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Measurement Canada's Assessment and Intervention Strategy For Canada's Marketplace

September 1999

Fair Measure
For All



La mesure juste
pour tous

Canada

Introduction

In May of 1997, Measurement Canada's Senior Management Committee tasked the Business Scope Team with the responsibility of developing a plan that will provide a strategy for Measurement Canada to negotiate levels of intervention with all stakeholders by 2011.

The Business Scope Team defined and standardized input criteria for use with the Marketplace Intervention Model, a mechanism devised for trade sector scoring and analysis. The result was the creation of the Trade Sector Review. These stand alone documents are used to assess and score each of Canada's trade sectors with respect to their economic significance, dependant party vulnerability and metrological practices to provide an industry overview for Measurement Canada to initiate its intervention negotiations. Although no direct correlation between sector score and intervention level exists, scores will be used as a determining factor for negotiation priority and may be used as a bench mark for future trade sector analysis. This report illustrates the development and use of Trade Sector Reviews, provides recommendations and action required to help Measurement Canada pursue its strategic direction. Key recommendations are:

- that intervention levels be negotiated in consultation with all sector stakeholders as no direct correlation between sector score and intervention level exists;
- that review periods for sector analysis be negotiated at the same time as intervention levels are negotiated;
- that any decisions made in regards to intervention levels are not a departure from internationally accepted standards so as not to impact Canada's overall reputation in the field of Legal Metrology;
- that Measurement Canada develop and promote incentives for the creation of a network of alternate service delivery partnerships for all trade sectors;
- that Measurement Canada institute a national compliance sampling program that monitors all trade sectors for future sector analysis and negotiations;
- that negotiations begin with the electricity and downstream petroleum sectors in the 1999/2000 fiscal year.

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D - Statistics Canada Report - "Statistical Information for the Intervention Model"

1. Background

Measurement Canada'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".

To fulfill this mission, Measurement Canada has been mandated to administer and enforce both the Electricity and Gas Inspection Act and Regulations and the Weights and Measures Act and Regulations which allows for the consistent application of trade measurement rules within the Canadian marketplace.

Measurement Canada has also adopted a strategic direction that ensures its continued involvement in the: establishment of rules and requirements for trade metrology; resolution of complaints and disputes; monitoring of the marketplace; and, where necessary, taking action to ensure appropriate levels of compliance. Measurement Canada will endeavor to use alternate service delivery mechanisms for device approvals, device inspections, installation inspections and standards calibration and intends to implement all initiatives by the year 2011.

Measurement Canada's Senior Management also recognized a need to focus its limited resources on those areas where return to the Canadian taxpayer is greatest. To do this, a method needed to be established 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".

As a first step, a Marketplace Intervention Model was developed with the assistance of the consulting group KPMG. The purpose of the model was for use in the assessment of Canada's trade sectors where measurement occurs. The Marketplace Intervention Model provides a method and criteria to score economic sectors, where goods and services are traded on the basis of measurement.

Once the model was developed, Measurement Canada's Senior Management Committee established the Business Scope Team and mandated the Team with assessing all Canadian trade sectors using the model. The team was also tasked with the responsibility of developing a plan that will provide a strategy for Measurement Canada to negotiate its intervention level with stakeholders by the year 2011, more specifically:

- to identify and define economic sectors where the trade of goods and services on the basis of measurement is significant;
- to score and rank the sectors using the Marketplace Intervention Model;
- to investigate and report on the trade sectors, existing metrological controls and, where possible, identify alternate service delivery mechanisms;
- to identify the major stakeholders, including vulnerable parties; and
- to provide a report, an action plan and milestones for implementation of recommendations contained in this report.

2. Scope of Report

The overall objective of the Business Scope Team was to develop mechanisms that enable Measurement Canada to negotiate intervention levels with the trade sectors while remaining cognizant of the needs of all stakeholders. The challenge, however, was to standardize the data gathering process for input into the Marketplace Intervention Model so that all sectors would be assessed in a consistent manner now and in the future. Measurement Canada's Senior Management Committee narrowed the scope of the project to sectors scoring 351 - 500 (high) and 251 to 350 (medium). These sectors will receive complete assessments by September 30th 1999. The remaining trade sectors will be assessed once the negotiation process has been tested and recommendations for improvement of trade sector assessments can be implemented.

This report includes:

- the scope of application of the Electricity and Gas Inspection Act and the Weights and Measures Act;
- the use of the Marketplace Intervention Model to develop the Trade Sector Reviews;
- information sources;
- development of Trade Sector Reviews;
- trade sector scores;
- intervention levels;
- recommendations;
- action plan to implement recommendations.

3. Scope of Application of the Electricity and Gas Inspection Act and the Weights and Measures Act.

The following is based on interpretations and legal opinions provided by the Legal Services Division of Industry Canada.

- References:
- Devices Used by Provincial Governments to Determine Whether Vehicles are Within Legal Limits of Weights - Collection of Fines (A. Rosenzveig, November 23, 1978)
 - Axle Weighing Services (Ann Sunahara, April 21, 1995)
 - Fee for Using Truck Axle Weighing Scales (A. Rosenzveig, June 4, 1980)
 - Dockage Scales (A. Rosenzveig, June 5, 1980)
 - Thermal Energy Metering Systems (Dave Farrel, April 25, 1994)
 - Weight Watchers (Daniel Gervais, March 17, 1997)
 - Correspondence from Daniel Gervais - 1997-1998
 - Weights and Measures Definition of Trade - Legal Interpretations on Specific Cases (Katia Bustros, May 28, 1999)

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The *Weights and Measures Act* and the *Electricity and Gas Inspection Act* contain provisions that pertain to weighing and measuring devices used in trade and to the net quantity determination and appropriate labeling of goods and services traded on the basis of measurement.

The *Electricity and Gas Act* states that any meter, which includes any apparatus used for the purpose of making measurement of, or obtaining the basis for a charge for electricity or gas supplied to a customer must be approved, inspected and sealed. The *Electricity and Gas Act* applies broadly to any type of measuring apparatus and accessories used for the selling, purchasing and the determination of fees for transportation, gas energy or BTU content or for the measurement of any other factors used to determine charges.

The *Weights and Measures Act* contains definitions for both "trade" and "device" that affect the scope of its application. It is essential that those involved in the negotiation of intervention levels have a clear understanding of the extent of application of the Act and what "trade measurement" is.

In consultation with Measurement Canada's legal advisors, it has been established that measurements used for the purpose of enforcing legislation, collecting fines or excise taxes do not constitute trade. Examples of these activities are: the weighing of vehicles by provincial authorities to determine whether they are within legal weight limits; the use of radar to determine fines for speeding; and the collection of excise taxes for alcohol. Measuring instruments used for these purposes are not required to be approved or inspected.

It has been determined that the practice of providing facilities, for a fee, for measurement purposes is trade. For instance, the practice of charging truck drivers for the service of providing axle weights by means of a vehicle scale is considered trade.

It has been determined that, for a given transaction, any measurement that is the basis for the direct determination of final quantity or the price to pay for a given commodity or service is trade measurement. For a given transaction, any measurement error would directly affect the final quantity of the commodity, or service delivered or received, or the total price paid or charged for it. The following applications are considered trade measurement:

- the determination of the quantity of certain elements or ingredients in a given commodity or load which would form the basis for establishing the total price or the final quantity. Specific examples of these are: the measurement of "dockage" in grains or crops, the measurement of the moisture content in woodchips; the measurement of the butterfat content or protein content in the raw milk picked up at the farms.
- the grading of commodities by measurement which would form the basis for establishing the unit price to pay for the commodity. For instance, the grading of eggs on the basis of their weight (small, medium, large, extra-large, jumbo); and the grading of poultry based on weight ranges which determine the unit price.
- the individual measurement of components that compose a product, the results of which are used for the determination of the final quantity. Examples of these are the individual weighing of cement powder, stone, sand and water for the batching of concrete (ready-mix) according to a recipe. The recipe and weighing results are not only used to batch for a given strength but also directly in the determination of the final quantity and price. A similar example exists in the livestock industry where different ingredients are blended on the basis of weight for the purpose of formulating different feeds subject to different prices. These two examples pre-suppose that the final blend or mix is not re-weighed or re-measured before being delivered.

The following is not trade measurement:

- the individual measurement of the ingredients of a product to ensure constant characteristics or quality. For instance, the measurement of the ingredients that compose ice cream, cakes or bread. In this case, the measurement of the individual ingredients is used to ensure consistency of the products. A measurement error would only impact on the quality of the product and not on the quantity delivered or total price for a specific purchase.

The definition of "measuring machine" provided in the Weights and Measures Act is also restrictive in scope. A measuring machine is defined as a machine that measures length, area, volume, capacity, temperature or time. It has been established that measuring instruments that are used in trade for the determination of these dimensions or conditions require approval and inspection, unless exempted by regulations. However, measuring instruments used in trade for the determination of other phenomenon or factors such as protein content are not "measuring machines" as per the definition and consequently are not required to be approved and inspected.

It has also been established that "laboratory" as referred to in the Weights and Measures Regulations is an institution or a specific location where scientific activities or studies are conducted. Measurement activities and devices used for trade measurement in the premises of a commercial establishment are subject to the application of the Act whether or not these trade measurement activities are performed in a designated room identified as a "laboratory".

Section 9 of the Weights and Measures Act prescribes that no trader shall sell a commodity unless the quantity is stated accurately within prescribed limits of error and in the manner prescribed. The requirement does not apply when a commodity has been packaged as required or authorized by or under any other Act of Parliament. For the purpose of negotiating the levels of intervention with the trade sectors, it must be taken into consideration that the Weights and Measures Act does not apply to food and non-food products that are packaged for consumers neither does it apply to feeds, seeds, fertilizers or pest control products that are packaged under the Feeds, Seed, Fertilizers or Pest Control Product Act. Therefore it is recommended that other provincial or federal organizations such as the Canadian Food Inspection Agency or Agriculture Canada be a party to the negotiation process for sectors they regulate.

4. Marketplace Intervention Model

Measurement Canada, in conjunction with the consulting group KPMG, developed the Marketplace intervention Model (see **Appendix C - "Recommended Structure For A Marketplace Intervention Model For Trade Measurement."**) This model was developed with the idea of creating a screening tool for use by Measurement Canada in the analysis of trade measurement dependant sectors within the Canadian marketplace. More specifically, the purpose of the model was to provide a mechanism to;

- screen trade-measurement dependent sectors in a consistent manner;
- rank them on a basis of apparent need for regulatory intervention;
- assess the existing degree of metrological control within each trade sector; and
- determine the most appropriate level of intervention by Measurement Canada in each sector of the economy.

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The structure of the model allows for the screening of trade-measurement dependent sectors by applying a scoring system to six specific questions/indicators addressing the following areas:

- 1) reliance on trade measurement;
- 2) economic significance of the sector;
- 3) economic risk to the vulnerable party;
- 4) dependancy of vulnerable party on counter party to provide accurate measure;
- 5) compliance of trade devices in the sector; and
- 6) consistency and conformance of these devices with established standards.

Scores from the six indicators are totalized and listed as the overall trade sector score. The maximum attainable score is 500 points. Sub-section 7 (e) "Sector Rating Guide" of the Trade Sector Review provides an in depth explanation of the scoring criteria.

Originally, the Business Scope Team set out to establish a link between the actual sector score and the level of intervention required as recommended by the Model. This was not possible due to the diversity of the trade sectors and their individual need for intervention. Although it was agreed that sector scores are a prime indication of sector importance, the Business Scope Team found that scores do not necessarily establish the need for intervention. For example, a sector may score high because of the value and nature of the products measured and other factors, but, nevertheless, require a minimum level of intervention due to its capability to self-regulate its metrological activities and the stakeholders' perceived confidence. On the other hand, a sector which scores low may require a higher level of intervention as the sector may not present the same potential for self-regulation of its metrological activities, and stakeholders may feel strongly about the need for direct intervention. Ultimately, Measurement Canada's level of intervention within the trade sectors will have to be established in consultation with interested parties and sector scores should be used primarily for prioritizing negotiations.

The model was found to be extremely useful in addressing the degree of metrological control that exists within the trade sectors. This narrative is integrated into section 7 (f) of the Trade Sector Review and provides an overview of the sectors measurement practices/controls and lists potential alternate service delivery mechanisms.

5. Information Sources

The trade sectors were identified and defined using Statistics Canada, Standard Industrial Classification 1980 (SIC) as recommended in the Marketplace Intervention Model. Statistics Canada was the main source of data used to assess and score individual trade sectors on the basis of the six Marketplace Intervention Model indicators. Information from other sources, including sector publications and direct consultation with sector associations, other government departments or agencies involved in the specific sectors, was also used to complement/verify existing Statistics Canada data.

The report "*Statistical Information for the Intervention Model*" prepared by Statistics Canada, which can be found in **Appendix D**, provides an in depth explanation of the data and its intended use for the assessment of certain indicators. It should be noted that Statistics Canada has adopted a new classification system for Canada's trade sectors. The North American Industry Classification System will replace the current classification system. It is recommended that Measurement Canada follow Statistics Canada and revise trade sector codes during the next round of trade sector assessments.

6. Explanation of Trade Sector Combinations

From Statistics Canada Standard Industrial Classification codes, preliminary assessments indicated that there were over 150 trade sectors that used significant amounts of trade metrology for the trade of goods and services in Canada. The Business Scope Team combined many of the sectors to eventually arrive at a total of 39 sectors. The rationale for combining sectors was based on the following criteria:

1) Common stakeholders; for instance metal mines and non metal mines present similar characteristics and in many cases share the same sellers and buyers. Therefore, it is conceivable to merge these two sectors; and

2) No additional measurement takes place; for instance, pre-packed food products are measured at the manufacturing level and then wholesaled through a distribution system without being re-measured. The Food Manufacturing sector and the Food Wholesale Sector can be combined taking care not to inflate the value of the traded products by counting them at each level.

In many instances, when combining sectors, a separate rating guide was completed for each sector within the combined sector. This is due in part to the individual sectors' economic significance and the need for distinct sector evaluations so as not to distort the combined sector score. In cases where multiple sectors are grouped, a weighting system was implemented to take this into account. The formula and a detailed description of this process are illustrated in subsection 7 (b) "Sector Score" of the Trade Sector Review.

7. Trade Sector Review

A Trade Sector Review is a Measurement Canada report for an individual or combined trade sector. The reports include: a description of the sector, the sector's score, a rating guide for the sector, an assessment of metrological control within the sector, possible alternate service delivery options, suggested negotiation methodology, a list of stakeholders / vulnerable parties and supporting documentation. Each individual report was designed to be used as a stand alone reference that provides the negotiating teams with information for a specific or combined trade sector to initiate the negotiation of Measurement Canada's intervention levels. It is recommended that a Trade Sector Review be used by the Measurement Canada negotiating team for reference when reading this section.

