Inspection**

#### **4.3.5.1- National Standards**

In states where metering accuracy is regulated, the state government is fully responsible for periodic inspection. It establishes obligations and error tolerances as well as seal periods, i.e., inspection frequency. States can also adopt section 3.36 of NIST Handbook 44. The NIST standard is the same as for initial inspection:  $\pm 1.5\%$  for intermediate and maximum flows,  $-5\%$  to  $+1.5\%$  for minimum flows.<sup>83</sup>

Where metering accuracy is unregulated, water utilities are free to reinspect meters as they see fit. A Measurement Canada survey of several municipal water utilities mentions that practices vary greatly among them. The practices mentioned in this survey show that regular inspection is infrequent:

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<sup>81</sup> James WELSH, e-mail received 3 June 2003.

<sup>82</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, *Measurement Standards*; STATE OF CALIFORNIA, *California Code of Regulations*; NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Uniformity of Laws and Regulations*, 10, 13.

<sup>83</sup> NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, "Water Meters," 3-65-66.

- Seattle's policy is to replace meters after 15 years, but this policy is not always followed due to budgetary restrictions, and meters are generally replaced when they malfunction. The city also conducts annual random inspections.
- Dallas only inspects meters if a problem arises and does not conduct random inspections.
- Provo, Utah has embarked on a phased meter replacement program.
- Tucson, Arizona regularly reinspects meters, but budgetary restrictions have considerably reduced the number of meters inspected.
- Las Vegas does not periodically reinspect meters and replaces them after 20 years of use.
- Omaha, Nebraska, inspects a sample of meters after 15 years. If the compliance rate of the sample is higher than a given threshold, the meters are not inspected for 15 years. If the compliance rate is below the threshold they are inspected the following year.<sup>84</sup>

#### **4.3.5.2- California**

##### **4.3.5.2.1- Meters Owned by Private Utilities**

Periodic meter inspection is mandatory for all devices and no sampling is accepted by the CPUC. Water utilities may propose an inspection frequency to the Commission, making the case for it based on an analysis of economic factors and the measured accuracy of their meters. The CPUC retains the authority to approve or reject the proposal. For water utilities not submitting such proposals, there is a default frequency for each meter size; e.g., 20 years for residential meters (less than 1 inch in diameter).<sup>85</sup>

As for initial inspection, the CPUC does not conduct periodic inspections itself. These inspections are conducted either by the utility, the manufacturer, or a metrology organization equipped to test meters. The CPUC does not certify or accredit such organizations, so they need not undergo a surveillance audit by the CPUC or any other body. However, they must keep the results of their tests on file for five years, including the same data as for initial inspection. In addition, they must

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<sup>84</sup> MEASUREMENT CANADA, *Canadian Water Utilities Trade Sector In Service Water Meter Performance Report*, 8-11.

<sup>85</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Rules Governing Water Service*, 23.

produce an annual summary of test results, and the utilities must include this summary in the annual report filed with the CPUC.<sup>86</sup>

The error tolerance for periodic inspection is that of the DMS:  $\pm 1.5\%$  for intermediate and maximum flow tests and  $-5\%$  to  $+1.5\%$  for minimum flow tests.

#### **4.3.5.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations**

Public, mutual, and homeowners' association-owned water utilities are free to adopt periodic meter inspection and replacement programs as they see fit.

#### **4.3.5.2.3- Meters Used for Sub-metering**

Meters used for sub-metering are covered by the DMS rules. However, the inspection frequency is 10 years, the same as for electricity and natural gas meters. This period is 1 year for most other measuring devices, such as scales and gasoline pumps.<sup>87</sup>

Periodic inspection is performed by county inspectors working under the supervision of the DMS, which is itself under the responsibility of the California Department of Food and Agriculture. The county weights and measures authorities can request authorization from the DMS director to change the inspection frequency by submitting an inspection plan. A security seal is affixed to each meter that complies with the error tolerances (of NIST Handbook 44). There is no program to accredit external organizations for this task.<sup>88</sup>

### **4.3.6- Complaint and Dispute Investigation**

#### **4.3.6.1- National Standards**

States that regulate metering accuracy are entirely responsible for complaint and dispute investigation. NIST has not produced a national standard in this area. In states where accuracy is unregulated, the water utilities handle complaints and disputes themselves, leaving dissatisfied consumers with no further recourse.

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<sup>86</sup> Ibid.

<sup>87</sup> STATE OF CALIFORNIA, *California Code of Regulations*.

<sup>88</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, *Measurement Standards*; STATE OF CALIFORNIA, *California Code of Regulations*.

#### **4.3.6.2- California**

##### **4.3.6.2.1- Meters Owned by Private Utilities**

Consumer metering accuracy complaints are initially handled by the utilities in a process supervised by the CPUC, which sets the following rules:

- The utility must respond to complaints within one week.
- The customer is entitled to attend the test.
- The utility may not charge a fee if the meter was installed within the last six months or if no test was performed during the last year.
- If the previous condition is not fulfilled, the utility may charge a deposit to cover the cost of the test, which is refunded only if the meter is out of tolerance by 2% or more.
- The test results must be provided to the customer no later than two weeks following the test.<sup>89</sup>

Customers dissatisfied with the utility's determination may appeal to the CPUC; an informal complaint may be filed on the Commission's website.<sup>90</sup>

##### **4.3.6.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations**

Consumers whose meter is directly connected to their public, mutual, or homeowners' association-owned utility may file a complaint concerning device accuracy directly with the utility. Neither the DMS nor the CPUC handles these cases.

##### **4.3.6.2.3- Meters Used for Sub-metering**

The DMS is responsible for investigation of consumer complaints related to sub-metering. The complaint is processed by the county weights and measures authority. Consumers can file complaints by telephone, mail, or, in certain larger counties such as Los Angeles County, over the Internet.<sup>91</sup>

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<sup>89</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, Rules Governing Water Service, 24.

<sup>90</sup> CALIFORNIA PUBLIC UTILITIES COMMISSION, *Informal Complaints*, online at <http://www.cpuc.ca.gov/static/forms/complaint.htm>.

<sup>91</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *Frequently Asked Questions*, online at <http://www.cdffa.ca.gov/dms/FAQ.htm>; COUNTY OF LOS ANGELES, *Consumers Concerns*, online at <http://acwm.co.la.ca.us/scripts/consumer.htm>.

## **4.3.7- Supervision of Meter Service Companies**

### **4.3.7.1- National Standards**

States that regulate meter service companies may use the NIST voluntary registration program for installation, maintenance, repair, and calibration companies and technicians under the *Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices*, a standard included in NIST Handbook 130, adopted by NCWM and presented in Appendix 4 of this report. This standard establishes certain parameters governing the work of companies and technicians, such as the equipment necessary to perform maintenance and calibration of measuring devices, and the privileges and accountability obligations of registered parties.<sup>92</sup>

### **4.3.7.2- California**

#### ***4.3.7.2.1- Meters Owned by Private Utilities***

Meter service companies are not supervised by the Commission.

#### ***4.3.7.2.2- Meters Owned by Public Utilities, Mutual Utilities, or Homeowners' Associations***

These water utilities are free to choose companies and technicians to perform meter installation, maintenance, repair, and calibration. Utilities may establish their own standards in this area.

#### ***4.3.7.2.3- Meters Used for Sub-metering***

Companies and technicians performing installation, maintenance, repair, and calibration of water meters used for sub-metering are regulated by the DMS's Registered Service Agency Program. This program stipulates that any company or employee performing installation, maintenance, repair, or reconditioning of an instrument used in trade measurement must obtain a license and be registered with the state authority. Registration fees of US \$200 for the principal place of business and US \$100 for other branch offices are charged. Licenses must be renewed annually.

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<sup>92</sup> BUREAU OF PETROLEUM INSPECTION FOR THE STATE OF FLORIDA, *Rules Chapter 5F-2*, online at [http://www.doacs.state.fl.us/~standard/petrol/chapter\\_5f-2.html](http://www.doacs.state.fl.us/~standard/petrol/chapter_5f-2.html); NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY, *Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices*, Gaithersburg, 2003, 126–8.

Technicians must obtain an individual license (US \$25) to perform work on measuring devices by passing an examination (US \$35). The license must be renewed every five years.<sup>93</sup>

Licensed and registered companies and technicians must have in their possession a copy of the state trade measurement regulations (*California Code of Regulation*, Title 4, Division 9, “Field Reference Manual”), use standards traceable to those of the State Metrology Laboratory, and report all work performed on regulated trade measuring devices to the competent county weights and measures authorities.<sup>94</sup>

#### **4.2.8- Conclusion to Section 4**

Water measurement regulation is considerably more multifarious than the traditional weights and measures sectors such as retail food or gasoline. For comparison, the report produced this year by Option consommateurs on retail gasoline trade measurement pointed to a degree of regulatory uniformity. This is due to a number of factors, including the existence of national standards established by NIST and the supervision of trade measurement by state weights and measures authorities with similar missions.<sup>95</sup>

In the case of water measurement, NIST standards do exist but they are not the only ones applied. In fact, these standards are less commonly used in public utility-dominated sectors such as electricity, natural gas and water. A survey of several states shows that they tend not to invest their weights and measures authorities (which are covered by NIST) with water trade measurement responsibilities. This does not mean that no states regulate the water sector in this way, as our study of California regulations makes clear. But our documentary research leads to the observation that there are other forms of regulation, including self-regulation and the application of rules by a public utility commission or board.

The state of California is representative of this diversity, with all three major modes of regulation in evidence. Self-regulation applies to public, mutual, and homeowners’ association-owned utilities, giving them absolute discretion in the area of metering accuracy.

Regulation of private utilities by the CPUC occupies a middle ground in terms of the level of regulatory oversight. Rules for meter accuracy, traceability, inspection, and complaint handling are defined but the Commission otherwise refrains from intervening in the process. Regulated

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<sup>93</sup> CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, DIVISION OF MEASUREMENT STANDARDS, *Registered Service Agency Program*, Sacramento, 2003, 2–6.

<sup>94</sup> *Ibid.*

<sup>95</sup> OPTION CONSOMMATEURS, *Ensuring Gasoline Pump Accuracy and Consumer Confidence in a Changing Market*, Montreal, 2003, 22–38.

areas relating to water measurement accuracy are left to the utilities, with the Commission playing a surveillance role, while approval of meter types and meter service companies is unregulated. It is also important to note that the CPUC's surveillance of utility-conducted inspections is very limited; in contrast to Canada, accreditation and surveillance audits are absent.

Finally, meters used for sub-metering are much more strictly regulated, with the state weights and measures authority (the DMS) guaranteeing their accuracy. The authority enforces the regulations (on type approvals, traceability of measurement standards, initial inspection, mandatory ten-year periodic inspection, conflict and complaint resolution, and supervision of meter service companies) directly, without any intermediary other than the county weights and measures authorities.

This segmented regulatory scheme for different types of water utilities evidently exists in other US states, e.g. New York. There, most meters belong to a municipal water utility and are regulated by the utility. But meter types in that state are approved by the state weights and measures authority in accordance with section 3.36 of NIST Handbook 44. Under the *Agriculture and Markets Law*, meters used for sub-metering or owned by private water utilities (rare) must comply with state and municipal weights and measures regulations. These meters are also subject to state type approval in accordance with section 3.36.<sup>96</sup>

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<sup>96</sup> Ross ANDERSEN, Director, NYS Bureau of Weights and Measures, e-mail received 22 July 2003.

## **5- ANALYSIS OF FOCUS GROUP OPINIONS**

Option consommateurs commissioned the polling firm Environics to conduct a Canada-wide survey and six focus groups. The groups were held in three Canadian cities, Toronto, Edmonton and Montreal, on May 29 and 31 and June 5, 2003, respectively. The focus group participants all lived in homes equipped with water meters and are interested in public policy issues.

### **5.1- Regulation of Weights and Measures in Canada**

#### **5.1.1- How Weights and Measures are Currently Regulated**

As has been observed in previous focus group studies dealing with the electricity, natural gas and retail food sector reviews for Measurement Canada, a vast majority of participants assumed that the accuracy of weights and measures in Canada was regulated in some way. In Toronto, it was assumed that this was done by some federal government agency with some people specifically mentioning “Weights and Measures Canada” or “Trade and Commerce” or “Consumer and Corporate Affairs.” In Montreal and Edmonton, most people also assumed that this must be regulated by some federal agency, though some people also wondered whether measurement devices might be regulated at the local or provincial level. Some participants mentioned that they had seen certification stickers on pumps at gas stations. Most added that this was not something that they had ever thought about. They took for granted that weights and measures were accurate.

Only a couple of participants spontaneously identified Measurement Canada as being the name of the agency that is charged with this responsibility. Some of those who did know about Measurement Canada knew about it because they had worked in places where they had dealt with measuring devices and had been exposed first hand to Measurement Canada inspection activities. To the extent that Measurement Canada has any awareness, it is largely due to people having seen stickers on pumps at gas stations. There were also a number of participants who thought that gas stations and parent companies and retail food outlets and utilities probably did their own inspections of these devices. Some people thought that companies serving the public would self-regulate in order to make sure that no measuring devices erred against them, and also for the sake of having a good public reputation.

Participants generally felt that if a regulatory role was to be performed, it should be done by some national governmental agency that is able to impose national standards of reliability and quality on measuring devices. There were some participants who did not think that it was necessary to have a governmental agency regulating this. They felt that it was in the interest of water utilities and gas stations to have accurate devices, and that it might not be necessary to have these regulated by the federal government. It was notable that, in Toronto and Edmonton in particular, there were some references to Walkerton as an example of what can happen when there is insufficient regulation.

### **5.1.2- Reaction to the Role of Measurement Canada**

When participants were told that Measurement Canada was responsible for regulating weights and measures in Canada, a couple of people mentioned that they vaguely recalled having heard of Measurement Canada before. A couple of participants had some awareness of Measurement Canada as a result of having worked in construction or in retail outlets where they had seen scales and meters get inspected, and therefore had direct dealings with Measurement Canada inspectors. A couple of people also recalled having seen a sticker or logo marked Measurement Canada – typically at a gas station – at some point in the past. It was clear that there was little top-of-mind identification of Measurement Canada with the regulation of weights and measures in Canada.

Participants read some background material explaining the role of Measurement Canada with regard to meters and scales. For most people, the extent of Measurement Canada's role in this area came as a pleasant surprise. Some had assumed that "someone" was performing these functions, but the consensus was that it was good to know that some arm of government was keeping "an eye on things." Most participants said that knowing all of this made them feel more comfortable about the accuracy of weights and measures that they deal with in their everyday lives, and that it was good to have some kind of a watchdog over industry. Participants were most concerned about the idea of stores, gas stations and utilities trying to cheat consumers, and they were happy to know that there was some kind of mechanism whereby they could be spot-checked.

The only discordant reaction was from a couple of participants in each city who were skeptical as to whether Measurement Canada actually performed all these functions. Since these people had never heard of Measurement Canada, and they had never seen any Measurement Canada inspectors with their own eyes, they wondered whether all this regulation was actually happening. Some wanted to know whether they as consumers could phone Measurement Canada if they had

questions or complaints about measurement devices. Also, some participants mentioned that since they had always taken it for granted in the first place – that scales and meters were accurate – there was no way that they could feel any more confident than they had felt in the first place.