The following subsections provide a description summarizing what can be found in each section of the Trade Sector Reviews. Where applicable, the rationale and approach for data gathering to maintain consistency in trade sector assessment is also provided.

a) Title and Sector Description (Standard Industrial Classification Codes)

For single sectors, the title is as defined by the Statistics Canada "Standard Industrial Classification Codes" (SIC). In the case of combined sectors the title best reflects the overall areas of trade. This may already be defined by Statistics Canada or it may be names assigned by the Business Scope Team to represent a combined sector. For example, the Canadian Grain and Field Crop Industries represents the Grain Elevators, Field Crop Producers, Seed and Feed sectors and is considered a combined sector. This sector was not listed under Statistics Canada data but was a logical combination due to its common stakeholders. In cases where a sector is combined, the SIC codes for each are further defined.

SIC codes are 3 or 4 digit combinations that Statistics Canada uses to represent a particular trade sector. Three digit codes represent multiple trade sectors or major trade sectors under which a logical progression of smaller similar trade sectors exist. These smaller more distinct trade sectors are given a 4 digit code.

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All statistical data pertaining to a trade sector is referenced using the applicable SIC code that has been assigned to the particular sector.

b) Sector Score

This is the overall score for the Trade Sector Review as derived from the Sector Rating Guide. In the case of combined sectors, this score is weighted on the basis of each individual sectors economic significance (criteria number 1) as per the following example.

The Grain and Field Crop Industry sector is composed of 4 individually scored sub-sectors:

Sub-sectors	Scores	Gross Annual Revenues (billion \$\$)
Grain Elevator Sector	410	15.017
Field Crop Farms	390	10.468
Feed Industry	260	3.9
Seed Industry	280	<u>1.244</u>
Total Annual Gross Revenue		30.629

Overall rating of the sector =

$$\frac{(15.017/30.629)410}{379 \text{ rounded to } 380} + \frac{(10.468/30.629)390}{379} + \frac{(3.9/30.629)260}{379} + \frac{(1.244/30.629)280}{379} =$$

Using a weighting system for combined sectors provides a more accurate reflection of the actual combined sector score. Since the gross annual revenue provided a constant for comparison of the individual trade sectors, it was selected as the key criteria in establishing the combined sector score. It was also the consensus of the Business Scope Leadership Team that providing a separate rating for each sub-sector within a combined sector could prove useful in the negotiation process. However, it must be stressed that the sector score is not indicative of the level of intervention required, but should be taken into consideration when prioritizing the order of negotiations and used as a bench mark for future trade sector analysis.

c) Sector Summary

The sector summary provides a brief overview of the economic importance of the sector, identifies stakeholders and vulnerable parties and it provides a short description of the nature of trade taking place in the sector.

d) Business Practices

The business practices section of the Trade Sector Review is meant to provide insight into the trade sector's manner of conducting business, types of devices used for trade - tools presently in place, trends in the industry, stakeholders and vulnerable parties. This section is especially useful for combined sectors, where differences between the sub-sectors of a combined sector are explained.

e) Sector Rating Guide

The Sector Rating Guide is the tool used to capture data required for scoring the trade sectors. It lists both the score and the rationale for scoring each of the six indicators outlined within the Marketplace Intervention Model. A table format is used as this ensures pertinent data is captured in the appropriate place and reflects each indicators' overall score.

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The following provides an explanation of scoring criteria for each of the six indicators used in the Sector Rating Guide:

Indicator number 1 - "Reliance on Trade Measurement for the Basis of Commercial Transactions"

This indicator takes into account the percentage, in terms of dollar value, of goods and services traded on the basis of measurement compared to the total production within a sector. Ratings for this indicator are based on the percentage of sector sales or purchases that are made on the basis of measurement. This indicator was scored based on knowledge of the team members and information provided by the sector.

Rating methodology: A rating out of five was assigned to the sector based on the following scale:

- | | | |
|----|----|---|
| 1. | -- | 20% or less of sector sales or purchases. |
| 2. | -- | 21 - 40% |
| 3. | -- | 41 - 60% |
| 4. | -- | 61 - 80% |
| 5. | -- | 81 - 100% |

A weighting of 20 points was applied to this indicator.

Indicator number 2 - "Economic Significance of the Sector in the Canadian Economy"

This indicator reflects the relative size of the sector in the Canadian economy, based on the value of annual sales revenues. The data source was the "Annual Revenues and Number of Firms in Canada and Five Regions for Selected Industries in 1995" Statistics Canada report. The year 1995 was chosen because it was the last year for which Statistics Canada had complete records for all sectors. When determining gross annual revenue, it is imperative to ensure that only one production and sales cycle is included. By considering only one cycle, double counting was avoided.

Rating Methodology: A rating out of five was assigned to the sector based on the following scale:

- | | | |
|----|----|-------------------------------------|
| 1. | -- | \$1 billion or less in annual sales |
| 2. | -- | \$1 - 5 billion |
| 3. | -- | \$5 - 10 billion |
| 4. | -- | \$10 - 15 billion |
| 5. | -- | More than \$15 billion. |

A weighting of 20 points was applied to this indicator.

Indicator number 3 - "Potential Economic Risk to the Vulnerable Parties in Trade Transactions in the Sector"

This indicator focuses on the potential economic risk of a sector's trade transactions on their vulnerable parties. It assesses the impact of erroneous measurement on the vulnerable parties and indicates the significance of these transactions. The proposed method for measuring potential economic risk is to compare the relative significance of the value of measured product purchased from the sector under analysis to the at-risk business entities or households (vulnerable parties) total expenditures. In other terms, the total value of goods purchased from sector under analysis divided by the total expenditures of the vulnerable party.

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At the manufacturing level, Statistics Canada "Input - Output - Final Demand matrices were used for selected products and industries as they enabled the identification of producers and clients and facilitated the determination of the total dollar value spent by a vulnerable party. These matrices were not used for the wholesale and retail level of trade for the differentiation between affected parties was not possible. At the retail level, for commodities purchased by consumers, data from Statistics Canada Family Expenditures (FAMEX) was used. A comparison was made of family average expenses on a given commodity or service relative to the total available net revenues.

It was determined that the model did not take into account multiple vulnerable parties with different levels of risks. In order to score the overall level of risk in the case of multiple vulnerable parties, the Business Scope Team developed a process that takes into account the number of vulnerable parties, their different level of risk and their economic significance. See **Appendix B** for the rationale on determining the degree of vulnerability of dependant parties.

Rating methodology: Whether there is a single or multiple vulnerable parties the following rating scale was applied

1.	-	10% or less of the vulnerable parties' transactions are in the sector (e.g., less than 10% of the total expenditures by buyers are accounted for by transactions in this sector).
2.	-	11 - 20%
3.	-	21 - 30%
4.	-	31 - 40%
5.	-	Greater than 40%.

Note that the point total was rounded to the nearest 0.5 in the case of multiple vulnerable parties.

A weighting of 20 points was applied to this indicator.

Indicator number 4 - "Dependency of the Vulnerable Party on the Counter Party to Ensure Accurate Measurement".

This indicator addresses the balance of power between vendors and customers, in terms of their respective abilities to verify the accuracy of the measurement devices used to calculate product values. This ability depends on such factors as:

- Whether the product or service in question can actually be re-measured.
- The vulnerable party's knowledge and sophistication regarding trade measurement.
- Whether they have access to alternative sources to verify the measurement in question (e.g., do they have access to accurate scales of their own, or an independent third party, to weigh a product and possess the knowledge to interpret the resulting measurement information).
- Their relative bargaining or negotiating power in the purchase process.

In some sectors, both vendors and customers have relatively equal levels of measurement knowledge and technical expertise (typically in industry sectors characterized by small numbers of large buyers and sellers). In other sectors, however, there is more likely to be a mismatch between the parties to measurement transactions with the vulnerable party being dependent on the counter-party to ensure the accuracy of trade measurements.

Rating methodology: Dependency is multidimensional in nature and, as such, cannot be readily measured using published statistical data. The Marketplace Intervention Model recommends using a series of screening questions measuring different determinants of dependency and assigning the overall sector rating based on the

answer patterns.

The screening questions are as follows:

- 4.1 Are the vulnerable parties dependent on three or less counter-parties, within a typical geographic region?
- 4.2 Do the vulnerable parties face high switching costs if they change their business to another supplier, relative to the typical value of transactions? For example, would a switch require additional capital or operating costs; mean a significant disruption to their operations; a need to retrain people; a need to change production operations or materials handling systems; and so on.
- [If the vulnerable party is not able to switch (i.e., where there is only one counter-party) this question would automatically be given 5 points.]
- 4.3 Do the vulnerable parties have only limited knowledge and capabilities to verify the accuracy of the products/services that are exchanged, either using their own resources or a third-party source of assistance (other than Measurement Canada)?
- 4.4 Is there evidence that measurement accuracy is a significant concern to vulnerable parties in this sector?

Each question was answered based on Measurement Canada's knowledge of the trade sector using the following answer categories and points:

Answer categories	Points per question
Yes, with an impact across <u>all</u> customer (or supplier) segments	5
Yes, but concentrated in <u>some</u> major customer (or supplier) segments only, or geographic region	3
No, or only in a limited number of instances	1

The total number of points from all four questions would be divided by four to arrive at a score, ranging from 1 to 5. In cases where multiple vulnerable parties exist, each vulnerable party must be examined independently and the overall rating would be the average of all the vulnerable party's scores. Scores are rounded to the nearest 0.5.

A weighting of 20 points was applied to this indicator.

Indicator number 5 - "Compliance Rates"

This indicator assesses the compliance rate for devices and commodities in the trade sector under analysis. The Business Scope Team used the Measurement Canada Information System (STARS), Inspection Type 3, Compliance Rate by Establishment Type, Report # 9, from April 1990 to March 1992 for devices subject to Weights and Measures requirements. This specific period was selected as it was determined to be the last period in which full trade sector device inspection coverage was attained. For commodity inspections covered by the Weights and Measures Act, data obtained from STARS Establishment Type Compliance, Report #10 for the period 1991/04/01 to 1998/09/30 was used.

Compliance Rates for meters regulated by the Electricity and Gas Inspection Act were derived through

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Measurement Canada regional surveys. For the balance of devices where no compliance information exists, a score of "5" was assigned.

Rating methodology: Sector ratings were assigned according to the following scale:

1. — 90% or better compliance rate of measurement devices or commodities over the previous two years.
2. — From 80% up to 90%
3. — From 70% up to 80%
4. — From 60% up to 70%
5. — Less than 60% or the compliance rate is unknown or there are no applicable compliance requirements.

A weighting of 10 points was applied to this indicator.

Indicator number 6 - "Measurement Consistency and Device Conformance with Established Standards"

This indicator focuses on the extent to which devices in use conform to recognized standards for device design and performance. The standards in question may be those developed by Measurement Canada or by other recognized authorities in Canada or internationally.

Rating methodology: This indicator was scored based on Measurement Canada's knowledge of each sector and information provided by the sector.

Sector ratings were assigned according to the following scale:

1. — Overwhelming majority – 75% or more – of devices in use conform with Canadian metrology standards.
2. — Overwhelming majority – 75% or more – of devices in use conform with metrology-related standards from other jurisdictions (e.g., international, U.S., Europe, provincial, municipal).
3. — Overwhelming majority – 75% or more – of devices in use conform with standards developed and maintained by industry groups. (For example, American Water Works Association (AWWA) for water meters.)
4. — Combination of industry-agreed standards and approved devices in use by some companies, and company-specific measurement approaches and methods that may not be consistent across the sector.
5. — No formally recognized metrology-related standards for the overwhelming majority - - 75% or more – of devices in use (i.e., reliant on company-specific measurement approaches and methods).

A weighting of 10 points was applied to this indicator.

f) Assessment of the Existing Degree of Metrological Control

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This section provides a negotiating team with an overview of what is presently happening within the sector in regards to Measurement Canada's lines of business. The section is structured in a question and answer format to assess the sector's degree of metrological control with respect to the establishment and adherence to rules for: the traceability of standards, device approval, net quantity verification, device inspection programs, dispute/complaint resolution mechanisms and potential for alternate service delivery. Much of this data was derived from the knowledge of Measurement Canada personnel or input from the trade sector under review.

g) Final Considerations

The Final Considerations section of the Trade Sector Review provides the reader with highlights of variations that exist within the trade sector. It outlines the presence of Alternate Service Delivery options that may exist and portrays Measurement Canada's present involvement within the sector. This section also provides a Suggested Negotiation Methodology, which is intended to assist the negotiating team with recommendations to facilitate the negotiation process. This information was derived through research of the trade sector by the Business Scope Team and through Measurement Canada's knowledge of the sector.

h) Stakeholder Contacts

This is a listing of stakeholders that were deemed to be conducting business, receiving services or had a vested interest in the trade sector. This list includes: sector companies, associations, vulnerable parties, government, and provides, where possible, an address, phone number and contact person.

i) Information Sources

This section lists supporting documentation for the development of the Trade Sector Review.

8) Trade Sector Scores

The following table summarizes the score and rank for the 39 trade sectors evaluated against the Marketplace Intervention Model criteria.

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LISTING OF TRADE SECTORS AND RANKING

High 351 to 500

Canadian Fishing and Fish Products Industries	390
Canadian Logging, Forest and Forest Product Industries	380
Canadian Grain and Field Crop Industry	380
Canadian Upstream Petroleum Industry	375
Canadian Mining and Metals Industry	360
Canadian Downstream Petroleum Industry	360
Canadian Agricultural Livestock Industry	360

Medium 251 to 350

Canadian Electricity Industry	350
Food and Beverage Manufacturing	350
Chemical Products Industry	340
Natural Gas Distribution	330
Canadian Textile Industries	330
Canadian Steam and Hot Water Industry	310
Canadian Fur and Skin Industry	305
Canadian Telecommunication Industry	300
Canadian Dairy Farms / Dairy Products Industry	300
Canadian Water Utilities Industry	300
Canadian Retail Gasoline Sector	300
Canadian Fruit and Vegetable Industry	280
Canadian Metal Scrap Industry	280
Canadian Retail Food Industry	280
Canadian Transportation Industry	270
Canadian Waste Collection and Disposal Industry	270
Canadian Taxicab Industry	270
Parking Lots and Parking Garage Sector	260
Canadian Tobacco Industry	255

Low 250 or less (Preliminary scores)

Quarries and Sand Pits	250
Non-Metallic Minerals (Cement, Hydraulic Cement, Refractories)	250
Trade Contractor (Water Well Drilling)	250
Honey and other Apiary	250
Alcoholic Beverages (Beer, Wine, Distillers)	250
Car and Truck Leasing	220
Precious Metals and Stones (Manufacturing, Wholesaling and Retailing)	220
Pieces Goods (Wholesale and Retail)	220
Laundries and Cleaners	210
General Merchandises (Wholesale)	190
Rubber Products (Manufacturing)	180
Vending Machines	180
Hardware Stores - Retail	160

Note: the table of contents of [Appendix A](#) provides a comprehensive list of the content of each trade sector and the name of authors.