### **5.1.3- Understanding of the Trade Sector Review**

The level of understanding of the Trade Sector Review (TSR) was mixed. Many participants clearly had problems grasping the meaning of the Trade Sector Review. Some confused the TSR with Measurement Canada's standard role reviewing the accuracy of measuring devices. Others saw the TSR as an internal bureaucratic process of the sort that probably happens frequently without the public having to be informed.

## **5.2- Residential Water Sector Review**

### **5.2.1- Attention Paid to Water Meters and Bills**

There was considerable variance from city to city in the extent to which people scrutinized and had concerns about their water bills. All participants paid for water at least in part on the basis of their usage as measured by a water meter. In Edmonton, it was clear that having a water meter was universal and that, furthermore, many people were surprised to learn that not everyone in Canada necessarily has a water meter. In Toronto, it was a similar situation, with participants reporting that they had always lived in homes with water meters. In Montreal, where water meters are less common, there was a mix of people who had always had water meters and those who reported that, depending on where they had lived, they had sometimes not had a water meters and had instead paid a flat fee for water.

It was also clear that the amounts that people pay for water and the extent to which their usage affects their billing varies greatly from city to city. This also has an impact on attitudes toward establishing a regulatory framework for water meters. In Edmonton, people seemed to have the highest water bills and it also seemed that there was a very direct correspondence between how much water they consumed and the amount they paid for water. In Alberta, water is regarded as more of a scarce commodity, with periodic droughts and bans on watering lawns. People there tend to see water as something that will get more and more expensive and scarce. As a result, the accuracy of the water meter is seen to be very important and on a par with the accuracy of a

gas or electricity meter. In Montreal, the story was the exact opposite. There, people tended to report paying comparatively little for water. Furthermore, the way it often works is that the homeowner pays a flat amount for water and only pays more if their consumption of water is above a certain threshold. Apparently, very few people in Montreal ever go over this threshold, so the water meter is really not very relevant. The situation in Toronto was somewhat in between the situation in Edmonton and Montreal. People there were interested in knowing how much water they use, but they also don't really consider the rates they pay for water to be a large enough amount to be worth worrying about.

Several participants in all three cities felt that they had been overcharged in the past due to incorrect estimations, human errors by meter readers or by their utility. Several participants had concerns about how their utilities estimated their usage based on past patterns but, again, it was understood that this had little to do with the meter itself. As far as the meter readings themselves are concerned, it was clear that this was, for the most part, a minor concern. People spoke of checking the graph on their bill that shows how their usage compares with a similar period in the previous year and, by and large, there were few clear discrepancies spotted here.

### **5.2.2- Confidence in Accuracy of Water Meters**

Participants in all three cities reported having quite a high level of confidence in their water meters. They assumed that these were correct in much the same way that they assumed that their electricity or gas meters are correct. For the most part, people felt that the amount of a typical water bill was not very much and that a water meter would have to have a huge error before it would have a real impact on a person's water bill. In some ways, people were more concerned with the accuracy of their water meter from the point of view of just wanting to know how much water they were using (for the sake of knowing). The impact on the water bill was less of a concern. It should be pointed out that participants overwhelmingly felt that all Canadians ought to have water meters and that having people pay a flat amount was both unfair and likely to lead to water being wasted. The main motive for wanting people to have meters was more from a point of view of encouraging water conservation than price considerations.

This relative confidence in water meters was based on the fact that most people's usage rates seemed to be quite consistent from month to month. Also, meters are regarded as being relatively basic technology that is unlikely to malfunction. Most people said that this was the first time they had even thought about whether to trust their water meter and that it was something they took for granted. Some were concerned that their water meters were very old and had not been changed in a long time, but they still assumed that the meter must have been functioning properly. It was

pointed out that if a meter were not working, it might not be very obvious since it would have to be inaccurate by a wide margin to lead to a noticeable increase in water bills. The notion that a meter might be only slightly defective and might cause small and seemingly unnoticeable increases (or decreases) in billings was mentioned but generally dismissed. It was often said that one had to trust meters because we all “have to trust something” or that it was “an act of faith.” It was often pointed out that, as long as the bill for water seemed fair and within believable bounds, people assume that their meter is correct. Most participants seemed to have more confidence in their water meters than they did in measuring devices such as retail food scales, if only because the water meter is something in their home over which they feel more in control.

The vast majority of participants did not report having had any disputes about their water meters, nor did they know of anyone having had a dispute. A couple of people mentioned having had water bills that were out of line, but this was invariably due to a leak and not due to the metering device itself.

### **5.2.3- Reaction to Measurement Canada’s Limited Role regarding Water Meters**

For the most part, participants were surprised to learn that Measurement Canada did not regulate water meters in any way. Most had assumed that whatever regulations existed for gas and electricity meters probably existed for water meters as well. The reaction to this fact was quite mixed. Some participants immediately expressed the view that water meters ought to be inspected and made to conform to national standards. They went so far as to say they were scandalized that there were no standards for water meters and they wanted to know why it was that meters had been exempted from the Weights and Measures Act in the first place.

Others felt that their municipal water utility probably already had some kind of a process in place to ensure that the meter was accurate and that a role for Measurement Canada may or may not be necessary. However, none of the participants were aware of their water utility’s quality control regime. It was also noted by several participants that water is simply not a large enough bill to worry about. However, other participants noted that attitudes towards water are changing. It was true in the past that water was an abundant resource that was comparatively cheap. They felt that water was inevitably going to get more scarce and get more expensive and that once this happened, it would be necessary to have a more rigorous process for regulating the accuracy of water meters. Participants in Edmonton were most sensitive on this point. In Montreal, where meters are less common and currently serve less of a purpose, the people were more willing to live with the status quo and not bother with federal standards. A number of people commented

that, when it came to water, they were more concerned with the quality safety of the water than they were with what they were paying for it.

#### **5.2.4- Consumer Safeguards for Water Meters**

Despite initial, somewhat apathetic comments about the need for national regulation of water meters, most participants felt that Measurement Canada should play some kind of role in regulating water meters at the national level. People tended to assume that water utilities in larger cities like Edmonton and Toronto probably already performed some level of regulation and quality control of meters. The main concern was that there was inevitably a lot of inconsistency in these standards and that, in smaller communities, there may be very little in the way of quality control at all.

Even though water utilities are almost all public institutions, there were still concerns about how diligent they would be in making sure that water meters met standards. The feeling in Toronto and Edmonton was that the most important role for Measurement Canada in protecting the interests of consumers was to approve all water meter prototypes in much the same that they do in the case of electricity meters and to also conduct some spot checks. There was some similar sentiment in Montreal, but as mentioned earlier, Montrealers feel less strongly about the need to have national standards for water meters since they pay so little for water and often pay on more of a flat rate basis.

Participants felt that a new regulatory framework could be phased in so that utilities do not face too heavy an initial cost in replacing vast numbers of unapproved meters. Existing devices could be “grandfathered.” In the long run, many participants said they would like to see some kind of a stamp of approval from Measurement Canada on water meters just like they see on some other measuring devices. It was also felt that Measurement Canada should set overall standards and guidelines for water meters and that municipalities should have to comply with these. Any manufacturers or utilities that do not comply with the standards would be warned and punished if necessary. Participants did *not* want to create a cumbersome expensive process of having Measurement Canada employees start checking every meter in Canada.

Even when participants were told that, to the extent that there were errors in water meters, they might even favour the consumer, they still want some national standards. It was pointed out that if a public water utility loses money because it is charging too little, it is still costing the taxpayer indirectly. People felt that measurement should be as accurate as possible, regardless of who benefits from any inaccuracy. Some participants expressed the view that imposing a new national

standard on water meters might create added costs for some utilities that currently do not meet the standards. However, the assumption was that this cost would not be particularly onerous as long as there was some mechanism to give utilities a long period of time in which to replace whole types of meters that are not approved. Some in Edmonton pointed out that if the day ever comes where local water utilities get privatized and are run on a for-profit basis, there would be even more of a need for some national standards.

In all three cities, participants felt that Canada should *not* automatically accept new water metering devices just because regulators in other countries had passed them. The consensus was that Canadian standards would always be higher than those in other countries, and that most other countries would not have comparable climate conditions. Therefore, a device passed in Australia, for example, might not work in as different a context as Canada. Participants felt that it would be acceptable for Measurement Canada to take test results from other countries into consideration when approving devices in Canada and that it would be acceptable for that process to be streamlined – as long as there would still be a process of final approval in Canada.

## **6- ANALYSIS OF CANADA-WIDE SURVEY**

Subsequent to the focus groups, which clarified some aspects of this trade sector review, we conducted a Canada-wide survey in order to explore further certain key issues raised by the participants, commissioning the firm Environics for this purpose. A total of 2,018 Canadians were contacted throughout Canada, with proportional representation from each region (Atlantic, Quebec, Ontario, West). The results of a survey of this size are correct to within 2.2%, 19 times out of 20.

It is important to specify, however, that we participated in an omnibus survey rather than conducting a survey with our questions only. In an omnibus survey, the respondents answer a series of questions on various subjects, depending on the polling firm's clients at that point in time. The methodological validity of this type of survey is inferior to that of a specialized survey, since the respondents only answer the questions of concern to them; this reduces the sample size and increases the uncertainty. Of the 2,018 respondents in this survey, only 689 answered the questions about water meter accuracy, and thus the margin of error rises to approximately plus or minus 4%, 19 times out of 20. This methodological compromise was necessitated by the much higher costs of a specialized survey and our budgetary constraints.

Again due to budgetary issues, the survey consisted of only four questions. Option consommateurs ensured that they were relevant to the issues of this sector review. The first question established the sample for the purposes of the following questions, i.e., only respondents whose homes are equipped with a water meter and have some responsibility for bill payment. The second question sought to establish consumers' level of confidence in their water meter's accuracy. For the third question, respondents were asked whether they believe water meter accuracy to be regulated by the government, their water utility, or no one at all. The respondents were then informed that water meter accuracy is unregulated in Canada, that each public water utility adopts its own standards, and that some utilities have very strict standards while others have none. The respondents were asked whether they would like Measurement Canada to regulate this sector.

The detailed survey results are given in Appendix 8. The results were determined for the aggregate of all Canadians but also broken down by population characteristics including sex, age, profession, religion, and political affiliation. However, given the small sample size (689 respondents), reliable conclusions cannot be drawn with respect to these factors, since the size of the subcategories is too small to be representative; for example, only 55 respondents were

from the Atlantic provinces, 54 had income under \$20,000, and 47 did not have a high-school diploma. For this reason, we present only aggregate results.

## **6.1- Confidence in Water Meter Accuracy**

We asked the respondents whether they are confident in water meter accuracy. Consumers were quite confident on the whole: in figures, 80% of them were very (32%) or somewhat (48%) confident, while only 17% were not very (11%) or not at all (6%) confident.

**Table 4 – Consumer Confidence in Water Meter Accuracy**

<b>Level of confidence</b>	<b>Proportion (%)</b>
Very	<b>32</b>
Somewhat	<b>48</b>
Not very	<b>11</b>
Not at all	<b>6</b>

## **6.2- Knowledge of Metering Accuracy Regulation**

The majority of the consumers surveyed, 62%, believed that water utilities self-regulate metering accuracy; 26% believed that a federal government agency regulates, and 6% believe that there are no such regulations.

**Table 5: Consumer Beliefs about Regulatory Authority for Meter Accuracy**

Type of body	Proportion (%)
Government agency	26
Water utility	62
No regulation	6

### **6.3- Consumer Opinion about Unregulated Status of Meters**

When the respondents were informed that there are no national standards for water meter accuracy and that each water utility adopts its own standards, the vast majority (80%) favoured Measurement Canada regulatory intervention in this sector through the implementation of national standards. A small minority (19%) opposed such intervention.

**Table 6: Respondents' Position about Measurement Canada Intervention to Regulate Meter Accuracy**

Position	Proportion (%)
In favour	80
Opposed	19

### **6.4- Summary**

Canadians whose home is equipped with a water meter are, on the whole, confident in the accuracy of this device, even though the majority of them believe the water utility to be responsible for guaranteeing it. When the respondents were informed that there are no regulations or national standards governing metering accuracy, the vast majority of them were in favour of Measurement Canada regulatory intervention. The findings appear somewhat

contradictory, but it is our view that the respondents' opinion may have been significantly influenced by being informed of the considerable differences in regulation among water utilities.

## **7- POSITION OF OPTION CONSOMMATEURS**

The preceding sections of this study have enabled us to build a portrait of the overall status of water trade measurement in Canada and the United States. They also reveal consumer opinion as to the desirability of regulation in this sector. On this basis, we shall now put forward a set of recommendations to be presented at the Measurement Canada meetings. The purpose of these meetings, which will include representatives of consumers, water utilities, water meter service companies, and water meter manufacturers, is to establish a consensus on future regulatory intervention in this sector.

Our position in this part of the report will take account of the nuances of consumer opinion. Consumers overall are highly confident in water metering accuracy. Given their comments, it is clear that they would not want overly cumbersome regulation that would cause the utilities' costs to rise, since these costs would be passed on to the consumer. Indeed, the importance respondents attached to metering accuracy varied according to the price they pay for water, a price that varies greatly from one Canadian region to another. But their opinion could change if prices were to rise or water services were privatized, and even under the present circumstances, there is a consensus on the need for change in the prevailing regulatory situation. Consumers by and large, regardless of where they live, want Measurement Canada to regulate this sector. Our first two recommendations, general in nature, are based on consumers' opinion and serve as the foundation for the other, more specific recommendations on an appropriate regulatory approach.

In addition to consumer opinion, our position will take account of our research findings on Canadian and US practices. It should be clear to everyone that the latter constitute a model to avoid, since they tend to accentuate regulatory inequities. The practices of Canadian water utilities provide a better model for intervention and will enable us to develop proposals on specific aspects of Measurement Canada's action in this sector. They will also serve to support the first three, more general recommendations.

### **7.1- Measurement Canada Should Intervene**

In our view, the absence of regulation in this sector must cease. Measurement Canada must rescind the water meter exemption provided by the *Weights and Measures Regulation*, for several reasons.

First, the consumers consulted in the focus groups and the Canada-wide survey stressed the need for Measurement Canada regulatory intervention on water metering accuracy. A large majority of them wanted Measurement Canada to end the exemption.

Second, the public water utility survey highlights the inequities caused by self-regulation, particularly as regards measurement standard traceability, periodic inspection, seal period, accuracy standards, and complaint resolution. Consumers are variously advantaged or disadvantaged depending on the municipality in which they live. National standards established by Measurement Canada would end these inequities and offer the same protection to all Canadians.

Finally, the use of water meters will probably become more widespread as public authorities seek to limit water consumption. In fact, the Government of Quebec, a province with relatively few water meters per capita, is considering the idea of across-the-board, province-wide metering.<sup>97</sup> As the number of meters increases, the need to regulate their accuracy will become more pressing.

**Recommendation 1: That Measurement Canada rescind the water meter exemption provided by section 4 of the *Weights and Measures Regulation*.**

## **7.2- Phase in National Standards**

Water trade measurement differs from other sectors studied by Option consommateurs in its lack of a national regulatory framework. The electricity, natural gas, retail food, and retail petroleum sector reviews involve proposed changes to an elaborate regulatory infrastructure which already does much to guarantee the accuracy of measuring devices across the nation. In the water sector, what we have is essentially a blank slate. Procedures on the establishment of metrological standards, traceability, type approval, and initial and periodic meter inspection, all must be created from scratch.