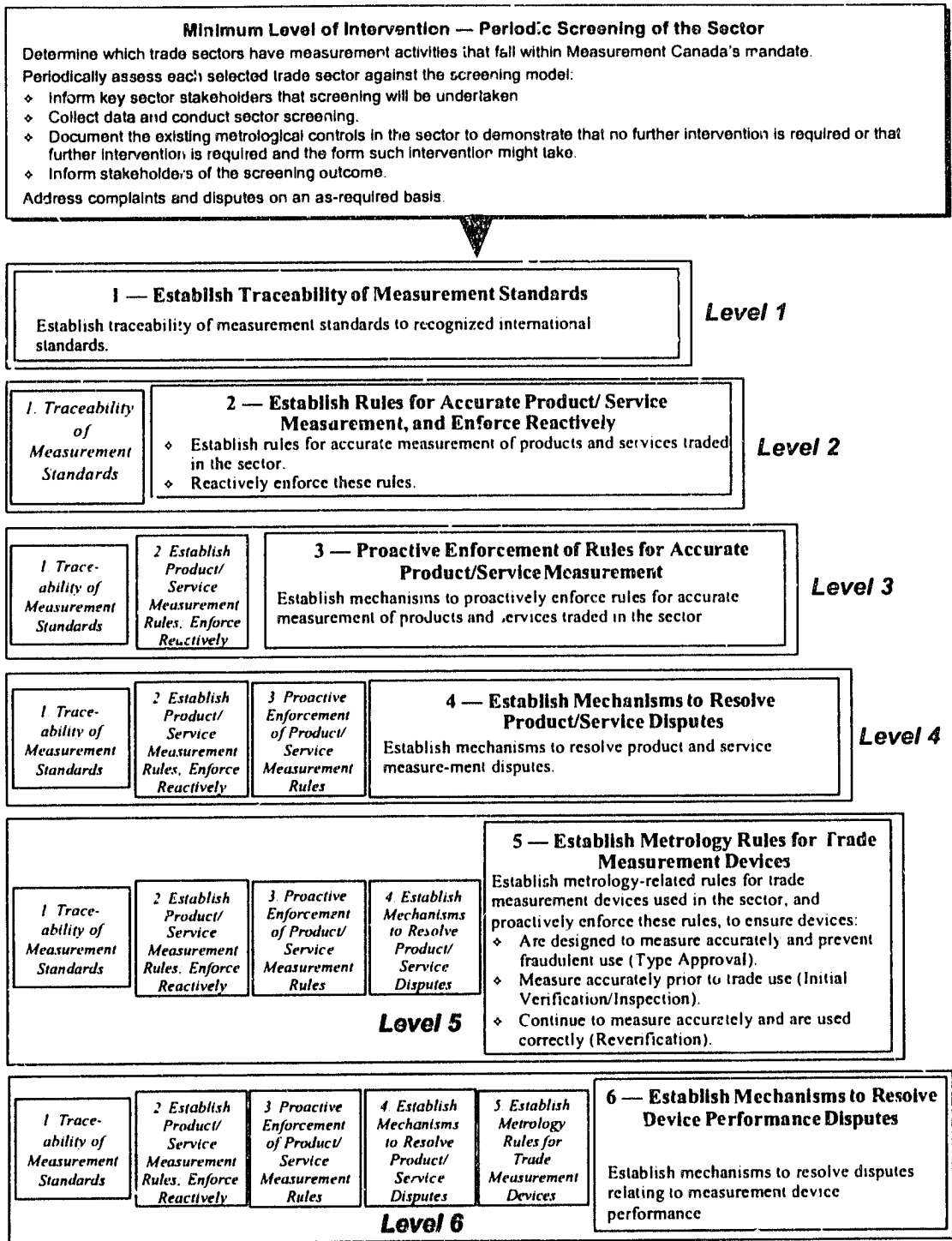
9. Intervention Levels

The Marketplace Intervention Model outlines six cumulative levels of intervention. The levels of intervention are presented in order of the amount of direct intervention that may be needed to ensure fair trade measurement. A key characteristic of the approach is the cumulative nature of the intervention levels, whereby more fundamental requirements for accurate and reliable trade measurement are addressed first. For instance, if trade measurement is important in a sector, as a minimum, it is necessary that the measurement standards in use be traceable to a recognized Canadian or international standard. Thereafter, depending on the characteristics of trade measurement used in that sector and the expressed needs of sector stakeholders, it may be necessary to ensure that either some or all of the following types of intervention are applied:

- Rules for fair product/service measurement are in place and are enforced, either reactively or proactively.
- Rules for device performance are in place and are enforced, either reactively or proactively
- Redress mechanisms are established and enforced.

It must be stressed that there is no readily apparent link between overall sector score and the level of intervention required. The six levels of intervention, although presented as cumulative, are a menu from which to pick and chose to accommodate for the characteristic and needs of sectors. Ultimately, Measurement Canada's level of intervention within the trade sectors must be negotiated with all affected stakeholders. It is recommended that all intervention negotiations commence at the highest level of intervention (level six).

The following exhibit illustrates the six levels of intervention and their cumulative nature.



10. Recommendations

The Business Scope Team developed the following list of recommendations that are intended to address several key areas of importance to facilitate the implementation of Measurement Canada's overall Strategic Direction and improve the overall process of trade sector analysis. Many of the recommendations were developed on the basis of the Team's personal knowledge gained through the research of information on trade sectors and the application of the Marketplace Intervention Model. These recommendations address the following areas of concern:

a) Negotiating Intervention Levels

It is recommended that intervention levels be negotiated with representation from all affected parties, within the trade sector, including vulnerable parties. As a starting point, it is recommended that the negotiations begin at the highest degree of metrological control (Level 6) and final levels would eventually be determined by the needs of the stakeholders through negotiation.

The Business Scope Team found that the scores do not necessarily establish the need for intervention and was unable to establish a direct correlation between sector scores and levels of intervention. For instance, a sector may score high because of the high value and nature of the products being measured and other factors but, nevertheless, the sector would require a minimum level of intervention since it presents potential for the establishment of self-regulatory metrological programs and because of actual stakeholders' perceived confidence in equity. On the other hand, the stakeholders of a sector that scored low may require a higher level of intervention for the opposite reasons. It was felt that if a pre-determined intervention level was assigned to a particular trade sector, it would invalidate the stakeholders' input and may jeopardize Measurement Canada's credibility.

b) Priority for 1999/2000 and Beyond

Year 1999 / 2000

It is recommended that Measurement Canada initiate negotiations with the Electricity sector and the Downstream Petroleum sector in the 1999 - 2000 fiscal year. It is recommended to begin with a limited number of sectors (pilot) to gain experience in the process of negotiating levels of intervention and implementing alternate service delivery mechanisms.

The choice of these two sectors present some advantages:

- these sectors are particularly well known by Measurement Canada staff;
- these sectors are aware of Measurement Canada's strategic direction;
- these sectors present good potential for rapid implementation of alternate service delivery mechanisms. An accreditation program for the verification and re-verification of electricity meters has been implemented in the electricity sector; and the petroleum sector already exercises some control over their measuring devices through inspection programs;
- the selection of the electricity sector supports one of the Measurement Canada's Strategic Direction to "no longer inspect electricity and gas meters in meter shops, as of March 31, 2000, if inspection services are available from other organizations".

Beyond Year 1999 / 2000

It is recommended that the order of priority for negotiating intervention levels with the remaining sectors be prioritized according to the sectors' scores. Consideration should also be given to sectors that present good potential for rapid implementation of alternate service delivery mechanisms.

The sector score is a reflection of: the economic significance of sector, the importance of measurement performed, the vulnerable parties' ability to protect themselves, and the effectiveness of metrological

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controls in place. Sectors that score high should be consulted earlier, since inequities due to measurement errors are likely to have greater adverse economic impact on stakeholders. Also, sectors where Measurement Canada has been involved, that present good potential for rapid implementation of alternate service delivery mechanisms, should be given a higher priority as this would free up resources for Measurement Canada to apply to other trade sectors.

c) Appropriate Review Periods and On-going Assessment of the Trade Sectors

It is recommended that Measurement Canada consult with stakeholders to determine appropriate review periods for the individual trade sectors.

Sectors may require different review periods to allow for the efficient implementation of the various levels of intervention, metrological control and to ensure proper resolution of issues found during consultation to reflect stakeholders perceived needs. However, review periods should not exceed 10 years so as not to erode the confidence in the accuracy of trade sector information.

It is recommended that stakeholders define and implement mechanisms or indicators, acceptable to Measurement Canada, to monitor levels of equity on a continuous basis.

The Business Scope Team believes that indicators should be developed and implemented by the sector to gather information that will allow Measurement Canada to determine whether or not established levels of intervention are appropriate and alternate service delivery mechanisms are effective. An on-going monitoring of the trade sector based on information provided by the sector is necessary to identify early needs for changes to the negotiated level of intervention and to introduce those changes rapidly.

d) Compliance Sampling

It is recommended that a national compliance sampling program be instituted to periodically assess current compliance levels for devices and commodities used in the trade sectors.

This information is needed for future trade sector analysis and to determine the effectiveness of agreed upon intervention levels thus helping Measurement Canada achieve its mission. The Business Scope Team also believes that providing the negotiating team with updated information would prove useful in the negotiation process.

e) Alternate Service Delivery Mechanisms

It is recommended that Measurement Canada undertake to assess the feasibility of accrediting or licensing industry associations and to research other alternate service mechanisms, as soon as possible and initiate the necessary legislative changes to facilitate the implementation of such mechanisms.

By the year 2007, Measurement Canada intends to use alternate service delivery mechanisms for the calibration of standards, device approvals, device verifications, device re-verifications and installation inspections. There are concerns among the members of the Business Scope Leadership Team regarding the applicability of the existing accreditation model to sectors that comprise numerous and diversified clients and vulnerable parties such as the retail food industry sector and the retail gasoline service station sector. Consumers are likely to demonstrate a strong interest in the determination of the appropriate level of intervention. Certain alternate service delivery mechanisms may neither be feasible nor acceptable to the consumers. Should consumers require a high level of intervention including periodic mandatory re-verification of devices and commodity verifications, the creation of a network of accredited organizations or the research and implementation of other acceptable alternatives, and the implementation of the necessary regulatory changes will require time and resources. A late initiation of the process will impact on the timely achievement of the strategic direction.

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Measurement Canada should enquire about possible partnerships with other regulatory enforcement agencies such as the Canadian Food Inspection Agency, Agriculture Canada, Fisheries and Oceans Canada, provincial ministries of transport and others, as alternatives to direct intervention.

f) Improving the Process of Trade Sector Analysis

Marketplace Intervention Model

It is recommended that the Marketplace Intervention Model be revised to address multiple vulnerable parties.

The Business Scope Team developed and used a method to assess the potential of economic risk to multiple vulnerable parties (indicators # 3) and the dependency of multiple vulnerable parties on the counter-party (indicator # 4). The Marketplace Intervention Model must be modified to allow for the integration of multiple vulnerable parties into the assessment criteria.

Data Sources

It is recommended that Measurement Canada update Standard Industrial Classification codes to correspond with the new North American Industry Classification System prior to undertaking the next round of sector reviews.

Standard Industrial Classification codes have been harmonized to be applied uniformly in North America.

It is also recommended that, prior to the next round of sector analysis, that the actual trade sectors be consulted for data before approaching Statistics Canada, in order to facilitate future research and review.

The trade sectors have proven to be an excellent source for reliable data. Statistic Canada will research specific custom data for a fee, however, what it can provide is not sufficient for complete sector analysis and needs to be complemented by information from other sources.

g) International Considerations

It is recommended that the negotiating team takes international standards into consideration in any decisions regarding the establishment of metrology rules for the sectors. "Stakeholders' informed views will be a key element in these decisions"

The team(s) mandated to negotiate levels of intervention and other aspects will have to ensure that representation from all stakeholders, particularly vulnerable parties, are included. For some sectors, it may be difficult to get adequate representation from the clients, who are in many cases the vulnerable parties since they are dispersed, unorganized and perhaps located abroad. For instance, sectors such as certain segments of the mining industry export most of their production. Consulted individuals or groups may advise that the use of some loose performance rules would satisfy their notion of equity and the selection of a minimal level of intervention is adequate. Care must be taken by the negotiating team to ensure that any decision made regarding metrology rules and standards is not a departure from internationally accepted rules and standards which may have the potential to adversely impact on Canada's overall metrology related reputation.

h) Time Measurement

It is recommended that general requirements be adopted to address time measurement in all sectors.

Time measurement is common to all trade sectors. The measurement of time forms the basis for establishing charges for utilizing communication equipment, renting equipment or tools, repairing cars, hiring contractor services, etc. The Business Scope Team has not included trade sectors in which time

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measurement is the sole measurement taking place, as the number of sectors would have been too numerous. The Business Scope Team recommends the development of a framework and tolerances to address those areas in case of disputes.

i) Existence of Other Legislation

It is recommended that Measurement Canada involve other federal or provincial ministries, departments or divisions in the negotiations with those sectors they regulate.

When negotiating intervention levels, consideration must be given to the existence of other legislation and the effect any intervention levels decisions will have on it.

j) Review of All Sectors Including Those Not Previously Involved in Trade Metrology

It is recommended that the list of sectors be reviewed for completeness.

The Business Scope Team has established a list of trade sectors where significant trade measurement is performed. Over time, the significance of measurement in sectors that were not considered may increase and, moreover, new trade sectors may also emerge. The list of trade sectors must be revisited periodically to ensure complete coverage.

k) Consumer Groups

It is recommended that Measurement Canada set up a consumer advocacy group to ensure that consumers' opinions are considered in sectors where the general public is a vulnerable party.

To effectively consult consumers' groups on appropriate levels of intervention and the selection of acceptable alternate service delivery mechanisms, Measurement Canada needs to have representatives of those groups identified and familiarized with its mission, mandate, process and objectives. Measurement Canada may have to budget for the expenses of consumer advocacy groups.

There are about 30 consumers associations in Canada. Some of these associations are national in scope; others are provincial associations but exercise a strong lobby. Certain associations such as the Canadian Shareowners Association, the Automobile Protection Association or the Canadian Toy Testing Council are specialised in a specific market area. It is recommended to consult the Industry Canada WEB site <http://strategis.ic.gc.ca/SSG> for more information on consumer contacts and about the mission and mandate of consumers' associations.

It is recommended that the negotiating teams contact most of these associations, at the initial stage of consultation, to seek their input and verify their interests. It is also recommended to seek advice and assistance from the Office of Consumer Affairs, Industry Canada, throughout the process of consulting with consumers' associations. The Office of Consumer Affairs has acquired a lot of expertise in this area and would be able to help the negotiating teams.

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As a minimum, the following associations must be consulted to ensure complete representation from the Canadian consumers:

Consumers' Association of Canada (CAC)
307-267 O'Connor Street
Ottawa, ON K2P 1V3
Tel.: (613) 238-2533 FAX: (613) 563-2254
E-mail: cacnational@sprint.ca (General Information)

Established in 1947, federally incorporated in 1962. The CAC is an independent, non-profit, volunteer organization committed to defending the rights of consumers in areas of consumer information. It protects consumers in the marketplace by lobbying government, business and industry for standards and legislation.

The Consumers Association of Canada prefers the following method for consultation: the CAC set up a 2-3 day work session where government organizations interested in obtaining their input are invited. As an example, each organization contributes for \$5000.00 (subject to change) to pay for the work session expenses including travelling and accommodation fees for 2 or 3 CAC representatives. Should Measurement Canada wish to have representation from CAC at meetings, it will have to pay for their expenses.

Option Consommateurs
2120 Sherbrooke Est
Bureau 604
Montréal, Québec
H2K 1C3

Option Consommateurs (Merged with l'Association des consommateurs du Québec in July 1999) promotes consumers interests and advocates for consumers' rights. They publish a magazine "Consommation" which reaches over 25 000 readers. Should Measurement Canada wish to have representation at negotiation meetings, it will have to pay for travel expenses.

Action réseau consommateur (Formerly FNACQ)
103 - 1215 Visitation
Montréal, QC
H2L 3B5
Tel.: (514) 521-6820 Fax: (514) 521-0736

L'Action réseau consommateur promotes consumer interests and advocates for rights of consumers, particularly those with low incomes. It brings together several organizations interested in advocating and promoting consumer's rights and interests. It promotes networking with other consumer organisations across Canada and other countries.

I) Device Manufacturers' Contribution

It is recommended to involve, as necessary, device manufacturers for their technical expertise during the consultation process.

Device manufacturers are neither stakeholders nor affected parties to trade transactions. Therefore, they should have only minimal input on the final decisions regarding the selection of appropriate levels of intervention. They can contribute to the process by providing technical advice and expertise that may be

useful for establishing the level of intervention. They may also be highly interested in discussions on alternate service delivery mechanisms.

11. Action Plan

An action plan and milestones have been included in this report to assist the negotiating team(s) in planning and organizing the trade sectors surveys, stakeholders' consultation and the negotiation process. The plan is a general layout of the key steps of the process for all sectors. As the negotiating team progresses through consultation and negotiation, the plan and milestones may have to be revised and refined to accommodate for the specific needs of the individual sectors. Also provided is a strategy to assist in the initial stage of forming negotiating teams and launching the project.

a) Composition of the Negotiating Team(s)

The Program Development Division will take the overall responsibilities for the negotiations in the sectors. A Steward, who is a member of the Measurement Canada's Senior Management Committee, will oversee the work of the team, provide direction and advice as necessary, and liaise with the Committee.

It is recommended that the Negotiating Team(s) core be composed of 3 persons at the most, and includes:

- a leader who will represent the Program Development Division. The leader should be selected for his/her in-depth knowledge and experience of the sector; interests and dedication in the mandate; skills to communicate, make presentations, chair meetings, negotiate agreements and work toward consensus; and his/her ability to work in teams.
- two additional members, one of these individuals representing the Intervention Strategies Division. The team member representing ISD will be responsible to lead the consultation portion related to Alternate Service Delivery Mechanisms. Both these team members should be selected for their skills and abilities to communicate, make presentations, negotiate agreements, work in teams toward consensus.

The Business Scope Team member, responsible for the research of data in the sector being consulted, will serve as an advisor. This person should join the team at least for the early stage.

The team may also wish to consult a regional specialist or a representative from the Engineering Division for technical expertise, a sector officer from Industry Canada with experience in the sector being consulted, a representative from the Consumer Information and Coordination Division of Industry Canada, a representative from other departments or divisions that regulate measurement accuracy within the sector (eg. Fair Business Practices Branch, Canadian Food Inspection Agency, Agriculture and Agri-Food Canada).

To meet the objectives of *"using alternate service delivery mechanisms by year 2007"* and *"periodically assessing measurement in all trade sectors intervening only where necessary by year 2011"*, multiple negotiation teams will have to be engaged in the sectors negotiations. Negotiations must commence in a minimum of 5 trade sectors each year, beginning in year 2000.

b) Training on Consultation and Negotiation

Before undertaking sector consultations and negotiations, the members of the Negotiating Team should receive training to enhance their skills in the area of managing consultations and conducting effective negotiations. The following courses are available from Industry Canada - Corporate Training and Renewal Division: Presentation Skills, Facilitation Skills, Conflicts Resolution and Negotiation Skills. The course Managing Public Consultation is available from Training and Development Canada. The courses Art of

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Negotiation and Facilitation Skills are also available from external sources such as Algonquin Management Center or Performance Training Solutions.

c) Negotiating Team Mandate and Objectives

Measurement Canada's Senior Management Committee must establish and communicate a clear mandate and well defined objectives to the Negotiating Team(s). The Business Scope Team proposes the following mandate:

the Negotiating Teams will: "establish the minimum level of Measurement Canada's intervention appropriate to ensure fulfilment of its mission and mandate, and acceptable to all stakeholders of the sector including the vulnerable parties; determine and recommend mechanisms for and the frequency of periodic assessment of measurement in the trade sector; identify and recommend possible alternate service delivery mechanisms for the delivery of required services; and establish a strategy, a plan and milestones for the effective implementation of the recommended level of intervention.

Key steps of the process are:

- investigate and document current measurement practices and metrological controls in the sector;
- identify stakeholders and inform them of Measurement Canada's mission, mandate and the review process;
- take the necessary steps to ensure that stakeholders are informed including providing training if necessary;
- consult and negotiate Measurement Canada's level of intervention with stakeholders with the objective of forming a consensus;
- investigate possible alternate mechanisms for the delivery of services to the sector;
- determine optimal frequency of periodic assessment of measurement in the sector and mechanism; and
- develop a strategy, plan and milestones acceptable to Measurement Canada Senior Management and stakeholders for the effective implementation of the level of intervention and alternate service delivery mechanism(s), and for the periodic assessment of measurement in the sector.

It is also recommended that Negotiating Team members are given sufficient time and resources to accomplish their tasks without conflicting with their regular duties and responsibilities.

d) Assistance from Marketing and Business Operation

The Negotiating Teams should seek assistance from the Marketing and Business Operation Division to communicate through letters, bulletins, communiqués, and use the WEB-site Measurement Canada's mission, mandate, strategic direction, and intent to survey Canada's trade sectors. It is important to keep stakeholders informed of the progress and decisions made and to encourage their participation.

e) Milestones

1) Phase 1 - Setting-Up the Negotiating Teams (one to two months)

Negotiating team members will be selected for a specific trade sector. Team members will be briefed on their mandate and objectives. The need for training to enhance their consultation and negotiation skills will be established; training must be arranged as soon as possible. With the assistance of the author of the Trade Sector Review document, the team will review the Business Scope Team Report, the Trade Sector Review document and all sector reference material, seeking clarifications as necessary. The list of stakeholders including the vulnerable parties will be reviewed for completeness. The team will identify the need for supplementary data and information. The team will review the plan and milestones, establish a consultation strategy, and determine members'

roles and responsibilities. The team will prepare the communication material necessary to initiate contacts with stakeholders. The team will establish contacts with advisors of other organizations and agencies, as necessary.

2) Phase 2 - Informing Stakeholders and Understanding their Perspectives - (Three months)

Stakeholders including vulnerable parties will be contacted. They will be briefed on Measurement Canada's mission and mandate, and its present involvement in the trade sector. They will be informed of the major and pertinent elements of the Strategic Direction. Information sessions will be set up as necessary to assist stakeholders to become informed. This may be done through communiqués, letters, meetings, information sessions, etc. Measurement Canada will advertise its activities and invite comments through its WEB-site or by other means. Meetings will be set up with identifiable groups of stakeholders to gather their views on actual level of equity, the appropriate level of intervention by Measurement Canada and other issues. The team will explore preliminary suggestions for possible Alternate Service Delivery Mechanisms. It is important at this stage to ensure that all major stakeholders including the vulnerable parties are consulted.

3) Phase 3 - Analyzing the Data and Developing a Negotiation Strategy - (Two months)

The team will review and analyze the data and information gathered, identify and consider all opinions and positions of the groups, forces, alliances that can be used, and potential as far as alternate service delivery mechanisms. The team will develop Measurement Canada's position with its appropriate level of intervention. A negotiation strategy will be developed to attempt to reconcile differences of opinion, to work toward consensus and to ensure that decisions taken by the sector will allow Measurement Canada to fulfil its mission. The team's strategy and position will be communicated to Measurement Canada Senior Management. The plan and milestones will be reviewed and updated, as necessary.

4) Phase 4 - Consulting and Negotiating - (Six to twelve months)

At this stage, the team will undertake to negotiate Measurement Canada's level of intervention and Alternate Service Delivery Mechanisms with stakeholders. Stakeholders can be consulted individually or in groups. The process may be fairly straightforward or very long and complex depending on the diversity of groups, how they inter-relate, past experiences, knowledge, their notion of equity, issues, and perceptions. The strategy applied must ensure that all views are presented and understood, so that positions can be reconciled and a consensus reached.

"Stakeholders' informed views will be a key element in these decisions". Negotiating Teams will ensure that stakeholders' knowledge of Measurement Canada's programs and services as well as the comprehension of the strategic objectives are brought to an adequate level so that they provide informed views. Stakeholders must understand the sector and implications of any possible inequities. Negotiating Teams will remain sensitive to the quality of the feedback and views provided by stakeholders throughout the process. Negotiating Teams members are invited to consult a Canada West Foundation publication entitled "Meaningful Consultation: A Contradiction In Terms?" for guidance on how to consult citizens efficiently. This publication is available on the organization's WEBSITE: <http://www.cwf.ca>.

Stakeholders must understand the non-negotiable elements: Measurement Canada's mission to ensure equity in each trade sector; and the use of alternate service delivery mechanisms for standards calibration and certifications, device approvals, device inspections and installation inspections.

Measurement Canada remains responsible and accountable for equity in all trade sectors.

Consultation and negotiations should allow Measurement Canada to:

- establish appropriate levels of intervention acceptable to all stakeholders;
- define alternate service delivery mechanisms and how they can be implemented;
- establish dispute resolution mechanisms acceptable to all stakeholders and Measurement Canada;
- determine what regulatory changes are required to support the implementation of the chosen alternate service delivery mechanisms;
- define and establish indicators to measure equity within the sector, feedback mechanisms and the frequency at which the sector must be surveyed; and
- establish a plan and milestones for implementing levels of intervention and alternate service delivery mechanisms.

5) Phase 5 - Establishing and Communicating Implementation Plan and Milestones - (Three months)

At this stage, the Negotiating Team will review the conclusions of the consultations and will develop a detailed plan to implement any agreed upon terms. The plan will include an overview of the regulatory changes required, a step by step process and the extent of involvement of key stakeholders. The plan will be submitted to Measurement Canada's Senior Management Committee for review and approval. The plan will be submitted to the stakeholders for their review and final agreement.

Upon conclusion of the negotiations and acceptance of the plan by the stakeholders, the Negotiating Team will draft for Measurement Canada Senior Management a report that provides an overview of accomplishments, recommendations for further consultation and monitoring of the sector.

6) Phase 6 - Implementation (One year to three years)

Measurement Canada will create the necessary mechanisms for the effective implementation of recommendations and for the realization of the plan. The implementation phase may be relatively short if the sector maintains the status quo. It also may take several years should regulatory changes be required; a high level of intervention be found necessary; or should the implementation of an alternate service delivery mechanism necessitate creating incentives.

k) Key Consultation/Negotiation Activities and Milestones in Table Format

The following tables depict, for each trade sector or group of trade sectors, the key consultation and negotiation activities that must be conducted by the Negotiating Teams and the proposed milestones. These key activities and milestones may need to be revised in light of the knowledge and experience acquired through the consultation and negotiation with stakeholders of the two pilot sectors: the electricity sector and the downstream petroleum sector.