But this is a complex and cumbersome process for an organization of Measurement Canada's size. Public water utilities have instituted a range of different procedures, of uneven efficacy, to provide for meter accuracy and reliability. The immediate imposition of across-the-board

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<sup>97</sup> Martin OUELLET, "Mulcair veut imposer les compteurs d'eau partout au Québec," *Le Devoir*, Friday, 4 July 2003, A-3.

regulations requiring major changes to metering infrastructure would be ineffective and costly to the utilities — and the costs would undoubtedly be passed along to the consumer. Instead, Measurement Canada should phase in the changes, paying due consideration to the realities of the water sector.

In the following sections, we shall propose potential solutions to the problem of adopting adequate regulations that provide equal protection to all Canadians while keeping utilities' and consumers' costs down.

**Recommendation 2: That Measurement Canada implement a regulatory structure sensitive to water sector realities that keeps the costs to water utilities at a reasonable level.**

### **7.3- Adopt a Uniform Regulatory Framework**

Our study of US regulations and, in particular, those of California reveals a complex, patchwork system with different provisions for different types of meter owners. There is absolutely no advantage to substituting such a system, which is riddled with inequities, for the current Canadian system. In fact, Option consommateurs wants to see the end of the existing inequities between Canadian municipalities that have adopted rigorous meter accuracy programs and those that have not. Option consommateurs stresses that the future regulatory framework must be uniform for all Canadians whose water is metered.

**Recommendation 3: That Measurement Canada's water metering accuracy standards be uniform for all of Canada.**

### **7.4- Adopt National Standards**

Measurement Canada's intervention should begin with the immediate adoption of a national standard applicable to all water utilities. This is necessary in order to operationalize the whole process of type approvals, initial inspections, and periodic inspections. Perhaps the fastest, most straightforward, least costly way to do this is to implement an existing standard.

The water utility survey revealed that the AWWA C700 standard is generally accepted in this industry; most meters in circulation are compliant with it. Measurement Canada should study the possibility of adopting AWWA C700 as is, or after making the necessary modifications to adapt it to the Canadian context and correct any deficiencies. Doing so would minimize water utilities' costs of compliance. Measurement Canada could also study the possibility of adopting IOLM standard R 49–1 if the World Trade Organization makes this a requirement.

The adoption of such standards would not mean a requirement of immediate compliance for all of Canada's 4–6 million meters (Measurement Canada figure). Meter-by-meter inspection and replacement would be unrealistic and costly. The focus group participants suggested the idea of a policy to phase out older, non-compliant meters as they come up for replacement ("grandfathering"); only new meters purchased by the utilities would have to meet the standards, and eventually all existing meters would be covered. This would avoid significant additional costs being passed on to the consumer.

**Recommendation 4: That Measurement Canada study the possibility of adopting the AWWA C700 standard and/or IOLM standard R 49–1 for water meters, adapting them as necessary.**

**Recommendation 5: That Measurement Canada use a grandfathering policy for existing non-compliant meters, requiring gradual phase-out and replacement with compliant ones.**

## **7.5- Implement a Type Approval Process**

Though North American meter manufacturers may claim that their devices comply with AWWA's C700 standards, adducing various test procedures, the AWWA itself has no process for evaluating such claims. Nor are we aware of the methods used by manufacturers to ensure the compliance of their meters.

If Measurement Canada adopts C700 or any other standard, a type approval process will be necessary in order to guarantee meter compliance. Ideally, Measurement Canada should be the one to perform the tests. However, if this would lead to overly long delays or if the agency does not have the resources to do so, accreditation would be another possibility. But for Option consommateurs, it would be undesirable to have manufacturers performing the tests. If it should prove necessary to choose between this method and having no type approvals at all, then the

Accreditation Program based on standard S–A–01:2002 should be used in order to monitor accredited organizations.

If Measurement Canada sets up a type approval process through the Accreditation Program, this must not lead to high costs and a bureaucratic burden for the industry. The first step is to consult manufacturers on the most affective way to implement such a process. As part of this consultation, Measurement Canada should review the manufacturers' existing type approval practices and assess their compatibility with the Accreditation Program. If it is feasible for manufacturers to perform the necessary type approval testing, Measurement Canada could allow them to do so. The agency could also study the possibility of accrediting manufacturer-independent laboratories for this purpose.

If Measurement Canada does use accredited organizations in this context, the agency should retain control over the process and give final approval of all new meter types. It could ensure further oversight by means of surveillance audits under the Accreditation Program.

In order to allow for quick and effective implementation of the type approval process, Option consommateurs submits that meters now on the market should benefit from a grandfather clause; only new meter prototypes should undergo the process.

**Recommendation 6: That Measurement Canada implement a type approval process for water meters. Testing should preferably be done by Measurement Canada but, if that is not possible, the agency could use external organizations under the Accreditation Program based on standard S–A–01:2002.**

**Recommendation 7: That if Measurement Canada uses external organizations for the type approval process, they should be required to submit their test results to the agency, which should retain responsibility for final approval.**

**Recommendation 8: That type approvals only apply to new meter prototypes and that existing types be grandfathered.**

## **7.6- Implement a Uniform Traceability Procedure**

The water utility survey revealed highly uneven traceability practices. Most utilities conducting meter inspections use measurement standards not approved by Measurement Canada. The

example of the former city of Ste-Foy, which uses a homemade tank, clearly illustrates this haphazardness. Option consommateurs is of the opinion that this situation must not be allowed to continue, since reference standards constitute the very foundation of metering accuracy. We therefore recommend that all standards used to conduct meter inspections be approved by Measurement Canada, including those used by water utilities if they are allowed to apply for accreditation.

**Recommendation 9: That all reference standards used to inspect water meters be approved by Measurement Canada.**

## **7.7- Regulate the Initial Inspection Process**

Measurement Canada should make initial inspection of water meters mandatory. This obligation will not be too burdensome for water utilities, since nearly all of those responding to the survey stated that they already conduct such inspections themselves or contract them out to the manufacturer. One possibility would be to simply let them continue in this way without regulatory oversight, but Option consommateurs recommends that they be accredited by Measurement Canada under the Accreditation Program based on standard S-A-01:2002.

The survey also revealed that some utilities inspect only a sample of their meters. Sampling is practiced in the electricity and natural gas sectors, where utilities must have their sampling program approved by Measurement Canada. Since the number of water meters in Canada is similar to the number of natural gas meters, Option consommateurs does not see any disadvantage in Measurement Canada's allowing water utilities to perform sampling. However, the municipalities must be required to file their sampling programs with Measurement Canada for approval.

**Recommendation 10: That Measurement Canada make initial inspection mandatory and that organizations conducting inspection be accredited under the Measurement Canada Accreditation Program based on standard S-A-01-2002.**

**Recommendation 11: That Measurement Canada allow water utilities to perform sampling of new meters for inspection purposes, subject to the filing of an acceptable sampling plan with the agency.**

## **7.8- Require Periodic Meter Inspection**

The utilities' periodic meter inspection and replacement practices vary greatly. Some have no such program at all. Some only replace meters when they malfunction. Others systematically replace or inspect their meters after a specific time lapse (varying from one utility to another); of these, some automatically replace all meters at that time, while others may extend the seal period depending on the results of an inspection. Finally, some municipalities inspect a random sample of meters, while others inspect them all. In short, it is clear that practices vary widely.

The *Weights and Measures Act*, which governs water meters, makes no provision for periodic inspection or a seal period. There is simply no requirement for water utilities to ever reinspect meters once they are installed. Yet water meters are more akin to electricity and natural gas meters, for which periodic inspection is mandatory, than to other trade measuring instruments such as scales or gasoline pumps. They operate continuously; they are more likely to wear out and lose accuracy. Certain stakeholders have remarked that this type of meter tends to slow down over time and calculate lower-than-actual consumption, benefiting the consumer. This argument is invalid, since it would result in lost revenue to the utility, which would raise its rates to compensate. Consumers with accurate meters would be the losers. As mentioned in the focus groups, metering accuracy ensures equity among all consumers.

In the opinion of Option consommateurs, adequate consumer protection necessitates mandatory periodic meter inspection in accordance with minimum national standards. Consumers living today in municipalities where water meters are rarely if ever reinspected would benefit from having their utility brought up to standard. And of course, nothing would prevent any given utility from adopting stricter standards.

We propose that the periodic inspection procedure comprise the following aspects. First, all 0.625-inch and 0.75-inch residential meters should be affixed with a security seal for a period of up to 15 years when first installed. This period is widely used by utilities that employ a security seal. At the expiry of this period, the water utility would be required to replace the meter or have it inspected for possible extension of validity.

Second, utilities extending the seal period could be allowed to inspect randomly rather than all-inclusively, subject to the filing of an acceptable sampling plan with Measurement Canada. Finally, water utilities or companies conducting periodic inspection should be accredited under the Measurement Canada accreditation program based on standard S-A-01:2002.

**Recommendation 12: That a 15-year security seal be affixed to every new meter upon installation.**

**Recommendation 13: That water utilities be allowed to reinspect a random sample of meters, subject to the filing of an acceptable sampling plan with Measurement Canada.**

**Recommendation 14: That water utilities and meter service companies conducting periodic inspection be accredited under the Measurement Canada accreditation program based on standard S-A-01:2002.**

## **7.9- Regulate the Complaint and Dispute Settlement Process**

The purpose of the Measurement Canada complaint handling process is to resolve conflicts between consumers and utilities. In this sector as in other trade sectors, Measurement Canada invites consumers who believe their meter to be inaccurate to first address their utility if the latter has a complaint procedure; the survey indicates that most water utilities do have one. If consumers are dissatisfied with the outcome, they can appeal to Measurement Canada, which inspects the suspect meter. The survey revealed that nearly half of utilities charge an inspection fee of up to \$140. Though these fees are refunded if the meter is found to be inaccurate, they nonetheless represent an entry barrier. Consumers who can't afford to take such a risk are denied access to an essential means of protecting their rights. Option consommateurs recommends that Measurement Canada disallow these fees.

The survey also indicates that the majority of consumers believe water meter accuracy to be regulated by the water utility, and that very few people are familiar with Measurement Canada or its appeals process. This simply has to change. Now, Option consommateurs is aware that a massive publicity campaign in Canada would generate a work overload for Measurement Canada. The solution could involve requiring the water utilities to inform consumers about the Measurement Canada appeal process.

**Recommendation 15: That Measurement Canada prohibit water utilities from charging fees in connection with complaints about metering accuracy.**

**Recommendation 16: That Measurement Canada's role as the final arbiter of complaints about metering accuracy be better known among consumers who complain to their water utilities.**

## **7.10- Ensure Consumer Representatives' Participation in the WTSR**

The recommendations put forward by Option consommateurs should be given a hearing during negotiations to establish future changes in regulation of the water sector by Measurement Canada. Our past experience has shown that without the participation of consumer associations in stakeholder meetings, consumer interests cannot be adequately represented.

To enable consumer representatives to assert their views, it is essential for Measurement Canada to ensure that they have the means to participate actively in all negotiations leading to a consensus on future strategies in this trade sector.

**Recommendation 17: That Measurement Canada ensure that all stages of the Water Trade Sector Review take place with the participation of consumer representatives.**

## CONCLUSION AND RECOMMENDATIONS

Option consommateurs agreed to participate in the consultations organized by Measurement Canada in connection with the WTSR. As a representative of residential consumers whose homes are equipped with a water meter, Option consommateurs considered the issues for the future of water trade measurement regulation. We were able to perform this in-depth analysis thanks to a financial contribution from the Contributions Program for Non-Profit Consumer and Voluntary Organizations.

This is not the first time that Option consommateurs has carried out this type of research; in fact, we have done so for four other sector reviews since 2001. However, this research and this sector review differ from the others due to the specific status of the water sector, which is currently exempted from the *Weights and Measures Act* by section 4 of the *Weights and Measures Regulation*. This means that water metering accuracy is not regulated by Measurement Canada; each water utility has total discretion over this within its jurisdiction.

In the WTSR, Measurement Canada is asking stakeholders whether or not they want this exemption to continue. In Canada, 4–6 million homes are equipped with a water meter, and the changes ensuing from this sector review will impact on all of them. Option consommateurs has responded to Measurement Canada's request by issuing an opinion based on the status of the water sector in Canada, regulation in the United States, and the opinion of consumers as expressed through focus groups and a Canada-wide survey.

Our research leads us to call on Measurement Canada to end the water meter exemption. Our recommendations go further to examine the various aspects of regulation of the water trade sector that we see as important in order to ensure meter accuracy.

**Recommendation 1: That Measurement Canada rescind the water meter exemption provided by section 4 of the *Weights and Measures Regulation*.**

**Recommendation 2: That Measurement Canada implement a regulatory structure sensitive to water sector realities that keeps the costs to water utilities at a reasonable level.**

**Recommendation 3: That Measurement Canada's water metering accuracy standards be uniform for all of Canada.**

**Recommendation 4: That Measurement Canada study the possibility of adopting the AWWA C700 standard and/or IOLM standard R 49-1 for water meters, adapting them as necessary.**

**Recommendation 5: That Measurement Canada use a grandfathering policy for existing non-compliant meters, requiring gradual phase-out and replacement with compliant ones.**

**Recommendation 6: That Measurement Canada implement a type approval process for water meters. Testing should preferably be done by Measurement Canada but, if that is not possible, the agency could use external organizations under the Accreditation Program based on standard S-A-01:2002.**

**Recommendation 7: That if Measurement Canada uses external organizations for the type approval process, they should be required to submit their test results to the agency, which should retain responsibility for final approval.**

**Recommendation 8: That type approvals only apply to new meter prototypes and that existing types be grandfathered.**

**Recommendation 9: That all reference standards used to inspect water meters be approved by Measurement Canada.**

**Recommendation 10: That Measurement Canada make initial inspection mandatory and that organizations conducting inspection be accredited under the Measurement Canada Accreditation Program based on standard S-A-01-2002.**

**Recommendation 11: That Measurement Canada allow water utilities to perform sampling of new meters for inspection purposes, subject to the filing of an acceptable sampling plan with the agency.**

**Recommendation 12: That a 15-year security seal be affixed to every new meter upon installation.**

**Recommendation 13: That water utilities be allowed to reinspect a random sample of meters, subject to the filing of an acceptable sampling plan with Measurement Canada.**

**Recommendation 14: That water utilities and meter service companies conducting periodic inspection be accredited under the Measurement Canada accreditation program based on standard S–A–01:2002.**

**Recommendation 15: That Measurement Canada prohibit water utilities from charging fees in connection with complaints about metering accuracy.**

**Recommendation 16: That Measurement Canada’s role as the final arbiter of complaints about metering accuracy be better known among consumers who complain to their water utilities.**

**Recommendation 17: That Measurement Canada ensure that all stages of the Water Trade Sector Review take place with the participation of consumer representatives.**

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# **APPENDIX 1 – NIST HANDBOOK 130 – 2003 EDITION – UNIFORM WEIGHTS AND MEASURES LAW**

## **1. Background**

Recognition of the need for uniformity in weights and measures laws and regulations among the States was first noted at the Second Annual Meeting of the National Conference on Weights and Measures in April 1906. In the following year, basic outlines of a "Model State Weights and Measures Law" were developed. The first "Model Law," as such, was formally adopted by the Conference in 1911.

Through the years, almost without exception, each State has relied upon the NCWM Weights and Measures Law when the State first enacted comprehensive weights and measures legislation. This has led to a greater degree of uniformity in the basic weights and measures requirements throughout the country.

The original Law was regularly amended to provide for new developments in commercial practices and technology. This resulted in a lengthy and cumbersome document and in the need for a simplification of the basic weights and measures provisions. The 1971 National Conference on Weights and Measures adopted a thoroughly revised, simplified, modernized version of the "Model State Weights and Measures Law." This Law now can serve as a framework for all the many concerns in weights and measures administration and enforcement.

The title of the Law was changed by the 1983 NCWM. Amendments or revisions to the Law since 1971 are noted at the end of each section.

Sections 4 through 10 of the Uniform Weights and Measures Law adopt NIST Handbook 44 and the Uniform Regulations in NIST Handbook 130 by citation. In addition, these sections adopt supplements to and revisions of Handbook 44 and the Uniform Regulations "except insofar as modified or rejected by regulation." Some State laws may not permit enacting a statute that provides for automatic adoption of future supplements to or revisions of a Uniform Regulation covered by that statute. If this should be the case in a given State, two alternatives are available:

- a. Sections 4 through 10 may be enacted without the phrase "... and supplements thereto or revisions thereof..."
- b. Sections 4 through 10 may be enacted by replacing "... except insofar as modified or rejected by regulation..." with the phrase "...as adopted, or amended and adopted, by rule of the director."

Either alternative requires action on the part of the director to adopt a current version of Handbook 44 and each Uniform Regulation each time a supplement or revision is made by the National Conference on Weights and Measures.

## **Section 1. Definitions**

When used in this Act:

**1.1. Weight(s) and (or) Measure(s).** -- The term "weight(s) and (or) measure(s) " means all weights and measures of every kind, instruments and devices for weighing and measuring, and any appliance and accessories associated with any or all such instruments and devices.

**1.2. Weight.** -- The term "weight " as used in connection with any commodity or service means net weight. When a commodity is sold by drained weight, the term means net drained weight.

(Amended 1974, 1990)

**1.3. Correct.** -- The term "correct " as used in connection with weights and measures means conformance to all applicable requirements of this Act.

**1.4. Primary Standards.** -- The term "primary standards " means the physical standards of the State that serve as the legal reference from which all other standards for weights and measures are derived.

**1.5. Secondary Standards.** -- The term "secondary standards " means the physical standards that are traceable to the primary standards through comparisons, using acceptable laboratory procedures, and used in the enforcement of weights and measures laws and regulations.

**1.6. Director.** -- The term "director " means the\_ of the Department of\_

**1.7. Person.** -- The term "person " means both plural and the singular, as the case demands, and includes individuals, partnerships, corporations, companies, societies, and associations.

**1.8. Sale from Bulk.** -- The term "sale from bulk " means the sale of commodities when the quantity is determined at the time of sale.

**1.9. Package.** -- Except as modified by § 1. Application of the Uniform Packaging and Labeling Regulation, the term "package," whether standard package or random package, means any commodity:

- a. enclosed in a container or wrapped in any manner in advance of wholesale or retail sale or
- b. whose weight or measure has been determined in advance of wholesale or retail sale.

An individual item or lot of any commodity on which there is marked a selling price based on an established price per unit of weight or of measure shall be considered a package (or packages).

(Amended 1991)

**1.10. Net "Mass" or Net "Weight."** -- The term "net mass" or "net weight" means the weight<sup>[NOTE 1, see page 78]</sup> of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials.

(Added 1988; Amended 1989, 1991, 1993)

**NOTE 1:** *When used in this law, the term "weight" means "mass." (See paragraph V. and W. in Section I., Introduction, of NIST Handbook 130 for an explanation of these terms.)*

(Note added 1993)

**1.11. Random Weight Package.** -- A package that is one of a lot, shipment, or delivery of packages of the same commodity with no fixed pattern of weights.

(Added 1990)

**1.12. Standard Package.** -- A package that is one of a lot, shipment, or delivery of packages of the same commodity with identical net contents declarations; for example, 1 L bottles or 12 fl oz cans of carbonated soda; 500 g or 5 lb bags of sugar; 100 m or 300 ft packages of rope.

(Added 1991; Amended 1993)

**1.13. Commercial Weighing and Measuring Equipment.** -- The term "commercial weighing and measuring equipment" means weights and measures and weighing and measuring devices commercially used or employed in establishing the size, quantity, extent, area, or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure.

(Added 1995)

## **Section 2. Systems of Weights and Measures**

The International System of Units (SI)<sup>[NOTE 2, see page 79]</sup> and the system of weights and measures in customary use in the United States are jointly recognized, and either one or both of these systems shall be used for all commercial purposes in the State. The definitions of basic units of weight and measure, the tables of weight and measure, and weights and measures equivalents as published by the National Institute of Standards and Technology are recognized and shall govern weighing and measuring equipment and transactions in the State.

(Amended 1993)

**NOTE 2:** *The "International System of Units" means the modernized metric system as established in 1960 by the General Conference on Weights and Measures and interpreted or modified for the United States by the Secretary of Commerce. [See Metric Conversion Act of 1975 (Public Law 94-168, § 3(1) and § 4(4), and NIST Special Publication 814 - Metric System of Measurement; Interpretation of the International System of Units for the United States, or the Federal Register of December 20, 1990, (FR 90-21913).] (Added 1993)*

## **Section 3. Physical Standards**

Weights and measures that are traceable to the US prototype standards supplied by the Federal Government, or approved as being satisfactory by the National Institute of Standards and Technology, shall be the State primary standards of weights and measures, and shall be maintained in such calibration as prescribed by the National Institute of Standards and Technology. All secondary standards may be prescribed by the director and shall be verified upon their initial receipt, and as often thereafter as deemed necessary by the director.

## **Section 4. Technical Requirements for Weighing and Measuring Devices**

[NOTE 3, see page 80]

The specifications, tolerances, and other technical requirements for commercial, law enforcement, data gathering, and other weighing and measuring devices as adopted by the National Conference on Weights and Measures, published in the National Institute of Standards and Technology Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," and supplements thereto or revisions thereof, shall apply to weighing and measuring devices in the State, except insofar as modified or rejected by regulation.

(Amended 1975)

**NOTE 3:** Sections 4 through 10 of the Uniform Weights and Measures Law adopt NIST Handbook 44 and Uniform Regulations in NIST Handbook 130 by citation. In addition, these sections adopt supplements to and revisions of NIST Handbook 44 and the Uniform Regulations "except insofar as modified or rejected by regulation." Some State laws may not permit enacting a statute that provides for automatic adoption of future supplements to or revisions of a regulation covered by that statute. If this should be the case in a given State, two alternatives are available:

- a. Sections 4 through 10 may be enacted without the phrase "...and supplements thereto or revisions thereof..."
- b. Sections 4 through 10 may be enacted by replacing "...except insofar as modified or rejected by regulation..." with the phrase "...as adopted, or amended and adopted, by rule of the director."

*Either alternative requires action on the part of the director to adopt a current version of the Handbook 44 and each Uniform Regulation each time a supplement is added or revision is made by the National Conference on Weights and Measures.]*

### **Section 5. Requirements for Packaging and Labeling** [NOTE 3, see page 80]

The Uniform Packaging and Labeling Regulation as adopted by the National Conference on Weights and Measures and published in the National Institute of Standards and Technology Handbook 130, "Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to packaging and labeling in the State, except insofar as modified or rejected by regulation.

(Added 1983)

### **Section 6. Requirements for the Method of Sale of Commodities** [NOTE 3, see page 80]

The Uniform Regulation for the Method of Sale of Commodities as adopted by the National Conference on Weights and Measures and published in National Institute of Standards and Technology Handbook 130, "Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to the method of sale of commodities in the State, except insofar as modified or rejected by regulation.

(Added 1983)

### **Section 7. Requirements for Unit Pricing** [NOTE 3, see page 80]

The Uniform Unit Pricing Regulation as adopted by the National Conference on Weights and Measures and published in the National Institute of Standards and Technology Handbook 130,

"Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to unit pricing in the State, except insofar as modified or rejected by regulation.

(Added 1983)

## **Section 8. Requirements for the Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices** [NOTE 3, see page 80]

The Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices as adopted by the National Conference on Weights and Measures and published in the National Institute of Standards and Technology Handbook 130, "Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to the registration of servicepersons and service agencies in the State, except insofar as modified or rejected by regulation.

(Added 1983)

## **Section 9. Requirements for Open Dating** [NOTE 3, see page 80]

The Uniform Open Dating Regulation as adopted by the National Conference on Weights and Measures and published in the National Institute of Standards and Technology Handbook 130, "Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to open dating in the State, except insofar as modified or rejected by regulation.

(Added 1983)

## **Section 10. Requirements for Type Evaluation** [NOTE 3, see page 80]

The Uniform Regulation for National Type Evaluation as adopted by the National Conference on Weights and Measures and published in National Institute of Standards and Technology Handbook 130, "Uniform Laws and Regulations," and supplements thereto or revisions thereof, shall apply to type evaluation in the State, except insofar as modified or rejected by regulation.

(Added 1985)

## **Section 11. State Weights and Measures Division**

There shall be a State Division of Weights and Measures located for administrative purposes within the Department of (agency, etc.). The Division is charged with, but not limited to, performing the following functions on behalf of the citizens of the State:

- a. Assuring that weights and measures in commercial services within the State are suitable for their intended use, properly installed, and accurate, and are so maintained by their owner or user.
- b. Preventing unfair or deceptive dealing by weight or measure in any commodity or service advertised, packaged, sold, or purchased within the State.
- c. Making available to all users of physical standards or weighing and measuring equipment the precision calibration and related metrological certification capabilities of the weights and measures facilities of the Division.
- d. Promoting uniformity, to the extent practicable and desirable, between weights and measures requirements of this State and those of other States and Federal agencies.
- e. Encouraging desirable economic growth while protecting the consumer through the adoption by rule of weights and measures requirements as necessary to assure equity among buyers and sellers.

(Added 1976)

## **Section 12. Powers and duties of the Director**

The director shall:

- a. maintain traceability of the State standards to the national standards in the possession of the National Institute of Standards and Technology;
- b. enforce the provisions of this Act;
- c. issue reasonable regulations for the enforcement of this Act, which regulations shall have the force and effect of law;
- d. establish labeling requirements, establish requirements for the presentation of cost-per-unit information, establish standards of weight, measure, or count, and reasonable standards of fill for any packaged commodity; and establish requirements for open dating information;

(Added 1973)

- e. grant any exemptions from the provisions of this Act or any regulations promulgated pursuant thereto when appropriate to the maintenance of good commercial practices within the State;
- f. conduct investigations to ensure compliance with this Act;
- g. delegate to appropriate personnel any of these responsibilities for the proper administration of this office;
- h. test annually the standards for weights and measures used by any city or county within the State, and approve the same when found to be correct;
- i. have the authority to inspect and test commercial weights and measures kept, offered, or exposed for sale;

(Amended 1995)

- j. inspect and test, to ascertain if they are correct, weights and measures commercially used:
  - 1) in determining the weight, measure, or count of commodities or things sold, or offered or exposed for sale, on the basis of weight, measure, or count, or
  - 2) in computing the basic charge or payment for services rendered on the basis of weight, measure, or count;
- k. test all weights and measures used in checking the receipt or disbursement of supplies in every institution, the maintenance of which funds are appropriated by the legislature of the State;
- l. approve for use, and may mark, such commercial weights and measures as are found to be correct, and shall reject and order to be corrected, replaced, or removed such

commercial weights and measures as are found to be incorrect. Weights and measures that have been rejected may be seized if not corrected within the time specified or if used or disposed of in a manner not specifically authorized. The director shall remove from service and may seize the weights and measures found to be incorrect that are not capable of being made correct;

(Amended 1995)

- m. weigh, measure, or inspect packaged commodities kept, offered, or exposed for sale, sold, or in the process of delivery, to determine whether they contain the amounts represented and whether they are kept, offered, or exposed for sale in accordance with this Act or regulations promulgated pursuant thereto. In carrying out the provisions of this section, the director shall employ recognized sampling procedures, such as are adopted by the National Conference on Weights and Measures and are published in the National Institute of Standards and Technology Handbook 133, "Checking the Net Contents of Packaged Goods;"

(Amended 1984, 1988, 2000)

- n. prescribe, by regulation, the appropriate term or unit of weight or measure to be used, whenever the director determines that an existing practice of declaring the quantity of a commodity or setting charges for a service by weight, measure, numerical count, time, or combination thereof, does not facilitate value comparisons by consumers, or offers an opportunity for consumer confusion;

(Amended 1991)

- o. allow reasonable variations from the stated quantity of contents, which shall include those caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice only after the commodity has entered intrastate commerce;
- p. provide for the training of weights and measures personnel, and may establish minimum training and performance requirements which shall then be met by all weights and measures personnel, whether county, municipal, or State. The director may adopt the training standards of the National Conference on Weights and Measures' National Training Program; and

(Added 1991)

- q. verify advertised prices, price representations, and point-of-sale systems, as deemed necessary, to determine: (1) the accuracy of prices and computations and the correct use of the equipment, and (2) if such system utilizes scanning or coding means in lieu of manual entry, the accuracy of prices printed or recalled from a database. In carrying out the provisions of this section, the director shall: (i) employ recognized procedures, such as are designated in National Institute of Standards and Technology Handbook 130, Uniform Laws and Regulations, "Examination Procedures for Price Verification," (ii) issue necessary rules and regulations regarding the accuracy of advertised prices and automated systems for retail price charging (referred to as "point-of-sale systems") for the enforcement of this section, which rules shall have the force and effect of law; and (iii) conduct investigations to ensure compliance.

(Added 1995)

### **Section 13. Special Police Powers**

When necessary for the enforcement of this Act or regulations promulgated pursuant thereto, the director is:

- a. Authorized to enter any commercial premises during normal business hours, except that in the event such premises are not open to the public, he/she shall first present his/her credentials and obtain consent before making entry thereto, unless a search warrant has previously been obtained.
- b. Empowered to issue stop-use, hold, and removal orders with respect to any weights and measures commercially used, stop-sale, hold, and removal orders with respect to any packaged commodities or bulk commodities kept, offered, or exposed for sale.
- c. Empowered to seize, for use as evidence, without formal warrant, any incorrect or unapproved weight, measure, package, or commodity found to be used, retained, offered, or exposed for sale or sold in violation of the provisions of this Act or regulations promulgated pursuant thereto.
- d. Empowered to stop any commercial vehicle and, after presentation of his credentials, inspect the contents, require the person in charge of that vehicle produce any documents in his possession concerning the contents, and require him to proceed with the vehicle to some specified place for inspection.
- e. With respect to the enforcement of this Act, the director is hereby vested with special police powers, and is authorized to arrest, without formal warrant, any violator of this Act.