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Canadian Downstream Petroleum Industry Sector

ID	Task Name	Start Date	End Date	Duration	1999			2000				2001			2002	
					Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	
1	Phase 1 - Setting up the team and briefing team members; team members to review documentation, reference material and stakeholders list; review plan and milestones and establish sector consultation strategy; supplement data and information	12/1/99	12/23/99	23d		■										
2	Phase 2 - Identify training needs and available courses	12/1/99	12/21/99	15d		■										
3	Phase 3 - Members to get the training as necessary	12/22/99	2/7/00	77d		■	■									
4	Phase 4 - With MDO's assistance, establish communication strategy, plan and milestones; develop communication material; begin implementation of communication plan	11/1/99	3/1/00	80d		■	■	■	■	■	■	■	■	■	■	■
5	Phase 5 - Establish preliminary contacts with and brief advisors	12/1/99	1/13/00	36d		■	■									
6	Phase 6 - Contact and brief stakeholders; Gather point of view; establish MC position and a negotiation strategy	12/20/00	4/13/00	65d			■	■	■	■	■	■	■	■	■	■
7	Phase 7 - Analyze data and information; develop negotiation strategy and plan	4/22/00	5/17/00	25d				■	■	■	■	■	■	■	■	■
8	Phase 8 - Consult stakeholders; ensure of informed users; negotiate level of intervention	5/17/00	11/13/00	191d					■	■	■	■	■	■	■	■
9	Phase 9 - Analyze and communicate results; establish implementation plan and milestones; inform and get stakeholders' agreement	11/16/00	2/14/01	65d									■	■	■	■
10	Phase 10 - Implementation of recommended level of intervention and ASD	2/15/01	5/16/01	121d											■	■

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Canadian Electricity Industry Sector

ID	Task Name	Start Date	End Date	Duration	1999				2000				2001				2002	
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Phase 1 - Setting up the team and bringing team members, team members to review documentation, reference material and stakeholders list, review plan and milestones and establish sector consultation strategy, schedule data and information	12/1/99	12/23/99	23d														
2	Phase 1 - Identify training needs and evaluate courses	12/1/99	12/21/99	15d														
3	Phase 1 - Members to get the training as necessary	12/22/99	2/7/00	77d														
4	Phase 1 - With MSO's assistance, establish communication strategy, plan and milestones, develop communication materials, begin implementation of communication plan	1/1/00	3/1/00	80d														
5	Phase 1 - Establish preliminary contacts with and brief advisors	12/1/99	1/13/00	35d														
6	Phase 2 - Contact and brief stakeholders, gather point of view, establish MC position and a negotiation strategy	1/20/00	4/19/00	150d														
7	Phase 3 - Analyze data and information, develop negotiation strategy and plan	4/20/00	5/11/00	22d														
8	Phase 4 - Consult stakeholders, ensure of informed views, negotiate level of intervention	5/17/00	11/15/00	193d														
9	Phase 5 - Analyze and communicate results, establish implementation plan and milestones, inform and get stakeholders' agreement	11/16/00	2/14/01	89d														
10	Phase 6 - Implementation of recommended level of intervention and ASD	2/15/01	5/16/01	123d														

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- 1 - Canadian Fishing and Fish Products Industries Sector
- 2 - Canadian Logging, Forest and Forest Products Industries Sector
- 3 - Canadian Grain and Field Crop Industry Sector
- 4 - Natural Gas Distribution Sector
- 5 - Canadian Retail Gasoline Sector

ID	Task Name	Start Date	End Date	Duration	2000			2001				2002				2003		
					Q1	Q2	Q3	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
1	Phase 1 - Setting up teams and briefing team members, team members to review documentation, reference material and stakeholders lists; review plan and milestones and establish sector consultation strategy; supplement data and information, members to take training as necessary	11/1/00	12/26/00	40d	[Task Bar]													
2	Phase 1 - With MBU's assistance, establish communication strategy, plan and milestones, develop communication material; begin implementation of communication plan, contact and brief advisors	11/1/00	12/26/00	40d	[Task Bar]													
3	Phase 2 - Contact and brief stakeholders. Gather point of views, establish MC positions, a negotiation strategy	1/16/01	4/16/01	65d	[Task Bar]													
4	Phase 3 - Analyze data and information; develop negotiation strategy and plan	4/17/01	5/14/01	20d	[Task Bar]													
5	Phase 4 - Consult stakeholders; ensure of informed views; negotiate level of intervention	5/5/01	11/5/01	131d	[Task Bar]													
6	Phase 5 - Analyze and communicate results; establish implementation plan and milestones; inform and get stakeholders' agreement	11/6/01	2/4/02	65d	[Task Bar]													
7	Phase 6 - Implementation of recommended levels of intervention and ASD	2/5/02	12/31/02	236d	[Task Bar]													

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Sector Consultations - Plan and Milestones**

- 1 - Canadian Mining and Metals Industries Sector
- 2 - Canadian Agricultural Livestock Industry Sector
- 3 - Chemical Products Industry Sector
- 4 - Food and Beverage Manufacturing Sector
- 5 - Canadian Retail Food Industry Sector
- 6 - Canadian Fruit and Vegetable Industry Sector

ID	Task Name	Start Date	End Date	Duration	2002				2003				2004					
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
1	Phase 1 - Setting up teams and briefing team members; team members to review documentation, reference material and stakeholders lists; review plan and milestones and establish sector consultation strategy; supplement data and information, members to take training as necessary	6/1/02	7/26/02	40d		■												
2	Phase 1 - With MBO's assistance, establish communication strategy, plan and milestones; develop communication material; begin implementation of communication plan, contact and brief advisors	8/1/02	9/25/02	40d			■											
3	Phase 2 - Contact and brief stakeholders; Gather point of views, establish MC position a negotiation strategy	10/1/02	12/30/02	65d				■										
4	Phase 3 - Analyze data and information, develop negotiation strategy and plan	12/31/02	2/10/03	30d					■									
5	Phase 4 - Consult stakeholders, ensure of informed views, negotiate level of intervention	2/11/03	8/12/03	131d						■								
6	Phase 5 - Analyze and communicate results, establish implementation plan and milestones inform and get stakeholders' agreement	8/13/03	11/11/03	65d							■							
7	Phase 6 - Implementation of recommended of intervention and ASD	11/12/03	10/6/04	236d														■

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Sector Consultations - Plan and Milestones**

- 1 - Canadian Textile Industry Sector
- 2 - Canadian Tobacco Industry Sector
- 3 - Canadian Telecommunication Industry Sector
- 4 - Canadian Dairy Farms / Dairy Products Industry Sector
- 5 - Canadian Fur and Skin Industry Sector
- 6 - Canadian Metal Scrap Industry Sector

ID	Task Name	Start Date	End Date	Duration	2004				2005				2006			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Phase 1 - Setting up teams and briefing team members, team members to review documentation, reference material and stakeholders lists, review plan and milestones and establish sector consultation strategy, supplement data and information, members to take training as necessary	4/2/04	5/27/04	40d	[Gantt bar spanning Q1-Q2 2004]											
2	Phase 1 - With MBO's assistance, establish communication strategy, plan and milestones, develop communication material, begin implementation of communication plan, contact and brief advisors	5/28/04	7/22/04	40d	[Gantt bar spanning Q2-Q3 2004]											
3	Phase 2 - Contact and brief stakeholders, Gather point of views, establish MC positions, a negotiation strategy	8/23/04	10/21/04	65d	[Gantt bar spanning Q3-Q4 2004]											
4	Phase 3 - Analyze data and information, develop negotiation strategy and plan	10/22/04	12/2/04	30d	[Gantt bar spanning Q4 2004]											
5	Phase 4 - Consult stakeholders, ensure of informed views, negotiate level of intervention	12/3/04	6/3/05	131d	[Gantt bar spanning Q1-Q2 2005]											
6	Phase 5 - Analyze and communicate results, establish implementation plan and milestones, inform and get stakeholders' agreement	6/6/05	9/2/05	65d	[Gantt bar spanning Q2-Q3 2005]											
7	Phase 6 - Implementation of recommended level of intervention and ASD	9/5/05	7/31/06	236d	[Gantt bar spanning Q3 2005 to Q3 2006]											

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- 1 - Canadian Steam and Hot Water Industry Sector
- 2 - Canadian Water Utilities Industry Sector
- 3 - Canadian Transportation Industry Sector
- 4 - Canadian Waste Collection and Disposal Industry Sector
- 5 - Canadian Toxicity Industry Sector
- 6 - Parking Lots and Parking Garage Sector

ID	Task Name	Start Date	End Date	Duration	2006				2007				2008			
					Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Phase 1 - Setting up teams and briefing team members, team members to review documentation, reference material and stakeholders lists, review plan and milestones and establish sector consultation strategy, supplement data and information, members to take training as necessary	4/2/06	5/26/06	40d	■											
2	Phase 1 - With MBO's assistance, establish communication strategy, plan and milestones develop communication material begin implementation of communication plan contact and brief advisors	5/28/06	7/21/06	40d	■											
3	Phase 2 - Contact and brief stakeholders . Gather point of views, establish MC positions negotiation strategy	8/23/06	10/20/06	65d					■							
4	Phase 3 - Analyze data and information, develop negotiation strategy and plan	10/23/06	12/1/06	30d					■							
5	Phase 4 - Consult stakeholders, ensure of informed views, negotiate level of intervention	12/3/06	6/4/07	131d					■							
6	Phase 5 - Analyze and communicate results, establish implementation plan and milestones inform and get stakeholders' agreement	5/5/07	9/3/07	65d									■			
7	Phase 6 - Implementation of recommended of intervention and ASD	9/4/07	7/29/08	236d									■			

Appendix A

Trade Sector Review List

Sectors	Sub-sectors	Author
Canadian Fishing and Fish Products Industries	Inland Fishing; Ocean Fishing; and Fish Processing Plants; Processed Fish and Sea Food Wholesale.	Bill Cochrane
Canadian Logging , Forest and Forest Product Industries	Logging and Forestry; Pulp and Paper; Saw Mills; Lumber, Veneer and Plywood; Paper Products Manufacturing, Wholesale Forest Products; Fuel Wood.	Bill Cochrane
Canadian Grain and Field Crop Industry	Field Crop Farms; Grain Elevator; Grain Wholesale; Feed and Seed Industry.	Eric Klawis
Canadian Upstream Petroleum Industry	Crude Petroleum and Natural Gas Production; Pipeline Transport Industry; Services Incidental to oil and Gas Production	Dale Bieber
Canadian Mining and Metals Industries	Metal Mines; Non-Mineral Agricultural Mines, Non-Mineral Mines, Coal Mines; Metal Manufacturing and Wholesale Industry.	Renald Marceau
Canadian Downstream Petroleum Industry	Petroleum Product Manufacturing (Refineries) Wholesale of Refined Petroleum Products and Lubricating Oils, Aviation Fuels, Wholesaling and Retailing of Heating Oil and Liquefied Petroleum Gas.	Dale Bieber
Canadian Agricultural Livestock Industry	Livestock Farms; Meat and Meat Product Manufacturing and Wholesale; Eggs	John Pheifer
Canadian Electricity Industry	Generation, Transmission and Distribution.	Al Davlut
Food and Beverage Manufacturing	Any Food and Beverage Processing and Manufacturing other than Meat, Dairy	Dale Bieber

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	Products, Fish and Sea Food Products, and Fruits and Vegetable.	
Chemical Products Industry	Agri-Chemical Products, Pesticides, Insecticides, Fertilizers; Refrigerant Products; Household and Industrial Chemical Products; Cryogenic Products; Soap, Paint and Varnish; Aviation Deicers; etc.	Eric Klawis
Natural Gas Distribution	Distribution of Natural Gas or Synthetic Gas	Dale Bieber
Canadian Textile Industries	Manufacturing and Wholesale of yarn, fibre, carpets, fabrics, etc.	Michel Maranda
Canadian Telecommunication Industry	Telephone Services; Carriers; Internet Access Providers; etc.	André Gagné
Canadian Steam and Hot Water Industry	Steam Generation; Co-Generation; Hot Water Energy Systems.	Al Davlut
Canadian Dairy Farms / Dairy Products Industry	Milk Farms; Dairy Industry; Manufacturing and Wholesale of Dairy Products.	Al Davlut
Canadian Fur and Skin Industry	Fur and Skin Wild and Domestic; Trapping; Tanneries.	Michel Maranda
Canadian Water Utilities Industry	Treatment and Distribution of Water; Utilities.	John Pheifer
Canadian Retail Gasoline Sector	Gasoline Service Stations; Retail propane Dispensers; Retail Small Water Craft and light Aircraft; Card/Key Lock Operation.	Dale Bieber
Canadian Fruit and Vegetable Industry	Farms; Processing and Canning Industry; Fruit and Vegetable Wholesale.	Al Davlut
Canadian Metal Scrap Industry	Metal Recovering and Recycling.	Renald Marceau
Canadian Transportation Industry	Truck Transport Industry; Air Cargo Industry; Railway Transport Industry; Ship	Al Davlut

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	Transportation; Postal and Courier Industry.	
Canadian Retail Food Industry	Grocery Stores; Supermarkets; Food Speciality Stores; Fruit and Vegetable Stores; Meat Markets; Candy and Nut Stores.	Al Davlut
Canadian Waste Collection and Disposal Industry	Garbage Collection; Garbage Dump Operation; Incinerators; Radioactive Waste; Recycling of Waste Material except metals.	Renald Marceau
Canadian Taxicab Industry		André Gagné
Parking Lots and Parking Garage Sector	Parking Lots and Garages for live storage of Automobiles; Parking Meters.	André Gagné
Canadian Tobacco Industry	Tobacco Farms; Leaf Tobacco Industry; Tobacco Products Industry	Al Davlut

Appendix B

Determining the Degree of Vulnerability of Dependant Parties

12. Evaluation of the Degree of Vulnerability of Dependant Parties

To determine the degree of vulnerability of a dependant party, it is imperative to have an understanding of who is involved, the amount and type of commodity traded and the nature of the trade transaction. This information is generally available from representatives of the trade sector, associations, interest groups, government bodies, Statistics Canada and general knowledge of Measurement Canada staff. Once it is known who is doing the trading, it must be determined if there are multiple vulnerable parties or if there is a single dominant vulnerable party.

13. Multiple Vulnerable Parties

Where it is determined that there are multiple vulnerable parties to a trade transaction, without a single dominant vulnerable party, Statistics Canada Average Input, Output and Final Demand Matrices are used in the overall rating of the degree of vulnerability of dependant parties.

Make (Output) Matrix

To determine the outputs of the trade sector under analysis, the Make (Output) Matrix must be used first. Using the Output Matrix, select the particular trade sector for which outputs must be determined. Remove all other non-applicable trade sectors. Scroll down the sector to find all non-zero entries. Remove all outputs that are zero. To maintain consistency throughout the evaluation process, only direct outputs of the trade sector will be used in the determination of vulnerable parties. Direct outputs include any and all measurable products that are a primary output of the particular trade sector.

Use (Input) Matrix

Once the outputs of the trade sector have been determined, use the Use (Input) Matrix to determine who the vulnerable parties are and their degree of vulnerability. This is accomplished by selecting all the applicable outputs (left column) obtained from the output matrix and deleting all non-outputs. Upon completion, scroll through the list of trade sectors and keep the sectors that have dollar values for any of the applicable outputs. This figure represents the amount of product that the vulnerable party is purchasing from the trade sector and the totals at the bottom of the matrix represent the total expenditures for the vulnerable party. The degree of vulnerability is then established as percentage of total inputs / total expenditures for the vulnerable party.

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Final Demand Matrix

The same process as for the Use (Input) Matrix is then applied to the Final Demand Matrix to obtain the remaining vulnerable parties that have not been captured by the Input Matrix.

Weighting

Once all the vulnerable parties have been identified a weighting system is used to establish the overall degree of vulnerability that will be used to determine the final score for indicator #3.