#### **Section 14. Powers and Duties of Local Officials**

Any weights and measures official appointed for a county or city shall have the duties and powers enumerated in this Act, excepting those duties reserved to the State by law or regulation. These powers and duties shall extend to their respective jurisdictions, except that the jurisdiction of a county official shall not extend to any city for which a weights and measures official has been appointed. No requirement set forth by local agencies may be less stringent than or conflict with the requirements of the State.

(Amended 1984)

#### **Section 15. Misrepresentation of Quantity**

No person shall:

- a. sell, offer, or expose for sale a quantity less than the quantity represented, nor
- b. take more than the represented quantity when, as buyer, he/she furnishes the weight or measure by means of which the quantity is determined, nor
- c. represent the quantity in any manner calculated or tending to mislead or in any way deceive another person.

(Amended 1975, 1990)

#### **Section 16. Misrepresentation of Pricing**

No person shall misrepresent the price of any commodity or service sold, offered, exposed, or advertised for sale by weight, measure, or count, nor represent the price in any manner calculated or tending to mislead or in any way deceive a person.

### **Section 17. Method of Sale**

Except as otherwise provided by the director or by firmly established trade custom and practice,

- a. commodities in liquid form shall be sold by liquid measure or by weight, and
- b. commodities not in liquid form shall be sold by weight, by measure, or by count.

The method of sale shall provide accurate and adequate quantity information that permits the buyer to make price and quantity comparisons.

(Amended 1989)

### **Section 18. Sale from Bulk**

All bulk sales in which the buyer and seller are not both present to witness the measurement, all bulk deliveries of heating fuel, and all other bulk sales specified by rule or regulation of the director shall be accompanied by a delivery ticket containing the following information:

- a. the name and address of the buyer and seller;
- b. the date delivered;
- c. the quantity delivered and the quantity upon which the price is based, if this differs from the delivered quantity for example, when temperature compensated sales are made;

(Amended 1991)

- d. the unit price, unless otherwise agreed upon by both buyer and seller;

(Added 1991)

- e. the identity in the most descriptive terms commercially practicable, including any quality representation made in connection with the sale; and
- f. the count of individually wrapped packages, if more than one, in the instance of commodities bought from bulk but delivered in packages.

(Amended 1983, 1991)

### **Section 19. Information Required on Packages**

Except as otherwise provided in this Act or by regulations promulgated pursuant thereto, any package, whether a random package or a standard package, kept for the purpose of sale, or offered or exposed for sale, shall bear on the outside of the package a definite, plain, and conspicuous declaration of:

- a. the identity of the commodity in the package, unless the commodity is a food, other than meat or poultry, that was repackaged in a retail establishment and the food is displayed to the purchaser under either of the following circumstances: (1) its interstate labeling is clearly in view or with a counter card, sign or other appropriate device bearing prominently and conspicuously the common or usual name of the food, or (2) the common or usual name of the food is clearly revealed by its appearance;

(Amended 2001)

- b. the quantity of contents in terms of weight, measure, or count; and,

- c. the name and place of business of the manufacturer, packer, or distributor, in the case of any package kept, offered, or exposed for sale, or sold in any place other than on the premises where packed.

(Amended 1991)

## **Section 20. Declarations of Unit Price on Random Weight Packages**

In addition to the declarations required by § 19 of this Act, any package being one of a lot containing random weights of the same commodity, at the time it is offered or exposed for sale at retail, shall bear on the outside of the package a plain and conspicuous declaration of the price per kilogram or pound and the total selling price of the package.

(Amended 1986)

## **Section 21. Advertising Packages for Sale**

Whenever a packaged commodity is advertised in any manner with the retail price stated, there shall be closely and conspicuously associated with the retail price a declaration of quantity as is required by law or regulation to appear on the package.

(Amended 1993)

## **Section 22. Prohibited Acts**

No person shall:

- a. use or have in possession for use in commerce any incorrect weight or measure;
- b. sell or offer for sale for use in commerce any incorrect weight or measure;
- c. remove any tag, seal, or mark from any weight or measure without specific written authorization from the proper authority;
- d. hinder or obstruct any weights and measures official in the performance of his or her duties; or
- e. violate any provisions of this Act or regulations promulgated under it.

## **Section 23. Civil Penalties**

**23.1. Assessment of Penalties.** -- Any person who by himself or herself, by his or her servant or agent, or as the servant or agent of another person, commits any of the acts enumerated in § 22 may be assessed by the a civil penalty of:

- a. not less than \$\_ nor more than \$\_ for a first violation,
- b. not less than \$\_ nor more than \$\_ for a second violation within from the date of the first violation, and

c. not less than \$ nor more than \$ for a third violation within from the date of the first violation.

**23.2. Administrative Hearing.** -- Any person subject to a civil penalty shall have a right to request an administrative hearing within days of receipt of the notice of the penalty. The director or his/her designee shall be authorized to conduct the hearing after giving appropriate notice to the respondent. The decision of the director shall be subject to appropriate judicial review.

**23.3. Collection of Penalties.** -- If the respondent has exhausted his or her administrative appeals and the civil penalty has been upheld, he or she shall pay the civil penalty within days after the effective date of the final decision. If the respondent fails to pay the penalty, a civil action may be brought by the director in any court of competent jurisdiction to recover the penalty. Any civil penalty collected under this Act shall be transmitted to \_\_\_\_\_.

(Added 1989) (Amended 1995)

## **Section 24. Criminal Penalties**

**24.1. Misdemeanors.** -- Any person who commits any of the acts enumerated in § 22 shall be guilty of a class \_\_\_\_\_ misdemeanor and upon a first conviction thereof shall be punished by a fine of not less than \$ \_\_\_\_\_ nor more than \$ \_\_\_\_\_ or by imprisonment for not more than \_\_\_\_\_ months, or both. Upon a subsequent conviction thereof, he or she shall be punished by a fine of not less than \$ \_\_\_\_\_ nor more than \$ \_\_\_\_\_ or by imprisonment for up to \_\_\_\_\_, or both.

**24.2. Felonies.** -- Any person who:

- a. intentionally violates any provisions of this Act or regulations under it;
- b. is convicted under the misdemeanor provisions of § 24 (a) more than three times in a 2-year period;
- c. uses or has in his or her possession a device which has been altered to facilitate fraud shall be guilty of a class \_\_\_\_\_ felony and upon a first offense shall be punished by a fine of not less than \$<sub>1</sub> or by imprisonment for not more than \_\_\_\_\_, or both.

(Added 1989)

## **Section 25. Restraining Order and Injunction**

The director is authorized to apply to any court of competent jurisdiction for a restraining order, or a temporary or permanent injunction, restraining any person from violating any provision of this Act.

(Retitled 1989)

### **Section 26. Presumptive Evidence**

Whenever there shall exist a weight or measure or weighing or measuring device in or about any place in which or from which buying or selling is commonly carried on, there shall be a rebuttable presumption that such weight or measure or weighing or measuring device is regularly used for the business purposes of that place.

### **Section 27. Separability Provision**

If any provision of this Act is declared unconstitutional, or the applicability thereof to any person or circumstance is held invalid, the constitutionality of the remainder of the Act and the applicability thereof to other persons and circumstances shall not be affected thereby.

### **Section 28. Repeal of Conflicting Laws**

All laws and parts of laws contrary to or inconsistent with the provisions of this Act are repealed except as to offenses committed, liabilities incurred, and claims made thereunder prior to the effective date of this Act.

### **Section 29. Regulations to be Unaffected by Repeal of Prior Enabling Statute**

The adoption of this Act or any of its provisions shall not affect any regulations promulgated pursuant to the authority of any earlier enabling statute unless inconsistent with this Act or modified or revoked by the director.

### **Section 30. Effective Date**

This Act shall become effective on\_

## **APPENDIX 2 – NIST HANDBOOK 130 2003 EDITION – UNIFORM REGULATION FOR NATIONAL TYPE EVALUATION**

### **Background**

The Uniform Regulation for National Type Evaluation was adopted by the NCWM at the 68<sup>th</sup> Annual Meeting in 1983 and is a necessary adjunct to recognize and enable participation in the National Type Evaluation Program administered by the National Conference on Weights and Measures. The Regulation specifically authorizes: type evaluation; recognition of a National Conference on Weights and Measures "Certificate of Conformance" of type; the State Measurement Laboratory to operate as a Participating Laboratory, if authorized by the National Institute of Standards and Technology under its program of recognition of State Measurement Laboratories; and, the State to charge fees to those persons who seek type evaluation of weighing and measuring devices.

(Amended 2000)

At the 81st Annual Meeting in 1996, the NCWM adopted major revisions to the Uniform Regulation for National Type Evaluation. These revisions were made to clarify the requirements and incorporate the policies and guidelines adopted by the Executive Committee as published in NCWM Publication 14, Technical Policy, Checklists, and Test Procedures.

(Amended 1997)

### **Intent**

It is the intent of this regulation to have all States use the National Type Evaluation Program, as approved by the National Conference on Weights and Measures, as their examining procedure. If a State does not wish to establish a Participating Laboratory, § 2.4. Participating Laboratory and § 4. Participating Laboratory may be deleted.

### **Section 1. Application.**

This regulation shall apply to <sup>[, see page 42]</sup> any type of device and/or equipment covered in National Institute of Standards and Technology Handbook 44 for which evaluation procedures have been

published in National Conference on Weights and Measures, Publication 14, "National Type Evaluation Program, Technical Policy, Checklists, and Test Procedures."

**NOTE 1:** *This section can be amended to include a list of devices or device types to which NTEP evaluation criteria does not apply. Additionally, a State can amend this section to allow it to conduct a type evaluation and issue a "Certificate of Approval." This approach should be limited to occasions where formal NTEP Type Evaluation criteria does not apply and to new technologies or device applications where the development of criteria is deemed necessary by the Director.*

## **Section 2. Definitions**

**2.1. Active Certificate of Conformance.** -- A document issued based on testing by a Participating Laboratory, which the certificate owner maintains in active status under the National Type Evaluation Program (NTEP). The document constitutes evidence of conformance of a type with the requirements of this document and the NIST Handbooks 44, 105-1, 105-2, or 105-3. By maintaining the Certificate in active status, the Certificate owner declares the intent to continue to manufacture or remanufacture the device consistent with the type and in conformance with the applicable requirements. For manufacturers of grain moisture meters, maintenance of active status also involves annual participation in the NTEP Laboratory On-going Calibration Program, OCP (Phase II). A device is traceable to an active Certificate of Conformance if it was manufactured during the period that the Certificate was maintained in active status.

(Amended 2000 and 2001)

**2.2. Device.**-- Device means any weighing and measuring device as defined in § 2.12. Commercial and Law Enforcement Equipment.

**2.3. Director.** -- Means the of the department of.

**2.4. Manufactured Device.** -- Any commercial weighing or measuring device shipped as new from the original equipment manufacturer.

(Added 2001)

**2.5. National Type Evaluation Program.** -- A program of cooperation between the National Conference on Weights and Measures, the National Institute of Standards and Technology, other Federal agencies, the States, and the private sector for determining, on a uniform basis, conformance of a type with the relevant provisions of National Institute of Standards and Technology Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices," and National Conference on Weights and Measures, Publication 14, "National Type Evaluation Program, Technical Policy, Checklists, and Test Procedures."

(Amended 2000)

**2.6. One-of-a-Kind Device.** -- A (non-NTEP) device designed to meet unique demands for a specific installation and of a specific *design* which is not commercially available elsewhere (one such device per manufacturer). If a device manufactured for sale by a company has been categorized and tested as a “one-of-a-kind” device and the manufacturer then decides to manufacture an additional device or devices of that same type, the device will no longer be considered a “one-of-a-kind.” This also applies to a device that has been determined to be a “one-of-a-kind” device by a weights and measures jurisdiction in one State and the manufacturer decides to manufacture and install another device of that same type in another State. In this case, the manufacturer of the device must request an NTEP evaluation on the device through the normal application process unless NTEP has already deemed that such evaluation will not be conducted.

(Amended 1998)

**2.7. Participating Laboratory.** -- Any State Measurement Laboratory or State Weights and Measures Agency or other laboratory that has been authorized to conduct a type evaluation under the National Type Evaluation Program.

(Amended 2001)

**2.8. Person.** -- The term "person " means both singular and plural, as the case demands, and includes individuals, partnerships, corporations, companies, societies, and associations.

**2.9. Remanufactured Device.** -- A device that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new device of the same type.

(Amended 2001)

**2.10. Remanufactured Element.** -- An element that is disassembled, checked for wear, parts replaced or fixed, reassembled and made to operate like a new element of the same type.

(Added 2001)

**2.11. Repaired Device.** -- A device on which work is performed that brings the device back into proper operating condition.

(Amended 2001)

**2.12. Repaired Element.** -- An element on which work is performed that brings the element back into proper operating condition.

(Added 2001)

**2.13. Type.** -- A model or models of a particular device, measurement system, instrument, or element that positively identifies the design. A specific type may vary in its measurement ranges, size, performance, and operating characteristics as specified in the Certificate of Conformance.

**2.14. Type Evaluation.** -- The testing, examination, and/or evaluation of a type by a Participating Laboratory under the National Type Evaluation Program.

**2.15. Commercial and Law Enforcement Equipment.** -- (a) Weighing and measuring equipment commercially used or employed in establishing the size, quantity, extent, area, or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure. (b) Any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed that its operation affects the accuracy of the device. (c) Weighing and measuring equipment in official use for the enforcement of law or for the collection of statistical information by government agencies. [NOTE 2, see page 92]

**NOTE 2:** *The section is identical to G-A.1., § 1.10, General Code, National Institute of Standards and Technology Handbook 44 for definition of "commercial" and "law enforcement equipment."*

### **Section 3. Certificate of Conformance**

The Director shall require a device to be traceable to an active Certificate of Conformance prior to its installation or use for commercial or law enforcement purposes.

(Amended 2001)

### **Section 4. Prohibited Acts and Exemptions**

**(1)** Except for a device exempted by this section, no person shall sell a device unless it is traceable to an active Certificate of Conformance.

(Amended 2001)

**(2)** Except for a device exempted by this section, no person shall use a device unless it is traceable to an active Certificate of Conformance.

(Amended 2001)

**(3)** A device in service in this State prior to, that meets the specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 shall not be required to be traceable to an active Certificate of Conformance.

(Amended 2001)

**(4)** A device in service in this State prior to, removed from service by the owner or on which the department has issued a removal order after, and returned to service at a later date shall be modified to meet all specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 effective on the date of the return to service. Such a device shall not be required to be traceable to an active Certificate of Conformance.

(Amended 2001)

**(5)** A device in service in this State prior to, which is repaired after such date shall meet the specifications, tolerances, and other technical requirements of National Institute of Standards and Technology Handbook 44 and shall not be required to be traceable to an active Certificate of Conformance.

(Amended 2001)

**(6)** A device in service in this State prior to, that is still in use may be installed at another location in this State provided the device meets requirements in effect as of the date of installation in the new location; however, the device shall not be required to be traceable to an active Certificate of Conformance.

(Amended 2001)

**(7)** A device in service in another State prior to \_\_\_\_, \_\_\_\_, may be installed in this State; however, the device shall meet the specifications, tolerances, and technical requirements for weighing and measuring devices in National Institute of Standards and Technology Handbook 44 and be traceable to an active Certificate of Conformance.