First, the degree of vulnerability must be established for each vulnerable party. This is done by dividing the total inputs by the total expenditures to derive a percent vulnerability. The individual vulnerable party can then be scored under the rating methodology used for indicator number 3. This must be done for all vulnerable parties prior to proceeding to the weighting process. To ensure a proper weighting, total all the inputs to all the vulnerable parties (numerator of the previous equation). This then becomes the denominator for the weighting process. The inputs for each vulnerable party is then divided by the total of all inputs (denominator) and multiplied by the score for vulnerability. Once all vulnerable parties have been weighted, the weighted scores must be added to determine the overall score for indicator #3.

The following is an example of the weighting system applied to multiple vulnerable parties. Note that the left hand column represents outputs from the sector under analysis. The sectors listed in the top row have been identified as vulnerable parties to the trade transaction: 1AGRIC is the livestock sector, 2AGRIC is the field crop sector, 16MEAT is the red meat sector, 17POULT is the poultry sector

For Example: Sector under analysis : Livestock Farms (011)

Sector O/P	1AGRIC (millions\$)	2AGRIC (millions\$)	16MEAT (millions\$)	17POULT (millions\$)
Cattle&Calf	809	0	2279	0
Hogs	26	0	1674	0
Poultry	11	0	0	1118
Beef(chilled)	0	0	1106	0
An/Veg Fert	0	351	0	0
Tot I/P	846	351	5059	1118
Tot Exp of sector	12401	12109	8769	2306
% Vulnerability (Tot I/P/Tot Exp)	6.8%	2.9%	57.7%	48.5%
Individual Sector Score for Ind #3	1	1	5	5
Tot of all Inputs	7374	7374	7374	7374

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Weighting = (Total I/P / Total of all Inputs) * Individual Sector Score	$(846/7374) * 1 = 0.11$	$(351/7374) * 1 = 0.05$	$(5059/7374) * 5 = 3.43$	$(1118/7374) * 5 = 0.76$
Total Score for Indicator #3 = (0.11 + 0.05 + 3.43 + 0.76) = 4.35 rounded up to 4.5				

*** Note that the lotus 1-2-3 spreadsheet titled "template.123" automatically calculates the score for Indicator #3

14. Single Vulnerable Party:

Seller of the product(s) but is not in control of the device

For a single vulnerable party that sells the product but has no control over the trade device, the degree of vulnerability can be determined by assessing the % of gross revenue derived from the trade transactions in comparison to the overall gross income of the vulnerable party. For example, if the primary vulnerable party happens to be a producer of the commodity such as in the case for most farm products, it would be deemed that more than 40% of the vulnerable party's income is derived from that transaction and subsequently would be scored a 5 for indicator # 3. Where possible, substantiating data should be provided to corroborate find

Purchaser of the product(s)

Where the vulnerable party is the purchaser of the product(s), Statistics Canada Average Input, Output and Final Demand Matrices are used in the overall rating of the degree of vulnerability of the dependant party. The methodology used for the input /output and final demand matrices described for multiple vulnerable parties is to be used, however, weighting will not be required. The degree of vulnerability can then be scored under indicator number 3. Since there is only one vulnerable party there is no need to proceed further.

Appendix C

KPMG Report

“Recommended Structure For a Marketplace Intervention Model For Trade Measurement”

Note that this document is available from Measurement Canada upon request.

Appendix D

Statistical Information for the Intervention Model

**A Report prepared by Statistics Canada
For Measurement Canada's Business Scope Project**

Technical Notes & Analysis

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Note that the following documents, tables and matrix information are available only electronically.

2. Tables

- **Annual Revenues and Number of Firms in Canada and Five Regions for Selected Industries in 1995 (MC Data.wk3)**
- **Canadian Imports and Exports for Selected Industries in 1995 (MC Industry ImpExp Rev1.wk3)**
- **Canadian Imports and Exports by Commodities for 1992 (MC Commodity ImpExp.wk3)**

3. Input-Output Matrix Information

- **Commodity Listing**
- **Industry Listing**
- **Final Demand Listing**

4. Additional Information

- **Publications of Potential Interest (MC Publications.doc)**
- **Department of Fisheries and Oceans WEB Page Information**

5. Total Outputs of Selected Industries

6. Family Expenditures in Canada 1992 - Table 7

7. Electronic Information

- **Input-Output Worksheet Level Matrixes for 1990, 1991 and 1992**
- **Average of Above Matrixes**
- **Files as Indicated in Parantheses above (filename.ext)**

Background & Objectives

Background Information

Statistics Canada was asked by Measurement Canada's Business Scope/Intervention Team to provide information that would assist them in fulfilling their mandate.

Measurement Canada, who administer and enforce the *Electricity and Gas Inspection Act* and the *Weights and Measures Act*, fulfill their mandate, in part, "by periodically assessing measurement in all trade sectors intervening only where necessary... and developing criteria for determining its level of intervention."

The Business Scope/Intervention Team's objective is to "gather information on each trade area and determine an appropriate level of intervention for each trade area using an intervention model." The intervention model consists of six indicators that are weighted to provide a score for each trade sector. The scores help establish the level of intervention.

Statistics Canada is providing information that would assist in responding to the first three of the six indicators.

Objectives

Statistics Canada is providing information that will assist Measurement Canada in responding to three of the six indicators of the Business Scope/Intervention Team's intervention model. These indicators are:

- Indicator #1 – Reliance on trade measurement as the basis for commercial transactions;
- Indicator #2 – Economic significance of the sector in the Canadian economy; and
- Indicator #3 – Potential economic risk to the vulnerable party in trade transactions in the sector.

As available, the above information is to be provided for each of the industries listed on the Business Scope Team's "Proposed List of Trade Sectors" dated January 26, 1998.

To respond to the information required for each of the above indicators, the following data is provided:

Indicator #1

The first indicator is to establish the portion of commercial transactions that are dependent on measurements and measurement devices. The commodities (products) involved in these commercial transactions are referred to in this report as "measured" commodities. The dollar values of products produced are provided for each industry grouping. Further breakdown will be required to differentiate which commodities are measured and which are not.

To help in identifying the commodities that are measured, the commodity information is given in the most detailed form available. The input-output "worksheet level" of information is used. It consists of 627 standard commodities and 216 industry groups.

Indicator #2

The second indicator measures the economic significance of the industry in the Canadian economy. A variety of information was requested to evaluate this particular indicator, including:

- Canada total & regional data on sales revenues;
- Canada total & regional data on number of firms or establishments;
- Average sales revenues of firms or establishments;
- Exports & imports by industry and by commodity.

There are two methods of measuring the economic significance of an industry, both in terms of production and in terms of revenue.

Production values are a measure of the industry's importance as a portion of the Canadian economy. The value of outputs of each industry grouping¹ can be measured as a percentage of the total outputs of the Canadian economy.

Annual revenue values also provide an indication of the size of each industry. Unlike the production values, these annual revenue figures include some double counting. As a commodity moves through the various stages of production and distribution the sales are counted at each stage. For example, sales of a commodity are counted at the manufacturing, wholesale and retail stages of production.

The numbers of firms or establishments in each industry are provided, giving an indication of the size of the industry in terms of its population. This information could be beneficial to help indicate the scope of a project and help foresee any logistical issues that may arise during the implementation of any interventions.

¹ The term "industry grouping" generally refers to the industry categories of the Input-Output System as listed in appendix 4.

As well, the average size of firms within the industry can be calculated by dividing the total revenues by the number of firms. This will provide further information on the industry profile.

Regional information is also given to show the geographical dispersion of the industry. There are many reasons why this information could be useful, such as:

- Understanding the impact of the industry on each region;
- The effect of local regulations on an industry may impact results;
- Logistical issues of enforcing interventions.

Exports and imports in dollar values are provided both by industry and by commodity. This information may provide an indication of the importance of international standards to measurement in certain areas.

Indicator #3

The third indicator is to determine the potential economic risk to the vulnerable party in trade transactions. Using the input-output series of matrices, trade transactions of commodities can be explored for individual industry groupings and categories of final demand. The input-output model identifies the value of commodities used both as intermediate inputs by producers and as final demand or consumption by consumers. With the final user or consumer identified, the value of trade transactions can be calculated as a percentage of the final users' total revenues.

Technical Notes

Data Sources & Concepts

Many Statistics Canada data sources were used to supply information regarding the three indicators of the intervention model. These sources and concepts will be described individually to help understand the meaning and origins of the data.

Input-Output Matrices

A major source of data is the input-output series of matrices, whose information covers the entire Canadian economy and is derived from surveys throughout Statistics Canada.

The Input-Output System's purpose is to:

15. Provide an accounting framework for recording the flows of goods & services for a particular accounting period;
16. Show inter-sector relationships;
17. Facilitate the study of the economic structure of the Canadian economy.

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A series of Input-Output matrices include three separate tables:

- **Use (Input) Matrix;**
- **Make (Output) Matrix; and**
- **Final Demand Matrix.**

They have been provided for three years 1990, 1991 & 1992, the latest years available. Also included is a series of the above noted matrices containing average values of the three years. The average value is used for analysis purposes to reduce the effect of unrepresentative values in any given year.

Note that difficulties arose in calculating the average when a particular commodity is present one year and not other years. The results could be misleading when adding three values and dividing by three if one or two of the values are zero. To avoid this, values were averaged only if they were non-zero for all of the three years. Otherwise the value in the average matrix is represented by zero.

All three matrices have the same commodities as rows. There are 627 standard commodity aggregations as listed in appendix 3.

The **Use Matrix** is a table showing the dollar value, in millions of dollars, of the standard commodity inputs used by each of the 216 industry groups. This table can be used to determine the value of commodities used or purchased by any given industry grouping or to determine which industry groupings use a commodity.

These industry groups may be linked to Statistics Canada's 3 and 4-digit 1980 Standard Industrial Classification (SIC) Codes² using the listing of industry groups in appendix 4.

The **Make Matrix** is similar to the Use Matrix with the fundamental difference that this matrix shows the commodity outputs made by each of the industry groups.

The **Final Demand Matrix** identifies the final user or consumer of each of the commodities. The final user is broken down into final demand groupings whose main categories are as follows:

- Personal Expenditures (PE) – consumption of goods and services;
- Machinery & Equipment (M&E) – capital expenditures;
- Construction (CON) – capital expenditures;
- Change in Inventories (INV) – change in value of goods produced but not sold;
- Government Current Expenditures (GCE) – consumption of goods and services;

² The 4-digit SIC code is the most detailed industry classification and 3-digit SIC code is an aggregate of from 1 to 10, 4-digit SIC codes. For example, 3-digit SIC 011 is an aggregate of the following 4-digit SIC codes; 0111, 0112, 0113, 0114, 0115 & 0119.

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- Imports – foreign production that is consumed by Canadians;
- Exports – Canadian production that is not consumed domestically.

A further breakdown of the final demand categories is located in appendix 5.

By design, the Input-Output series of matrices are balanced. The total value of inputs from the use matrix is equal to the total value of outputs from the make matrix, any given industry grouping. Commodities are also balanced, the demand (inputs + final demand) is equal to supply (outputs) for all commodities with the exception of the primary inputs. Primary inputs are returns to labour and capital, and include; net indirect taxes, wages and salaries, supplementary labour income, net income of unincorporated business and other operating surplus.

The values in all three matrices are in current dollars, meaning that they are the actual amounts, not discounted to allow for inflation as constant dollars are. Inflation was relatively flat throughout the three years used, therefore the effect is not significant.

Statistics Canada Publications

A variety of publications were used in preparing the table of appendix 1.

The publication *Manufacturing Industries of Canada: national and provincial areas* (#31-203-XPB), reports data derived from the Annual Survey of Manufacturers. This survey collects information from about 33,000 Canadian manufacturers, grouped into 230 industries. It is collected at the establishment level, the smallest unit capable of reporting certain production data, usually a factory, plant or a mill. The value of shipments of goods manufactured is provided as a proxy for annual revenues, it is the net selling value of goods made. It excludes discounts, returns, allowances, sales tax, excise taxes and duties, returnable containers, common or contract carriers' charges for outward transportation. It includes internal transfers to establishments of the same company, the value of non-returnable containers and the book value of goods produced and shipped for the first time on a rental basis.

Quarries and Sand Pits, Metal Mines and Non-metal Mines (#26-255-XPB) publications report data derived from the Census of Mines, Quarries and Sand Pits. The Census is conducted at the establishment level, the smallest operating unit capable of reporting a specified range of basic statistics of economic production, usually a mine, mine/mill, quarry or sand pit operation. The value of production is provided as a proxy for annual revenues. The value of production is the value of shipments adjusted for change in inventories. The value of shipments is the net selling value of goods produced by the establishment. It excludes discounts, returns, allowances, sales taxes, excise taxes and duties, returnable containers and common or contract carriers' charges for outward transportation (but not own carriers' delivery expense). It includes revenues from repairs and work done on materials owned by others and transfers to reporting units of the same firm and all exports.

The publication *Vending Machine Operators* (#63-213-XPB) reports data derived from a survey of vending machine operators with annual revenues of at least \$20,000. Many thousands of machines are owned and operated by various retail stores, some wholesalers, restaurants, hotels, service stations and other personal service establishments are not included in this survey because separate accounting records are not available. The number of vending machines and the annual sales are provided.

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Coal Mines (#26-206-XPB) publication reports data derived from a survey of mines with annual revenues of at least \$1 million. The value of production is provided as a proxy for annual revenues. It includes operating subsidies, but excludes the value of coal used at the mines. For mines where the operator owns the mining property, the value of production is the value of the coal produced. Where the operator is contracted to operate the mine but does not own the property, the value of production is the monies received for work done on behalf of others.

The publication *Electric Power Generating Stations* (#57-206-XPB) reports data derived from the Generating Station survey. The survey coverage is limited to those utilities and companies that have at least one plant with a capacity of over 500 kW and is exclusive of auxiliary equipment installed only for generating station service. Standby generators (activated usually if there is a shut down of the power grid) are excluded from this survey.

Electric Power Annual Statistics (#57-202-XPB) publication reports financial data derived from an annual survey of all electric utilities in Canada. Also included are statistics on the supply and disposition of electric energy which are compiled from a quarterly survey of all power producers (approximately 200 producers operating some 900 stations).

The publication *Oil Pipeline Transport* (#55-201-XPB) reports data derived from an annual survey of approximately 70 oil pipelines, representing the entirety of Canadian oil pipeline operations. Some pipelines extend into the United States and return to Canada; these statistics account for the commodity distribution to the United States but the transportation equivalent of these operations is not included. Statistics on the summary of pipeline movements of Liquefied Petroleum Gases (LPG) are reported in this publication.

Grain Trade of Canada (#22-201-XPB) publication reports data derived mostly from administrative sources from within Statistics Canada or from other federal, provincial or international agencies. The number of grain elevators was derived from the Canadian Grain Commission.