(Amended 2001)

**(8) One-of-a-kind Device.** -- The Director may accept the design of a one-of-a-kind device without an NTEP evaluation pending inspection and performance testing to satisfy that the device complies with Handbook 44 and is capable of performing within the Handbook 44 requirements for a reasonable period of time under normal conditions of use. Indicators and load cells in all "one-of-a-kind" scale installations must have an active NTEP CC as evidence that the system meets the influence factor requirements of Handbook 44.

(Amended 1998 and 2001)

**(9) Repaired Device.** -- If a person makes changes to a device to the extent that the metrological characteristics are changed, that specific device is no longer traceable to the active Certificate of Conformance.

(Amended 2001)

**(10) Remanufactured Device.** -- If a person repairs or remanufactures a device, they are obligated to repair or remanufacture it consistent with the manufacturer's original design; otherwise, that specific device is no longer traceable to an active Certificate of Conformance.

(Amended 2001)

**(11) Copy of a Device.** -- The manufacturer who copies the design of a device that is traceable to an active Certificate of Conformance, but which is made by another company, must obtain a separate Certificate of Conformance for the device. The Certificate of Conformance for the original device shall not apply to the copy.

**(12) Device Components** -- If a person buys a load cell(s) and an indicating element that are traceable to Certificates of Conformance and then manufactures a device from the parts, that person shall obtain an active Certificate of Conformance for the device.

(Amended 2001)

## **Section 5. Participating Laboratory and Agreements**

The Director is authorized to:

**(1)** Operate a Participating Laboratory as part of the National Type Evaluation Program. In this regard, the Director is authorized to charge and collect fees for type evaluation services.

**(2)** Cooperate with and enter into agreements with any person in order to carry out the purposes of the act.

## **Section 6. Revocation of Conflicting Regulations**

All provisions of all orders and regulations before issued on this same subject that are contrary to or inconsistent with the provisions of this regulation, are hereby revoked.

(Amended 2001)

## **Section 7. Effective Date**

This regulation shall become effective on.

(Amended 2001)

## **APPENDIX 3 – NIST HANDBOOK 44 - SECTION 3.36 - WATER METERS**

### **Sec. 3.36. Water Meters**

#### **A. Application**

**A.1.** - This code applies to devices used for the measurement of water; generally applicable to, but not limited to, utilities type meters installed in residences or business establishments and meters installed in batching systems.

(Amended 2002)

**A.2.** - This code does not apply to:

(a) water meters mounted on vehicle tanks (for which see Sec. 3.31; Code for Vehicle-Tank Meters).

(b) mass flow meters (see Sec. 3.37. Code for Mass Flow Meters)

(Added 1994)

**A.3.** - See also Sec. 1.10; General Code requirements.

#### **S. Specifications**

##### **S.1. Design of Indicating and Recording Elements and of Recorded Representations.**

###### **S.1.1. Primary Elements.**

**S.1.1.1. General.** - A water meter shall be equipped with a primary indicating element and may also be equipped with a primary recording element. Such elements shall be visible at the point of measurement or be stored in non-volatile and nonresettable memory. The display may be remotely located provided it is readily accessible to the customer.

(Amended 2002)

**S.1.1.2. Units.** - A water meter shall indicate and record, if the device is equipped to record, its deliveries in terms of liters, gallons or cubic feet or binary or decimal subdivisions thereof except batch plant meters, which shall indicate deliveries in terms of liters, gallons or decimal subdivisions of the liter or gallon only.

**S.1.1.3. Value of Smallest Unit.** - The value of the smallest unit of indicated delivery and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

- (a) 50 L (10 gal) on utility type meters,
- (b) 0.2 L (1/10 gal) on batching meters delivering less than 375 L/min (100 gal/min),  
or
- (c) 5 L (1 gal) on batching meters delivering 375 L/min (100 gal/min) or more.

**S.1.1.4. Advancement of Indicating and Recording Elements.** - Primary indicating and recording elements shall be susceptible to advancement only by the mechanical operation of the device.

**S.1.1.5. Return to Zero.** - If the meter is so designed that the primary indicating elements are readily returnable to a definite zero indication, means shall be provided to prevent the return of these elements beyond their correct zero position.

## **S.1.2. Graduations.**

**S.1.2.1. Length.** - Graduations shall be so varied in length that they may be conveniently read.

**S.1.2.2. Width.** - In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations, and the width of main graduations shall be not more than 50 percent greater than the width of subordinate graduations. Graduations shall in no case be less than 0.2 mm (0.008 in) in width.

**S.1.2.3. Clear Interval Between Graduations.** - The clear interval shall not be less than 1.0 mm (0.04 in). If the graduations are not parallel, the measurement shall be made:

- (a) along the line of relative movement between the graduations at the end of the indicator, or
- (b) if the indicator is continuous, at the point of widest separation of the graduations.

## **S.1.3. Indicators.**

**S.1.3.1. Symmetry.** - The index of an indicator shall be symmetrical with respect to the graduations, at least throughout that portion of its length associated with the graduations.

**S.1.3.2. Length.** - The index of an indicator shall reach to the finest graduations with which it is used, unless the indicator and the graduations are in the same plane, in which case the distance between the end of the indicator and the ends of the graduations, measured along the line of the graduations, shall be not more than 1.0 mm (0.04 in).

**S.1.3.3. Width.** - The width of the index of an indicator in relation to the series of graduations with which it is used shall not be greater than:

- (a) *the width of the narrowest graduation\**, and

*[\*Nonretroactive as of January 1, 2002]*

(Amended 2001)

- (b) the width of the minimum clear interval between graduations.

When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation.

**S.1.3.4. Clearance.** - The clearance between the index of an indicator and the graduations shall in no case be more than 1.5 mm (0.06 in).

**S.1.3.5. Parallax.** - Parallax effects shall be reduced to the practicable minimum.

## **S.2. Design of Measuring Elements.**

**S.2.1. Provision for Sealing.** - Adequate provision shall be made for applying security seals in such a manner that no adjustment may be made of:

- (a) any measurement elements, and
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries.

The adjusting mechanism shall be readily accessible for purposes of affixing a security seal.

### **S.2.2. Batching Meters Only.**

**S.2.2.1. Air Elimination.** - Batching meters shall be equipped with an effective air eliminator.

**S.2.2.2. Directional Flow Valves.** - Valves intended to prevent reversal of flow shall be automatic in operation.

## **N. Notes**

**N.1. Test Liquid.** - A meter shall be tested with water.

**N.2. Evaporation and Volume Change.** - Care shall be exercised to reduce to a minimum, evaporation losses and volume changes resulting from changes to temperature of the test liquid.

**N.3. Test Drafts.** - Test drafts should be equal to at least the amount delivered by the device in 2 minutes and in no case less than the amount delivered by the device in 1 minute at the actual maximum flow rate developed by the installation. The test drafts shown in Table 1, next page, shall be followed as closely as possible.

### **N.4. Testing Procedures.**

**N.4.1. Normal Tests.** The normal test of a meter shall be made at the maximum discharge rate developed by the installation. Meters with maximum gallon per minute ratings higher than Table 1 values may be tested up to the meter rating, with meter indications no less than those shown.

(Amended 1990 and 2002)

**N.4.1.1. Repeatability Tests.** – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

(Added 2002)

**N.4.2. Special Tests.** - Special tests to develop the operating characteristics of meters may be made according to the rates and quantities shown in Table 2.

**N.4.3. Batching Meter Tests.** - Tests on batching meters should be conducted at the maximum and intermediate rates only.

## **T. Tolerances**

**T.1. Tolerance Values.** - Maintenance and acceptance tolerances shall be as shown in Table 1 and Table 2.

**T.1.1. Repeatability.** – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6 percent for tests performed at the normal and intermediate flow rates, and 1.3 percent for tests performed at the minimum flow rate, and each test shall be within the applicable tolerance.

(Added 2002)

<b>Table 1. Tolerances for Water Meters</b>					
<b>Normal Tests</b>					
Meter size (inches)	Rate of flow (gal/min)	Maximum Rate			Tolerance on over- and under- registration
		Meter indication			
		gal	ft <sup>3</sup>		
Less than 5/8	8	50	5	1.5%	
5/8	15	50	5		
3/4	25	50	5		
1	40	100	10		
1 1/2	80	300	40		
2	120	500	40		
3	250	500	50		
4	350	1 000	100		
6	700	1 000	100		

Table 2. Tolerances for Water Meters									
Special Tests									
Meter size (inches)	Intermediate Rate				Minimum Rate				
	Rate of flow (gal/ min)	Meter indication		Tolerance on over- and under- registration	Rate of flow (gal/ min)	Meter indication		Tolerance	
		gal	ft <sup>3</sup>			gal	ft <sup>3</sup>	Under- regis- tration	Over- regis- tration
Less than or equal to 5/8	2	10	1	1.5%	1/4	5	1	5.0%	1.5%
3/4	3	10	1		1/2	5	1		
1	4	10	1		3/4	5	1		
1 1/2	8	50	5		1 1/2	10	1		
2	15	50	5		2	10	1		
3	20	50	5		4	10	1		
4	40	100	10		7	50	5		
6	60	100	10		12	50	5		

**UR. User Requirements**

**UR.1. Batching Meters Only.**

**UR.1.1. Strainer.** - A filter or strainer shall be provided if it is determined that the water contains excessive amounts of foreign material.  
**UR.1.2. Siphon Breaker.** - An automatic siphon breaker or other effective means shall be installed in the discharge piping at the

highest point of outlet, in no case below the top of the meter, to prevent siphoning of the meter and permit rapid drainage of the pipe or hose.

**UR.1.3. Provision for Testing.** - Acceptable provisions for testing shall be incorporated into all meter systems. Such provisions shall include a two-way valve, or manifold valving, and a pipe or hose installed in the discharge line accessible to the proper positioning of the test measure.

**APPENDIX 4 – NIST HANDBOOK 130 – 2003  
EDITION – UNIFORM REGULATION FOR THE  
VOLUNTARY REGISTRATION OF  
SERVICEPERSONS AND SERVICE AGENCIES  
FOR COMMERCIAL WEIGHING AND MEASURING  
DEVICES**

**Background**

The Uniform Regulation covering the registration of servicepersons and service agencies was developed and adopted by the National Conference on Weights and Measures in 1966, retitled in 1983, and substantially revised in 1984. It is designed to promote uniformity among those jurisdictions that provide for or are contemplating the establishment of some type of control over the servicing of commercial weighing and measuring devices. It offers to a serviceperson or to a service agency the opportunity to register and carries with it the privilege of restoring devices to service and of placing new or used devices in service.

Two unique features of the registration plan are its voluntary nature and the provision for reciprocity. Registration is not required; however, the privileges gained make it attractive. Also, in order to provide maximum effectiveness of the program and to reduce to a minimum legal obstacles to service across State lines, provision is made for reciprocity in certification of standards and testing equipment among States.

**Section 1. Policy**

For the benefit of the users, manufacturers, and distributors of commercial weighing and measuring devices, it shall be the policy of the Director of Weights and Measures, hereinafter referred to as "Director," to accept registration of (a) an individual and (b) an agency providing acceptable evidence that he, she, or it is fully qualified by training or experience to install, service, repair, or recondition a commercial weighing or measuring device; has a thorough working knowledge of all appropriate weights and measures laws, orders, rules, and regulations; and has possession of, or has available for use, and will use calibrated weights and measures standards

and testing equipment appropriate in design and adequate in amount. (An employee of the government shall not be eligible for registration.)

The Director will check the qualifications of each applicant. It will be necessary for an applicant to have available sufficient standards and equipment (see § 5).

It shall also be the policy of the Department to issue to qualified applicants, whose applications for registration are approved, a "Certificate of Registration." This gives authority to remove rejection seals and tags placed on Commercial and Law-Enforcement Weighing and Measuring Devices by authorized weights and measures officials, to place in service repaired devices that were rejected, or to place in service devices that have been newly installed.

The Director is NOT guaranteeing the work or fair dealing of a Registered Serviceperson or Service Agency. He will, however, remove from the registration list any Registered Serviceperson or Service Agency that performs unsatisfactory work or takes unfair advantage of a device owner.

Registration with the Director shall be on a voluntary basis. The Director shall reserve the right to limit or reject the application of any Serviceperson or Service Agency and to revoke his, her, or its permit to remove rejection seals or tags for good cause.

This policy shall in no way preclude or limit the right and privilege of any individual or agency not registered with the Director to install, service, repair, or recondition a commercial weighing or measuring device. (see § 7).

(Added 1966; Amended 1984)

## **Section 2. Definitions**

**2.1. Registered Serviceperson .** -- The term "registered serviceperson" shall be construed to mean any individual who for hire, award, commission, or any other payment of any kind, installs, services, repairs, or reconditions a commercial weighing or measuring device, and who voluntarily applies for registration with the Director of Weights and Measures.

(Added 1966)

**2.2. Registered Service Agency .** -- The term "registered service agency" shall be construed to mean any agency, firm, company, or corporation that for hire, award, commission, or any other payment of any kind installs, services, repairs, or reconditions a commercial weighing or measuring device, and that voluntarily registers itself as such with the Director of Weights and Measures. Under agency registration, identification of individual servicepersons shall be required.

(Added 1966; Amended 1984)

**2.3. Commercial and Law-Enforcement Weighing and Measuring Devices.** -- The term "Commercial and Law-Enforcement Weighing and Measuring Device" shall be construed to include any weight or measure or weighing or measuring device commercially used or employed in establishing the size, quantity, extent, area, or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure. It shall also include any accessory attached to or used in connection with a commercial weighing or measuring device when such accessory is so designed or installed that its operation affects the accuracy of the device. It also includes weighing and measuring equipment in official use for the enforcement of law or for the collection of statistical information by government agencies.

(Added 1966; Amended 1984)

### **Section 3. Registration Fee**

There shall be charged by the Director an annual fee of (\$) per Registered Serviceperson and (\$) per Registered Service Agency to cover costs at the time application for registration is made, and annually, thereafter.

(Added 1966; Amended 1984)

### **Section 4. Voluntary Registration**

An individual or agency qualified by training or experience may apply for registration to service weighing devices or measuring devices on an application form supplied by the Director. Said form, duly signed and witnessed, shall include certification by the applicant that the individual or agency is fully qualified to install, service, repair, or recondition whatever devices for the service of which competence is being registered; has in possession or available for use, and will use, all necessary testing equipment and standards; and has full knowledge of all appropriate weights and measures laws, orders, rules, and regulations. An applicant also shall submit appropriate evidence or references as to qualifications. Application for registration shall be voluntary, but the Director is authorized to reject or limit any application.

(Added 1966; Amended 1984)

### **Section 5. Minimum Equipment**

Applicants must have available sufficient standards and equipment to adequately test devices as set forth in the Notes section of each applicable code in NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." When

applicable, this equipment will meet the specifications of National Institute of Standards and Technology Handbook 105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Weights (NIST Class F)," National Institute of Standards and Technology Handbook 105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Field Standard Measuring Flask," or National Institute of Standards and Technology Handbook 105-3, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards." See also § 9.

(Added 1984)

### **Section 6. Certificate of Registration**

The Director will review and check the qualifications of each applicant. The Director shall issue to the applicant a "Certificate of Registration," including an assigned registration number if it is determined that the applicant is qualified. The "Certificate of Registration" will expire 1 year from the date of issuance.