Statistics Canada Databases

A variety of areas in Statistics Canada provided information for this project, retrieving data directly from their databases. This was necessary to provide the detail of information requested. The following is a brief description of the various databases used:

Agriculture provided data from their Whole Data Project database that contains information on farms with annual revenues greater than \$10,000. The database was created using administrative taxation data provided from Revenue Canada for incorporated and unincorporated businesses.

Manufacturing provided data from their databases to supplement information from their publication *Manufacturing Industries of Canada* as described above. The source of data and criteria are identical to those described above for the publication.

Distributive Trades provided data on retail and wholesale trade from their databases. These databases were created using a number of surveys as well as administrative taxation records of incorporated and unincorporated businesses.

Transportation provided data from their databases. The databases were created using a number of surveys as well as administrative taxation records. For the Ship Transportation industries the database includes companies with a gross business income of \$500,000 or more.

Industrial Organization and Finance derived data from the 1995 corporate administrative taxation database, also known as T2 file, that contains information on all corporations who file income tax returns with Revenue Canada. Import and export information by industry was derived from the Globalization database that was created from administrative sources, including customs files.

Tax Data Division provided access to their 1995 T1.SUP file that contains information on individual tax filers that reported business income on their 1995 return. It contains approximately 3.5 million records.

Interpretation of Data

Indicator #1

The purpose of this indicator is to establish the portion of commercial transactions that are dependent on measurements and measurement devices. This information, in part, could be derived from the series of Input-Output matrices.

For each industry grouping, the amount of commercial transactions that are dependent on measurement or measurement devices can be estimated using the Make (Output) Matrix of the annual averaged series of Input-Output Matrices. This matrix shows the value of commodities produced by each industry grouping. The portion can be calculated by identifying the commodities produced that are dependent on measurement and totaling them as a percentage of the total of all commodities produced. Measured commodities are referred to in the "measured outputs" column of Table A, below.

If a further breakdown of industries beyond the industry grouping is necessary, some estimation is required. The commodities should be distributed among industries within the industry grouping. From this a new percentage of the total could be calculated for each industry.

For example, the first industry grouping, Agriculture Livestock, produces the commodities listed in Table A. These values can be obtained by sorting, in descending order, the 627 values of output by commodity in the Make (Output) Matrix of the Input-Output Matrices.

By examining the commodities individually and estimating the portion of each that require measurement within this particular industry grouping, a total value of measured output can be calculated. Dividing the measured output by the total output (11,809/12,402) it is found that 95.2% of outputs produced are measured in this industry grouping, assuming the estimated percentages of measured output by commodity are accurate.

However, these industry groupings do not directly coincide with the industries or "trade sectors" of interest to Measurement Canada. The industry list in Appendix 3 shows the standard industrial classification codes of industries included within each industry grouping. From this list it is found that included within this industry grouping are the following trade sectors:

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- Dairy Farms (raw milk, cream);
- Livestock farms (beef, hog, poultry, sheep & goat, etc.);
- Honey and Other Apiary Product Farms;
- Furs and Skins; and
- Services Industries Incidental to Agriculture – only partially.

Further breakdown of the industry group value into trade sectors will require some estimation and arbitrary allocations.

Table A

Total and Measured Value of Outputs
For the Industry Grouping Agriculture Livestock
Three Year Average (1990, 1991 & 1992)
Current Dollars (\$millions)

Commodities	Value of Outputs	% of total Outputs	% of Outputs Measured	Value of Measured Outputs
0010 CATTLE & CALVES	4,168	33.6%	100	4,168
0090 FLUID MILK, UNPROCESSED	3,303	26.6%	100	3,303
0030 HOGS	1,847	14.9%	100	1,847
0040 POULTRY	1,119	9.0%	100	1,119
0231 SERVICES INCIDENTAL TO AGRICULTURE	593	4.8%	0	0
0100 EGGS IN THE SHELL	497	4.0%	100	497
4031 ANIMAL & VEGETABLE FERTILIZERS	352	2.8%	100	352
0059 OTHER LIVE ANIMALS	144	1.2%	100	144
0521 BEEF, FRESH, CHILLED, FROZEN	97	0.8%	100	97
0639 ANIMAL BYPRODUCTS FOR IND USE	61	0.5%	100	61
0650 POULTRY, FRESH, CHILLED, FROZEN	49	0.4%	100	49
0110 HONEY & BEESWAX	48	0.4%	100	48
0522 PORK, FRESH, CHILLED, FROZEN	42	0.3%	100	42
4080 PHARMACEUTICALS	39	0.3%	100	39
0210 MINK SKINS, RANCH UNDRESSED	26	0.2%	100	26
0523 OTHER MEAT, FRESH, CHILLED, FROZEN	10	0.1%	100	10
0620 RAW ANIMAL HIDES & SKINS	5	0.0%	100	5
0220 RAW WOOL	1	0.0%	100	1
Total	12,402	100%		11,809

Source of Data: Statistics Canada's Input-Output Make Matrix, the average of three years 1990, 1991 & 1992

For example, to arrive at a value for dairy farms, first select the commodities that are expected to be produced within this industry, then recalculate the percentage that require measurement as above, using only those commodities.

The commodities produced by the dairy farm industry might include fluid milk, cattle and calves, animal & vegetable fertilizers, all of which were estimated to be

100% measured. Therefore, for this particular industry we can estimate as 100% dependent on measurement, again assuming the estimated percentages of measured output by commodity are accurate.

The wholesale and retail industries must be evaluated differently from the example above. To avoid double counting on the input-output matrices, these industries provide the wholesale and retail margins³ as their output, but not the value of all the products they sell. The value of products measured by retailers and wholesalers do not appear with that industry, but is buried within values of the manufacturers and producers of those products. An approach may be to examine the final demand matrix and make basic assumptions, based on knowledge of each industry, such as, all personal expense (PE) items are assumed to be retail sales.

Indicator #2

The purpose of this indicator is to establish the economic significance of the industry in the Canadian economy. From the data provided there are two methods of evaluating this significance, both in terms of production and in terms of revenue

Production significance can be evaluated by looking at the outputs of each industry grouping as a percentage of total outputs of the Canadian economy. See appendix 7 for a listing of the selected industry groupings with the value of their total output and the percentage of their contribution to the total output of the Canadian economy. For example, the industry grouping Agriculture Livestock produced, on average for the years 1990, 1991 & 1992, a total output of \$12,401 million, which represents 1.22% of the total output of the Canadian economy (\$1,012,591 million).

The values for annual revenues and number of firms or establishments in Canada and by region for each of the industries and "trade sectors" of interest can be found in the table of appendix 1. The table shows that the Dairy Farms Industry had total revenues of \$4,608.5 million from 23,800 farms across Canada in 1995. This information is further broken down into five regions across Canada, including: Atlantic, Quebec, Ontario, Prairies and British Columbia.

When revenue information on an individual industry was not available, the industries were grouped together in such a way that information could be provided. They were grouped as follows:

- 0162 & 0163 Greenhouse and Nursery Products;
- 031 Fishing Industry (combines 0311 Salt Water Fishing & 0312 Inland Fishing);
- 0612 & 0613 Nickel-Copper-Zinc Mines;
- 0615 & 0619 Molybdenum & Other Metal Mines;
- 1995 & 1999 Other Textile Products Industries n.e.c.;
- 392 Jewelry & Precious Metal Industries (combines 3921 Jewelry and Silverware & 3922 Precious Metal Secondary Refining);
- 4612 & 4619 Crude Oil and Other Pipeline Transport Industry;
- 484 Postal & Courier Services (combines 4841 Postal Service & 4842 Courier Service);

³ Margins are sales minus the cost of goods sold.

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- 602 Liquor, Wine & Beer Stores (combines 6022 Wine Stores & 6023 Beer Stores).

The revenue information was found on almost all industries, as requested, with the exception of the following:

- 0632 Subbituminous Coal Mines;
- 0633 Lignite Mines;
- 1931 Canvas & Related Products.

Import and Export information is provided by commodity and by industry for selected industries in appendix 2. The first table in appendix 2 gives the value of Canadian imports and exports for selected industries in 1995. For example, this table indicates the export value of the industry "Dairy Farms" is \$11,948,000 and the import value is \$1,283,000.

The second table in appendix 2 is derived from the final demand matrix of the Input-Output series of matrixes and includes average values over three years (1990, 1991 & 1992) of exports and imports by commodity. For example, this table indicates the export value of the commodity "Cattle & Calves" is \$1,111 million and the import value is \$29 million.

Indicator #3

The third indicator is to determine the potential economic risk to the vulnerable party in trade transactions.

To evaluate this indicator it is simpler to evaluate one commodity at a time. Using the input and final demand matrices the users of the commodity can be identified.

Looking back to the example of indicator #1, the industry grouping Agricultural Livestock produced \$4,168 million of the commodity, "cattle & calves" as derived from the output matrix. The input table indicates the value of these outputs that were used as inputs in other industry groups. The final demand matrix indicates the value of these outputs purchased by the final user. The values in table B below are derived by extracting and sorting the values related to the commodity "cattle & calves" from the input and final demand matrices and comparing them to the total output of the commodity.

Table B
Values of Input, Output & Final Demand
For the Commodity "Cattle & Calves"
Three Year Average (1990, 1991 & 1992)

Matrix	No.	Description	Value (\$millions)	% of Outputs
Final Demand	128	Exports	820	19.7%
Final Demand	1 PE	Personal Expenditure -Food & non-	142	3.4%

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Final Demand	120 INV	alcoholic beverage		
Final Demand	121 INV	Inventory – Finished goods & goods i.p.	90	2.2%
Final Demand	135 GCE	Inventory – Raw materials	3	0.1%
Final Demand	130	Government Current Expenditures – Other provincial government revenues	1	0.0%
Final Demand	130	Imports	-30	-0.7%
Input	16 MEAT	Meat & meat products (except poultry)	2279	54.7%
Input	1 AGRIC	Agriculture livestock	809	19.4%
Input	183 RETAI	Retail trade	52	1.2%
Input	182 WHOLE	Wholesale trade	2	0.0%
Outputs	1	Cattle & calves	4168	100%

Table B indicates that the greatest portion (54.7%) of the commodity is used as an intermediate input to the Meat and Meat Products Industry, 19.7% is exported and 19.4% is sold within the same industry grouping as it is produced, Agriculture Livestock.

To establish the risk to the vulnerable party, it must first be established who the vulnerable party is. Knowledge about the industry and how trade transactions occur within the industry will help to identify the vulnerable party or parties. For this example, it will be assumed that the Meat & Meat Products Industry is the vulnerable party since it uses the largest amount of the commodity.

The risk to the Meat & Meat Products Industry can be calculated to be 26%, by dividing the inputs (\$2,279 million) of this commodity by the total value of outputs of the industry (\$8,769 million).

When the vulnerable parties are households rather than industries, household expenditure values should be compared to total household revenues. For example, the Meat and Meat Product (except poultry) industry group produces the commodities in table C, as derived from the output matrix.

All of the commodities produced, as listed in table C, can be evaluated separately or grouped together as deemed appropriate for determining the risk to the vulnerable party. For this example, the commodity with the largest value will be examined. The largest commodity produced in this industry grouping is "beef, fresh, chilled, frozen." It accounts for \$3,736 million or 43% of all commodities produced by this industry grouping.

Table D was created by extracting information from the input, output and final demand matrices.

It relates to the commodity "beef, fresh, chilled, frozen." Note that the input values represent intermediate use of the product. These industries use the product only to produce other products.

Table C

Total and Measured Value of Outputs
For the Industry Grouping Meat & Meat Products (except poultry)
Three year Average (1990, 1991 & 1992)

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Current Dollars (\$millions)

Commodities	Value of Outputs	% of total Outputs	% of Outputs Measured	Value of Measured Outputs
0521 BEEF, FRESH, CHILLED, FROZEN	3,736	43%	100%	3,736
0522 PORK, FRESH, CHILLED, FROZEN	1,851	21%	100%	1,851
0559 PREPARED MEAT PRODUCTS	1,289	15%	100%	1,289
0540 CURED MEAT	812	9%	100%	812
0620 RAW ANIMAL HIDES & SKINS	194	2%	100%	194
0619 FEEDS FROM ANIMAL BYPRODUCTS	177	2%	50%	89
0570 ANIMAL FAT & LARD	165	2%	100%	165
0523 OTHER MEAT, FRESH, CHILLED, FROZEN	106	1%	100%	106
5500 WHOLESALING MARGINS	96	1%	0%	-
0843 PRECOOKED & FROZEN FOOD PRODUCTS	87	1%	100%	87
0524 EDIBLE OFFAL, FRESH, CHILLED, FROZEN	83	1%	100%	83
0640 CUSTOM WORK, MEAT & FOOD	52	1%	50%	26
0650 POULTRY, FRESH, CHILLED, FROZEN	21	0%	75%	16
0590 SAUSAGE CASINGS	16	0%	100%	16
5590 OTHER RENT	3	0%	0%	-
5700 MEALS	2	0%	0%	-
TOTAL	8,769	100%		8,470

Table D

Values of Input, Output & Final Demand
For the Commodity Beef, Fresh, Chilled, Frozen
Three Year Average (1990, 1991 & 1992)

Matrix	No.	Description	Value (\$millions)	% of Outputs
Final Demand	1 PE	Personal Expenditure - Food & non-alcoholic beverages	2,060	55%
Final Demand	128	Exports	268	7%
Final Demand	120 INV	Inventory - Finished goods & goods I.p.	1	0%
Final Demand	121 INV	Inventory - Raw materials	1	0%
Final Demand	129	Re-imports	1	0%
Final Demand	130	Imports	-625	-17%
Input	16 MEAT	Meat & meat products industry (excluding poultry)	1,106	30%
Input	200 FOOD	Food & beverage service industries	735	20%

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Input	212 CAFET	Cafeteria supplies	228	6%
Input	199 ACCOM	Accommodation service industries	75	2%
Output	51	Beef, fresh, chilled, frozen	3,736	100%

Note that values may not add properly due to rounding, suppressions of confidential data and averaging three years of data.

In the example above, the largest consumer of the commodity is in the final demand category "personal expenditure – food & non-alcoholic beverages" which represents 55% of the total output. The personal expenditures referred to in this table are the same as household expenses. To evaluate the risk involved with the measurement, first it should be established what portion of the "personal expenditure – food & non-alcoholic beverages" is spent on "beef, fresh, chilled, frozen," then compare it to the portion of household income used to pay for food purchased from stores.