(Added 1966; Amended 1984)

### **Section 7. Privileges and Responsibilities of a Voluntary Registrant**

A bearer of a Certificate of Registration shall have the authority to remove an official rejection tag or mark placed on a weighing or measuring device by the authority of the Director; place in service, until such time as an official examination can be made, a weighing or measuring device that has been officially rejected; and place in service, until such time as an official examination can be made, a new or used weighing or measuring device. The Registered Serviceperson or Service Agency is responsible for installing, repairing, and adjusting devices such that the devices are adjusted as closely as practicable to zero error.

(Added 1966; Amended 1984)

### **Section 8. Placed in Service Report**

The Director shall furnish each Registered Serviceperson and Registered Service Agency with a supply of report forms to be known as "Placed in Service Reports." Such a form shall be executed in triplicate, shall include the assigned registration number, and shall be signed by a Registered Serviceperson or by a serviceperson representing a Registered Agency for each rejected device restored to service and for each newly installed device placed in service. Within 24 hours after a device is restored to service or placed in service, the original of the properly executed Placed in

Service Report, together with any official rejection tag removed from the device, shall be mailed to the Director at (address). The duplicate copy of the report shall be handed to the owner or operator of the device, and the triplicate copy of the report shall be retained by the Registered Serviceperson or Registered Service Agency.

(Added 1966)

### **Section 9. Examination and Calibration or Certification of Standards and Testing Equipment**

All standards that are used for servicing and testing weights and measures devices for which competence is registered shall be submitted to the Director for examination and certification at intervals determined by the director. A Registered Serviceperson or Registered Service Agency shall not use in servicing commercial weighing or measuring devices any standards or testing equipment that have not been certified by the Director. Equipment calibrated by another State weights and measures laboratory that can show evidence of measurement traceability to the National Institute of Standards and Technology will also be recognized as equipment that is suitable for use by Registered Servicepersons or Registered Service Agencies in this State.

(Added 1966; Amended 1984 and 1999)

### **Section 10. Revocation of Certificate of Registration**

The Director is authorized to suspend or revoke a Certificate of Registration for good cause which shall include, but not be limited to: taking of unfair advantage of an owner of a device; failure to have test equipment or standards certified; failure to use adequate testing equipment; or failure to adjust Commercial or Law-Enforcement Devices to comply with Handbook 44 subsequent to service or repair.

(Added 1966; Amended 1984)

### **Section 11. Publication of Lists of Registered Servicepersons and Registered Service Agencies**

The Director shall publish, from time to time as he deems appropriate, and may supply upon request, lists of Registered Servicepersons and Registered Service Agencies.

(Added 1966)

### **Section 12. Effective Date**

This regulation shall become effective on.

(Added 1966)

## **APPENDIX 5 – DISCUSSION GUIDE**

**MAY 29, 2003**

### **DISCUSSION GUIDE**

### **ENVIRONICS PN 5365**

### **MEASUREMENT CANADA – RESIDENTIAL WATER SECTOR REVIEW**

#### **1.0 INTRODUCTION TO PROCEDURES (5 MINUTES)**

Welcome to the group. We want to hear your opinions. Not what you think other people think – but what you think!

Feel free to agree or disagree. Even if you are just one person among ten that takes a certain point of view, you could represent hundreds of thousands of people in the country who feel the same way as you do.

You don't have to direct all your comments to me; you can exchange ideas and arguments with each other too.

You are being taped and observed to help me write my report.

I may take some notes during the group to remind myself of things also.

The hostess (I) will pay you your incentives at the end of the session.

Let's go around the table so that each of you can tell us your name and a little bit about yourself, such as what you do for a living, who lives in your house and what you like to do for fun.

## **2.0 INTRO. TO MEASUREMENT CANADA AND THE CURRENT REGULATORY FRAMEWORK FOR OF METERS (15 MINUTES)**

Today we are going to be talking about issues relating to weights and measures. As far as you know, are weights and measures such as electricity, natural gas and water meters or gas pump meters etc...regulated in any way? Is there any level of government or industry that polices whether the meters and scales are sound and reliable and keep to any standards?

Who does this?

Who should be doing this? Should it be the utilities or retail outlets? Should it be the government? Some other agency?

In fact, the reliability of weights and measures is the responsibility of a federal government agency called Measurement Canada. Did anyone know this?

I am going to circulate a couple of pages that describe in greater detail how Measurement Canada works and what we are here to discuss.

### **Distribute “Backgrounder”**

I want you all to read **Point 1.0** that describes what Measurement Canada does. Were any of you aware of any of this before?

How does it make you feel to know that MC does all these things? Does this make you feel more confident in your meter and in metering in general? Or does it have no impact?

Measurement Canada is conducting what is called a **Trade Sector Review**. If you read on to **Point 2.0** it will explain this in more detail.

Does everyone understand what this Trade Sector Review is all about? Any comments/questions on it?

## **3.0 DISCUSSION OF WATER METERS (10 MINUTES)**

Now, I want to talk about water in your home and how it is measured. Let's discuss our personal experiences with regard to water and meters. Do you have a water meter? Have you always had one?

Do you scrutinise your water bill at all? How?

What about your water meter? Do you ever look at it? How does it work? Is it in your house or external? Do you ever study the readings or try to understand what they mean?

How much confidence do you have in the water meter itself? I should make it clear now that we are discussing the mechanics of the meter and not the actual water rates that are charged by your utility and which simply get multiplied against your meter reading.

Why do you trust it? Why don't you trust it?

Have you ever had a dispute about your meter? Do you know of anyone having a dispute or a malfunction with their meter? What happened?

#### **4.0 CHANGES IN WATER METERING AND SAFE GUARDING THE INTERESTS OF CONSUMERS (25 MINUTES)**

Many of you may not have been aware of whether or not Measurement Canada had a role in this area before today. If you all read **Section 3.0** in the Backgrounder it will tell you more about this.

As you can see, right now Measurement Canada really has very little if any role in regulating the accuracy of water meters. What is your reaction to that?

Does this make you have any less confidence in your water meter than you have in your gas or electricity meter?

Do you know anything about whether your water utility has any kind of a verification program for water meters?

Do you care?

Are there things that could be done to make sure that your interests as a consumer are safeguarded?

Do you feel that you, as a consumer who pays a water bill, need any safeguards from MC? In other words, what is the very least that Measurement Canada should be doing to make you continue to feel confident that your residential water usage is being accurately measured?

Should there be national standards set for water meters like there is for other kinds of meters such as electricity and gas? Or is the system fine the way it is?

What if Measurement Canada were to impose some regulation here? Would you as a consumer have anything to lose from this?

What would it mean in municipalities that currently do not verify their water meters at all?

Since there is no Measurement Canada regulation of water meters we don't really know what their accuracy rate is. There is some evidence that to the extent that they are inaccurate it may favour the consumer more than the utility. Would you still prefer that they be regulated? **NB:** If public utilities are losing money this way, it costs everyone indirectly.

If a metering device has been approved in other countries like Australia or the US, should that be considered good enough for Canada? Or, should there still be a time-consuming testing procedure in Canada as well?

Is this purely an internal technical matter that will make no difference to you as a consumer, or could this potentially have a major impact on you and the confidence you have in your water bill and in how your usage is measured?

As you may know, there are several consumers' organizations in Canada. If you knew that there would be representation from some of these organizations on the committees that would develop and set standards, how would it make you feel about this process?

**THANK YOU FOR YOUR PARTICIPATION**

## **APPENDIX 6 – BACKGROUNDER DOCUMENT USED FOR FOCUS GROUPS**

**May 2003**

### **Backgrounder Document**

#### **1. What is Measurement Canada?**

Have you ever stopped to think about why and how goods are weighed or measured before they are sold each day in Canada? Have you ever wondered about how these weights and measures are standardised and regulated?

In Canada, weights and measures are a responsibility of the federal government. Measurement Canada (MC) is a government agency that is part of Industry Canada. Its role is to ensure that a fair and accurate weights and measures system exists to protect both buyers and sellers.

- MC's mission is: *"to ensure equity and accuracy where goods and services are bought and sold on the basis of measurement, in order to contribute to a fair and competitive marketplace for Canadians."*
- MC administers and enforces the Electricity and Gas Inspection Act and the Weights and Measures Act
- There are 39 different business sectors where trade measurement is significant (examples of these are electricity, natural gas, retail food, gasoline, water, taxis etc...)
- MC periodically reviews the need for a role in each sector beyond active monitoring and solicits stakeholders' views as a key element in these decisions, particularly those of vulnerable parties.

## **2. What is a Trade Sector Review?**

---

Measurement Canada is initiating what is called a Trade Sector Review (TSR). This is a comprehensive review process to determine the most appropriate role for Measurement Canada in a particular trade sector or marketplace. MC is consulting its clients to ensure fair and efficient measurement in all trade sectors. By clients we mean stakeholders who buy and sell a given commodity. This can include: consumers, retailers, utilities etc...

Measurement Canada is responsible for measurement issues in all sectors of the Canadian marketplace. With the increase in the number of devices and the increasingly sophisticated technology used it is becoming more difficult for Measurement Canada to have an effective presence in all areas of the marketplace. For these reasons, the department would like to ensure it focuses its resources in the most important areas and identifies other suitable methods of ensuring that the goal of Measurement Equity is maintained.

There are 39 different trade sectors that have weights or measures that Measurement Canada regulates. A phased approach is being used to review Measurement Canada's role in each of these sectors. The first trade sector reviews that have been completed have included the **electricity sector**, the **natural gas sector** and the **retail food sector**, etc. Currently, sector reviews are being conducted in the **retail petroleum** (ie: gasoline, propane, diesel etc...) and **household water metering** sectors. Later on many other sectors such as mining, forestry, fishing, taxi meters etc...) will be reviewed, with targeted completion by 2013.

## **3. Evaluation of Residential Water Sector**

Measurement Canada currently has a very limited role in the regulation of water meters. For a variety of historical reasons, the Weights and Measures Act and Regulations exempts water meters from the approval and initial inspection processes. Water meters therefore are not subjected to the kind of mandatory Measurement Canada inspection requirements that electricity and natural gas meters must undergo.

For example: Presently Measurement Canada (MC) directly provides the following services with regard to **natural gas** measurement:

- Establishes measurement rules and meter requirements.
- Calibrates and certifies measurement standards and test equipment.
- Evaluates and approves new measuring apparatus.

- Initial and re-verification testing of complex meters and devices.
- Inspects meter installations.
- Investigates measurement disputes and complaints.
- Accredits meter service organizations to test and seal meters on Measurement Canada's behalf.
- Monitors and enforces compliance e.g., audits, revocation of accreditation, prosecutions.

With regard to **water meters**, Measurement Canada's only role is to occasionally investigate disputes between water utilities and their customers with respect to the accuracy of water meters.

Not all Canadian households have water meters. Some major municipalities do not bother to measure household water consumption and property tax payers simply pay a flat fee for water. Other municipalities have water meters in all households and these are used to determine water bills based on the household's water usage. A smaller percentage of municipalities use water meters for some but not all of their residential customers.

The level of regulation and quality control of water meters in Canada varies from municipality to municipality and is at the discretion of local water utilities. Some utilities have established very elaborate water meter inspection programs. Basically the water meters are tested to verify their accuracy. These programs are similar in nature to those used by Electricity and Natural Gas Utilities. Other water utilities, particularly in very small municipalities, have limited or no water meter inspection programs in place.

Some utilities have contracted out their water meter inspection programs to third party inspection organizations.

## **APPENDIX 7 – QUESTIONS USED FOR THE SURVEY**

June 9, 2003

### **Options Consommateurs**

#### **FC32 Omnibus**

#### **Measurement Canada Water Meter Trade Sector Review Questions**

74-B Do you pay a water bill in your household where your bill is at least partly determined by readings on your water meter?

01 – Yes

02 – No, have no water meter/pay a flat fee for water **SKIP TO Q. 78**

03 – No, do not pay a water bill at all **SKIP TO Q. 78**

99 – DK/NA **SKIP TO Q. 78**

#### **ASK ALL WHO ANSWER YES TO Q.74B**

75-B Are you very, somewhat, not very or not at all confident that your water meter accurately measures how much water you consume?

01 – Very confident

02 – Somewhat confident

03 – Not very confident

04 – Not at all confident

99 – DK/NA

76-B Who do you think makes sure that water meters are accurate? Is it...? **READ AND ROTATE WITH “NO ONE” ALWAYS LAST**

01 – A federal government agency

02 – Your local water utility

03 – No one at all

99 – DK/NA

77-B In fact, there are no national standards or regulations in Canada for the accuracy of water meters. Each local water utility adopts its own regulations and quality control standards. In some municipalities these regulations are very rigorous and in other municipalities there are no standards at all. Would you favour or oppose having a federal government agency like Measurement Canada start to regulate and set standards for water meters?

01 – Favour

02 – Oppose

99 – DK/NA

## **APPENDIX 8 – SURVEY FINDINGS**

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 THE FOCUS CANADA REPORT 2003-2  
 Option Consommateurs - Water Sector Review

74. Do you pay a water bill in your household where your bill is at least partly determined by readings on your water meter?

	GENDER		A G E				MARITAL STATUS			KIDS <18 AT HOME		LANGUAGE AT HOME		RELIGION		NON-BRIT IMMIGRANT			TENURE		UNION MEMBER		
	TOTAL	Male	18 to 29	30 to 44	45 to 59	60 or more	Single	Married	Separated	Yes	No	English	French	Catholic	Protestant	Ath/Ag	Eur/Ope	Oth/er	Own	Rent	Yes	Pri vate Sect	Pub lic Sect
UNWEIGHTED SAMPLE	2018	994	1024	352	565	605	455	869	1145	658	1347	1424	490	800	618	474	83	122	1328	665	372	104	246
WEIGHTED SAMPLE	2018	969	1049	395	613	514	455	903	1110	672	1335	1431	459	773	605	507	97	153	1302	694	360	100	237
Yes	36	37	35	30	38	37	36	29	41	39	34	43	12	28	44	36	44	40	45	18	38	38	38
No, have no water meter/pay a flat fee for water	20	20	19	13	19	23	22	17	22	20	19	17	31	25	15	18	14	12	22	15	24	28	24
No, do not pay a water bill at all	42	41	44	52	40	38	41	51	35	38	45	38	56	44	40	42	39	45	31	63	35	34	36
DK/NA	2	2	2	5	3	1	1	3	2	3	2	2	2	2	2	3	3	3	2	3	3	1	3

	EMPLOYMENT STATUS					OCCUPATION					HOUSEHOLD INCOME					EDUCATION							
	TOTAL	Full Time	Part Time	mak er	Un empl oyed	Home Work ing	Un. Adm. OLB	Prof. S.P. OSB	Tech. Sale Serv	Off. Semi Skil Work	Sk/ Un- less than \$20K	\$20K to \$30K	\$30K to \$40K	\$40K to \$60K	\$60K to \$80K	\$80K or More	Less than H.S.	H.S.	Coll. Voca	Some Univ	Univ Deg.		
UNWEIGHTED SAMPLE	2018	949	180	126	74	394	584	592	245	318	327	320	275	250	273	395	232	366	249	352	622	210	567
WEIGHTED SAMPLE	2018	961	175	120	77	377	600	601	246	334	317	306	262	243	263	395	243	399	221	346	617	215	602
Yes	36	36	38	36	30	32	37	42	33	38	39	25	19	30	34	35	49	47	20	31	37	36	42
No, have no water meter/pay a flat fee for water	20	21	20	19	11	23	18	20	23	17	18	20	21	18	20	23	17	20	22	21	21	15	18
No, do not pay a water bill at all	42	41	39	45	50	44	41	35	43	43	40	52	58	49	45	42	32	28	57	46	39	46	37
DK/NA	2	3	3	-	7	1	3	3	1	2	3	3	2	3	1	1	2	5	1	2	2	3	3

Should Residential Water Meter Accuracy be Regulated in Canada?

THE FOCUS CANADA REPORT 2003-2  
Option Consommateurs - Water Sector Review

74. Do you pay a water bill in your household where your bill is at least partly determined by readings on your water meter?

	REGION				SUB-REGIONS						COMMUNITY SIZE				FED. POLITICAL PREFERENCE								
	TOTAL	Atl. Prov	Que bec	Ont ario	West Can.	Tor onto	Mont real	Van cou ver	Man.	Sask erta	Alb B.C.	Que	Can. 1 excl	100K Mill +	5K 100K	Less than 5K	Lib.	P.C.	NDP	CA	Bloc Que.	Und.	
UNWEIGHTED SAMPLE	2018	256	514	565	683	182	211	95	137	117	209	220	1504	488	514	503	513	715	286	231	261	139	246
WEIGHTED SAMPLE	2018	156	487	770	605	347	211	115	75	66	200	264	1531	673	457	457	431	737	271	231	262	132	232
Yes	36	23	10	51	40	55	13	16	50	53	52	24	44	35	51	31	25	39	41	36	42	9	33
No, have no water meter/pay a flat fee for water	20	23	31	11	21	9	27	37	7	16	15	31	16	19	12	23	25	20	15	21	17	37	19
No, do not pay a water bill at all	42	52	58	36	36	33	60	40	42	32	31	40	37	43	35	43	49	39	42	42	38	53	44
DK/NA	2	1	2	2	3	3	1	8	1	-	3	5	3	3	3	2	1	2	2	2	3	1	4

75. Are you very, somewhat, not very or not at all confident that your water meter accurately measures how much water you consume?

Subsample: Those who said "yes" to Q74

	GENDER		A G E				MARITAL STATUS		KIDS <18 AT HOME		LANGUAGE AT HOME		RELIGION			NON-BRIT IMMIGRANT			TENURE		UNION MEMBER		
	TOTAL	Male	18 Fe	30 to male	45 to	60 or more	Sin gle	Mar ried	Yes	No	Eng lish	Fre nch	Cath	Prot	Ath/ Ag	Eur ope an	Oth er	Own	Rent	Yes	Pri vate	Pub lic	
UNWEIGHTED SAMPLE	689	350	339	102	203	221	150	238	451	247	439	597	52	208	262	171	36	48	562	120	138	36	92
WEIGHTED SAMPLE	720	356	363	119	232	193	163	260	460	262	455	614	53	218	266	184	43	61	585	128	137	37	90
Very confident	32	37	26	36	27	33	33	31	32	31	33	32	27	30	30	34	14	35	32	33	35	29	38
Somewhat confident	48	46	50	49	52	48	43	47	49	50	47	48	54	50	50	49	65	42	49	44	52	48	52
Not very confident	11	9	13	9	13	11	9	12	11	11	11	11	14	10	11	9	9	17	10	13	6	4	5
Not at all confident	6	6	7	4	7	5	9	7	6	6	6	7	3	6	7	7	3	5	6	7	7	13	5
DK/NA	3	2	3	2	1	3	6	4	2	1	3	3	2	3	3	2	9	1	2	3	1	5	-

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Should Residential Water Meter Accuracy be Regulated in Canada?

THE FOCUS CANADA REPORT 2003-2  
Option Consumers - Water Sector Review

75. Are you very, somewhat, not very or not at all confident that your water meter accurately measures how much water you consume?

Subsample: Those who said "yes" to Q74

	EMPLOYMENT STATUS					OCCUPATION					HOUSEHOLD INCOME					EDUCATION							
	Home Full Time	Unempl	Part Time	Retired	Other	Work ing	Prof Adm.	Tech S.P.	Off. Sale	Sk/ Semi	Un- skill	Less than \$20K	\$20K to \$30K	\$30K to \$40K	\$40K to \$60K	\$60K to \$80K	Less than \$80K	Comm Coll	Some Univ	Univ Deg.			
UNWEIGHTED SAMPLE	689	328	62	45	21	120	208	237	78	118	124	76	54	74	88	134	109	170	47	104	228	77	227
WEIGHTED SAMPLE	720	345	66	43	23	122	223	255	81	128	122	78	50	73	89	137	120	188	44	108	231	78	253
Very confident	32	35	23	23	28	32	28	37	29	27	29	25	27	26	28	29	34	40	34	30	25	35	38
Somewhat confident	48	48	59	63	57	42	50	47	53	51	50	50	45	40	40	54	52	47	39	47	52	44	48
Not very confident	11	9	9	10	-	12	13	11	11	9	8	10	13	17	18	9	9	7	13	11	13	10	9
Not at all confident	6	7	4	-	9	10	7	4	4	8	10	12	12	11	7	7	3	4	8	10	8	7	3
DK/NA	3	2	5	4	7	3	3	1	3	4	3	2	3	6	7	1	1	3	6	2	2	5	2

	REGION			SUB-REGIONS					COMMUNITY SIZE					FED. POLITICAL PREFERENCE									
	Atl. Prov	Que bec	Ont ario	West Can.	Van cou	Alb erta	Man. Sask	Can. excl B.C.	100K +	100K to 5K	5K to 100K	Less than 5K	Lib.	P.C.	NDP	CA	Bloc Que.	Und.					
UNWEIGHTED SAMPLE	689	55	50	286	298	100	27	15	72	64	108	54	639	142	263	156	128	264	108	84	107	12	78
WEIGHTED SAMPLE	720	36	49	394	240	191	27	18	38	35	103	64	671	237	231	144	108	287	111	83	111	11	78
Very confident	32	23	29	33	32	34	26	26	41	32	30	32	32	33	33	30	30	34	34	34	28	21	30
Somewhat confident	48	49	49	48	48	46	53	54	44	44	49	51	48	47	51	49	43	49	50	51	47	52	40
Not very confident	11	13	16	10	12	12	18	13	6	12	14	11	11	13	8	13	10	8	12	11	11	19	17
Not at all confident	6	11	2	7	6	6	-	-	8	9	5	4	7	5	6	6	12	6	3	4	12	8	7
DK/NA	3	4	4	3	2	2	4	7	2	3	2	2	2	2	2	2	5	3	1	-	2	-	6

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Should Residential Water Meter Accuracy be Regulated in Canada?

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Option Consumers - Water Sector Review

76. Who do you think sets regulations and standards to make sure that water meters are accurate? Is it ...

Subsample: Those who said "yes" to Q74

	GENDER			A G E				MARITAL STATUS			KIDS <18 AT HOME		LANGUAGE AT HOME		RELIGION			NON-BRIT IMMIGRANT			TENURE				UNION MEMBER	
	TOTAL	Male	Female	18-29	30-44	45-59	60 or more	Single	Married	Widowed	Yes	No	English	French	Catholic	Protestant	Ath/Ag	Eur/Ope	Oth/er	Own	Rent	Yes	No	Pri vate	Pub lic	
UNWEIGHED SAMPLE	689	350	339	102	203	221	150	238	451	247	439	597	52	208	262	171	36	48	562	120	138	36	92			
WEIGHED SAMPLE	720	356	363	119	232	193	163	260	460	262	455	614	53	218	266	184	43	61	585	128	137	37	90			
A federal government agency	26	27	25	34	21	28	25	28	25	27	25	24	38	30	24	23	23	28	25	28	22	18	23			
Your local water utility	62	62	61	58	71	58	56	55	65	62	62	62	52	58	61	69	65	59	62	62	67	66	69			
No one at all	6	6	6	7	5	7	6	8	5	7	6	6	8	6	6	3	3	7	6	6	3	5	2			
DK/NA	7	5	8	1	4	7	13	9	5	5	8	7	2	5	8	5	9	6	7	4	8	11	6			

	EMPLOYMENT STATUS				OCCUPATION							HOUSEHOLD INCOME						EDUCATION					
	Full Time	Part Time	mak er	Home empl oyed	Un empl oied	Work ing Wm.	Prof Adm. OLB	Tech S.P. OSB	Off. Sale Serv	Sk/ Semi Skil Work	Un- Less than \$20K	\$20K \$30K	\$30K \$40K	\$40K \$60K	\$60K \$80K	Less than H.S.	Comm Coll	Some Univ Deg.					
UNWEIGHED SAMPLE	689	328	62	45	21	120	208	237	78	118	124	76	54	74	88	134	109	170	47	104	228	77	227
WEIGHED SAMPLE	720	345	66	43	23	122	223	255	81	128	122	78	50	73	89	137	120	188	44	108	231	78	253
A federal government agency	26	25	26	32	34	21	25	28	27	26	23	19	27	25	19	30	25	28	21	23	29	24	25
Your local water utility	62	67	56	53	63	60	63	62	68	59	63	65	52	62	63	60	63	61	49	66	59	60	66
No one at all	6	4	10	4	-	8	5	2	4	9	9	6	8	7	5	4	7	6	6	8	8	9	1
DK/NA	7	4	8	11	3	11	7	8	1	6	5	10	13	5	12	6	5	5	24	3	4	7	7

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THE FOCUS CANADA REPORT 2003-2  
Option Consommateurs - Water Sector Review

76. Who do you think sets regulations and standards to make sure that water meters are accurate? Is it ...

Subsample: Those who said "yes" to Q74

	REGION					SUB-REGIONS					COMMUNITY SIZE					FED. POLITICAL PREFERENCE							
	Atl. Que	Ont	Man.	West Can.	Van	Man.	Sask	Alb	Alb	Man.	100K	100K	5K	Less	Lib.	P.C.	NDP	CA	Bloc	Que.	Und.		
UNWEIGHTED SAMPLE	689	55	50	286	298	100	27	15	72	64	108	54	639	142	263	156	128	264	108	84	107	12	78
WEIGHTED SAMPLE	720	36	49	394	240	191	27	18	38	35	103	64	671	237	231	144	108	287	111	83	111	11	78
A federal government agency	26	31	36	28	20	29	30	33	15	19	22	20	25	29	25	26	18	25	20	27	30	61	24
Your local water utility	62	58	54	62	63	63	58	53	74	58	64	60	62	62	64	56	64	65	63	66	54	33	60
No one at all	6	5	8	5	8	5	8	7	9	12	4	11	6	5	6	7	7	4	11	3	10	6	5
DK/NA	7	7	2	6	9	3	4	7	2	10	11	9	7	3	5	11	11	6	7	4	6	-	11

77. In fact, there are no national standards or regulations in Canada for the accuracy of water meters. Each local water utility adopts its own regulations and quality control standards. In some municipalities these regulations are very rigorous and in other municipalities there are no standards at all. Would you favour or oppose having a federal government agency like Measurement Canada start to regulate and set standards for water meters?

Subsample: Those who said "yes" to Q74

	GENDER	A G E				MARITAL STATUS	KIDS <18 AT HOME	LANGUAGE AT HOME		RELIGION	NON-BRIT IMMIGRANT			TENURE		UNION MEMBER							
		Male	Female	18 to 29	30 to 44			45 to 59	60 or more		Eng	Fre	Ath/ Eur	Oth	Ag	Open	Own	Rent	Yes	No			
UNWEIGHTED SAMPLE	689	350	339	102	203	221	150	238	451	247	439	597	52	208	262	171	36	48	562	120	138	36	92
WEIGHTED SAMPLE	720	356	363	119	232	193	163	260	460	262	455	614	53	218	266	184	43	61	585	128	137	37	90
Favour	80	79	81	81	85	79	75	77	82	85	78	80	76	79	79	84	88	94	79	84	86	93	83
Oppose	19	20	17	18	15	21	23	20	18	15	20	19	24	20	20	16	9	6	20	15	14	7	16
DK/NA	1	1	2	1	1	*	3	3	*	-	2	1	-	1	1	-	2	-	1	1	1	-	1

ENVIRONICS RESEARCH GROUP LIMITED

*Should Residential Water Meter Accuracy be Regulated in Canada?*

THE FOCUS CANADA REPORT 2003-2  
Option Consumers - Water Sector Review

77. In fact, there are no national standards or regulations in Canada for the accuracy of water meters. Each local water utility adopts its own regulations and quality control standards. In some municipalities these regulations are very rigorous and in other municipalities there are no standards at all. Would you favour or oppose having a federal government agency like Measurement Canada start to regulate and set standards for water meters?

Subsample: Those who said "yes" to Q74

	EMPLOYMENT STATUS					OCCUPATION					HOUSEHOLD INCOME					EDUCATION							
	Full Time	Part Time	Home maker	Unempl	Retired	Work ing Wm.	Prof Adm. OLB	Tech S.P. OSB	Off. Sale Serv	Skil Work	Un- Less than \$20K	\$20K to \$30K	\$30K to \$40K	\$40K to \$60K	\$60K to \$80K	Less than or More H.S.	Comm Coll	Some Voc	Univ Deg.				
	TOTAL																						
UNWEIGHED SAMPLE	689	328	62	45	21	120	208	237	78	118	124	76	54	74	88	134	109	170	47	104	228	77	227
WEIGHTED SAMPLE	720	345	66	43	23	122	223	255	81	128	122	78	50	73	89	137	120	188	44	108	231	78	253
Favour	80	81	76	80	89	81	82	84	84	76	78	77	70	78	77	86	80	82	73	73	83	76	82
Oppose	19	18	22	18	11	16	16	16	16	21	20	21	26	18	21	14	20	18	17	25	15	23	18
DK/NA	1	1	2	2	-	3	1	-	-	3	2	3	4	4	1	-	-	-	9	1	1	1	-

	REGION				SUB-REGIONS				COMMUNITY SIZE				FED. POLITICAL PREFERENCE										
	Atl. Prov	Que bec	Ont ario	West ern Can.	Tor onto	Van cou ver	Man. Sask	Alb erta	Can. excl B.C.	100K +	100K to 5K	5K to 100K	Less than 5K	Lib. P.C.	NDP	CA	Bloc Que. Und.						
	TOTAL																						
UNWEIGHED SAMPLE	689	55	50	286	298	100	27	15	72	64	108	54	639	142	263	156	128	264	108	84	107	12	78
WEIGHTED SAMPLE	720	36	49	394	240	191	27	18	38	35	103	64	671	237	231	144	108	287	111	83	111	11	78
Favour	80	81	74	84	75	85	92	87	80	72	76	71	81	86	83	73	72	83	76	81	77	59	80
Oppose	19	19	26	15	23	14	8	7	20	28	21	27	18	13	16	27	26	16	23	17	22	41	14
DK/NA	1	-	-	1	2	1	-	7	-	-	4	2	1	1	1	1	2	*	1	1	1	-	6

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