In this case, \$2,060 million is spent on the commodity "beef, fresh, chilled, frozen" within the final demand category of "personal expenditures – food & non-alcoholic beverages". The total amount spent on this final demand category is \$42,965 million as derived from summing all commodities within this category on the final demand matrix. The result is 4.8% of "personal expenditure - food & non-alcoholic beverages category" was spent on the commodity "beef, fresh, chilled, frozen".

To pursue this evaluation of the risk to the vulnerable party further, the Statistics Canada publication *Family Expenditures in Canada (FAMEX)* provides a breakdown of average household expenses as well as average household incomes, see appendix 9. The 1992 issue of FAMEX indicates that on average, \$5,686 was spent on food, of this amount \$4,236 was spent on food purchased from stores and \$1,434 was spent on food purchased from restaurants, etc. The average household income was \$46,076. Meaning that on average 9.2% of household income was spent on food purchased from stores.

The final step in the analysis is to tie in the information. Assuming the value of "personal expenditures – food & non-alcoholic beverages" can be related to the value of "food purchased from stores" from the FAMEX publication. The risk to the vulnerable party can be estimated to be the product of the portion of personal expenditures on food & non-alcoholic beverages spent on "beef, fresh, chilled, frozen" (4.8%) and the portion of household income spent on food purchased from stores (9.2%). The resulting risk is 0.44%.

Highlights & Analytical Summary Tables

One of the primary objectives of this report is to indicate the economic significance of the production and consumption of selected commodities that require measurement or use measurement devices in the Canadian economy. The size and significance of industrial activities is also an objective. The selected industries and commodities are ones identified by Measurement Canada as being important to their program.

Statistics Canada produces statistics on economic production and consumption as well as industry gross revenues for the entire Canadian economy. This information is available by industry grouping and by commodity. At the most detailed level there are 627 commodities and 216 industries used by this set of statistics.

To ensure consistency and comparability of commodity and industry statistics it is necessary to employ standard concepts and definitions for all commodities and industries in the analysis. Comprehensive coverage of the Canadian economy is also important. The national economic accounts within the accounting framework called the "System of National Accounts" for Canada (SNA) are published by Statistics Canada. They were selected as the main source of data for the report because they best met the criteria noted above.

The specific SNA statistical series used are the *Input-Output Accounts*. They are a set of two dimensional large matrices which indicate the value of commodities used, which are called *inputs*, and the value of commodities made, which are called *outputs*. "Commodities" are defined to include both tangible goods and services. The producers of goods and services are classified to standard industry groupings and the Canadian accounts are published by these industry grouping. The goods and services purchased by the producers are called "intermediate inputs". On the other side of the accounts the goods and services produced by the producers are displayed and they are called "outputs". The input-output tables are balanced. For each producer industry the market value of outputs equals the value of inputs, both intermediate and primary inputs. The primary inputs are the returns to labour and capital, or the *value-added*.

Primary inputs are listed in the following categories:

1. Labour income.
2. Operating surplus and net income of unincorporated businesses.
3. Net indirect taxes paid to government.

The economic significance of commodities produced in Canada can be measured by the value of producers' outputs. In this study outputs are also measured by industry grouping and by sector.

On the consumption and use side of the equation the value of inputs and the "final demand" are indicators of the value of commodities consumed or used. The vulnerable party in many cases is the user or consumer of the commodity. Producers of commodities purchase and use other commodities as intermediate inputs in their production operations. Persons and governments are the major final consumers of goods and services. The value of this consumption is called "final demand". Another way of expressing this accounting equation at the total economy level is:

Intermediate Inputs + Final Demand = Total Outputs.

Tables that set out the value of inputs ("Use" tables) and the value of output ("Make" tables) as well as "final demand" tables have been supplied to Measurement Canada. These tables are in great detail in terms of commodities and industry grouping so it may be difficult to grasp the meaning of all the data in these large matrices. To aid in the understanding of these accounts there are five highly summarized tables included in this analytical section of the report. This description and analysis is for illustrative purposes and is designed to help Measurement Canada understand the detailed tables already supplied.

Table 1

Table 1 sets out the value of inputs, outputs and final demand by commodity. It is in a highly summarized form. The table indicates the value of all outputs at \$1.0 trillion. This represents an average of the annual outputs for the years 1990 to 1992.

The commodity inputs are listed from item 1 to 45 in the table. Items 46 to 49 are primary inputs.

To identify the most significant groupings of commodity outputs in Canada one can rank the outputs from largest to smallest. A majority of the top 20 commodities are services as opposed to goods. The largest commodity produced is "personal and miscellaneous services," item 40, at \$88.8 billion.

Seven of the top twenty commodities are goods:

<u>Ranking</u>	<u>Goods</u>	<u>Value of Outputs</u>
3	- Autos, trucks and other transportation equipment	\$46.9 billion
9	- Supplies and materials used in laboratories, food services, Offices and other business operations	27.6
13	- Paper and paper products	20.5
15	- Crude mineral fuels	19.8
17	- Agricultural products	18.9
18	- Chemical and Chemical products	18.4
20	- Petroleum and coal products	17.1

The value of all goods and services consumed, which is under the heading "final demand" – according to table 1 was \$678.4 billion. This also represents the "Gross Domestic Product" (GDP). The largest single group of goods consumed is autos, trucks and other transportation equipment at \$20.1 billion.

The input column represents the intermediate inputs or commodities used by producers and the final demand column represents the commodities consumed.

Table 2

Table 2 sets out the value of outputs by highly summarized 16 industry groups. The 16 industry groups are ranked from largest to smallest.

Manufacturers produced 29.8% of all outputs, or \$302.0 billion. This group of industries represented by far the largest single portion of all outputs. Most other industry groups produced less than 10% of all outputs.

Table 1
Economic Production in Canada
Total Outputs, Inputs and Final Demand by Commodity
Three Year Average (1990, 1991 & 1992)
Current Dollars (\$millions)

	Commodity title -- Small Aggregation (S)	Inputs	Outputs	Final Demand
1	Grains	2,106	4,914	2,579
2	Other agricultural products	13,849	18,938	4,302
3	Forestry products	7,690	7,897	218
4	Fishing & trapping products	1,182	1,735	546
5	Metallic ores & concentrates	4,480	9,176	3,643
6	Mineral fuels	14,192	19,814	4,710
7	Non-metallic minerals	1,468	2,041	586
8	Services incidental to mining	3,832	3,816	0
9	Meat, fish & dairy products	7,006	19,592	13,526
10	Fruit, vegetables, feed, miscellaneous food products	6,761	13,939	10,609
11	Beverages	648	1,939	4,733
12	Tobacco & tobacco products	259	1,576	1,658
13	Rubber, leather, plastic fabricated products	6,426	5,462	-985
14	Textile products	4,900	4,154	-583
15	Knitted products & clothing	910	6,291	5,439
16	Lumber, sawmill, other wood products	8,632	14,149	5,576
17	Furniture & fixtures	358	4,187	3,892
18	Paper & paper products	10,702	20,544	11,498
19	Printing & publishing	10,899	10,906	1,704
20	Primary metal products	10,661	8,601	2,282
21	Metal fabricated products	13,859	11,270	-1,217
22	Machinery & equipment	6,015	10,582	2,456
23	Autos, trucks, other transportation equipment	19,537	46,895	20,135
24	Electronic & communications products	8,310	9,195	2,376
25	Non-metallic mineral products	6,437	5,003	-572
26	Petroleum & coal products	10,825	17,094	7,258
27	Chemicals, chemical products	16,138	18,434	4,150
28	Miscellaneous manufactured products	3,979	4,725	1,203
29	Residential construction	0	31,868	31,868

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30	Non-residential construction	0	46,345	45,589
31	Repair construction	9,912	14,379	3,977
32	Transportation & storage	34,635	45,880	11,550
33	Communication services	13,172	22,977	9,748
34	Other utilities	13,876	25,800	11,494
35	Wholesale margins	22,613	50,116	27,436
36	Retail margins	3,315	47,128	43,795
37	Imputed rent owner occupied dwellings	0	57,036	57,036
38.1	Imputed service, banks	3,787	9,565	5,771
38.2	Other finance & real estate services	16,314	35,157	18,853
38.3	Insurance & workers' compensation	6,546	13,742	7,175
38.4	Cash & residential rent	0	19,834	19,833
38.5	Other rent	16,542	18,262	1,770
38.6	Government royalties on national resources	4,055	4,058	1
39	Business services	35,759	41,912	6,125
40	Personal & other miscellaneous service	24,855	88,829	63,884
41	Transportation margins	8,337	18,505	10,161
42	Operating, office, laboratory & food	19,544	27,635	7,951
43	Travel, advertising, promotion	20,208	23,447	3,223
44	Non-competing imports	173	0	-782
45	Unallocated imports & exports	376	0	-376
46	Net indirect taxes	33,831	0	46,734
47	Labour income	274,526	0	107,399
48	Net income unincorporated business	37,804	0	0
49	Other operating surplus	167,765	0	10,672
	Total	1,012,591	1,012,591	678,388

Table 2
Economic Production in Canada – Total Outputs by Industry
Three Year Average (1990, 1991 & 1992)
Current Dollars

Rank	Ind. No.	Industry title – Small Aggregation (S)	Output (\$millions)	% of total
1	5	Manufacturing industries	302,002	29.8%
2	12	Finance insurance & real estate industries	157,431	15.5%
3	13	Community, business, personal services	117,957	11.6%
4	6	Construction industries	93,137	9.2%
5	11	Retail trade industries	55,694	5.5%
6	10	Wholesale trade industries	47,136	4.7%
7	7	Transportation & storage industries	46,741	4.6%
8	4	Mining, quarrying & oil well industries	37,360	3.7%
9	14	Operating, office, catering & laboratory supplies	27,635	2.7%

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10	9	Other utility industries	26,734	2.6%
11	1	Agriculture & related services industries	24,510	2.4%
12	8	Communication industries	23,985	2.4%
13	15	Travel, advertising & promotion	23,447	2.3%
14	16	Transportation margin	18,505	1.8%
15	3	Logging & forestry industries	8,557	0.8%
16	2	Fishing & trapping industries	1,759	0.2%
		Total	1,012,591	

Table 3

Table 3 displays the final demand data or Gross Domestic Product (GDP) by major sectors of the Canadian Economy. It sets out the expenditures, both current and capital, on goods and services. The "change in inventories" represents economic production that has not been consumed but remains in unsold inventory. Exports of goods and services represent economic production in Canada but not consumed domestically. On the other side, imports of goods and services represent domestic consumption that is not produced in Canada. The difference between exports and imports is shown (-\$5,442 million).

The two major consumer sectors are "persons" and "government". The personal sector alone accounts for \$411.3 billion, or 60.6% of all consumption. A little over 50% of this (\$210.3 billion) is in the form of services, and the balance represents goods.

A table setting out more a detailed list of commodities that are consumed was sent to Measurements Canada. This will help in identifying the significance of the commodity consumption by the vulnerable party.

Table 3

Economic Production in Canada -Final Demand
Three Year Average (1990, 1991 & 1992)
Current Dollars (\$millions)

1. Personal expenditures on:	
• Durable goods	54,644
• Semi-durable goods	37,888
• Non-durable goods	108,459
• Services	210,275
2. Government current expenditures net of Government sales of goods & services	143,477
3. Capital expenditures by:	
• Business	117,397
• Government	16,382
4. Change in inventories	-4,693
5. Exports net of imports	-5,442

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Total

678,388

Tables 4 and 5

Table 4 sets out the annual revenue by industry for 1995. The industries are ranked from largest to smallest in terms of annual revenues generated. The 84 "selected" industry groups in total represent \$665.2 billion in annual revenue.

The largest industry group is the retail food group at \$53.7 billion or 8.07% of the total. Most other industries (52 of the 84) have less than a 1% share of the total revenue.

In terms of the number of firms or producers, Cash Crop Farms and Livestock Farms at 112,415 and 109,924 respectively represent the industry groupings with the largest number of firms.

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Table 4

Custom Tabulation for Measurement Canada's Business Scope Project
 Number of Firms and Ranking of Annual Revenues,
 For Selected Industry Groups (Trade Sectors) in 1995

Ranking	Industry Description	# of Firms	Annual Revenue (\$millions)	% of Total Annual Revenues
1	71. Food Industry, Retail *	30,765	53,694.0	8.07%
2	58. Food and Beverage Manufacturing*	4,148	43,902.0	6.60%
3	49. Electricity	...	34,566.4	5.20%
4	57. Petroleum Products Wholesale*	3,465	32,821.0	4.93%
5	28. Pulp and Paper Industry	161	30,819.0	4.63%
6	30. Metal Except Precious Metals Steel Foundries	559	29,611.0	4.45%
7	11. Crude Petroleum Production	2,857	25,306.9	3.80%
8	35. Other Chemical Products Manufacturing	892	21,247.0	3.19%
9	32. Refined Petroleum Products Manufacturing	173	18,671.0	2.81%
10	2. Livestock Farms (beef, hog, poultry, sheep & goat)	109,924	18,639.0	2.80%
11	47. Telecommunication Carriers Industry	418	18,125.1	2.72%
12	54. Livestock, Wholesale*	1,420	16,669.0	2.51%
13	10. Mining Industries	242	15,787.0	2.37%
14	42. Truck Transportation	10,129	14,241.0	2.14%
15	75. Service Stations - Gasoline/Diesel*	15,859	14,180.8	2.13%
16	14. Meat and Meat Products Manufacturing	557	13,038.1	1.96%
17	55. Grains, Wholesale*	437	12,930.0	1.94%
18	9. Logging Industry	9,636	11,716.3	1.76%
19	5. Crops (wheat, grains, corn, oilseed, canola, soya...)	112,415	11,405.0	1.71%
20	33. Other Chemical Industries Incl. Cryogenic Liquids Manufacturing	216	10,185.1	1.53%
21	17. Dairy Products Manufacturing	270	9,448.6	1.42%
22	39. Air Cargo	786	9,418.0	1.42%
23	38. Trade Contractor Industries	5,143	8,502.0	1.28%
24	22. Other Food Products Industries Manufacturing	409	7,885.5	1.19%
25	77. Hardware Stores*	3,862	7,584.0	1.14%
26	70. Other Products, Wholesale*	2,143	7,478.0	1.12%
27	48. Postal and Courier Services	13,391	7,353.9	1.11%
28	62. Metals (except Precious), Hardware, Building Materials*	631	7,324.0	1.10%
29	40. Railway Transportation	27	7,207.0	1.08%
30	27. Textiles Manufacturing	776	7,061.0	1.06%
31	45. Pipelines - Custody Transfer	...	6,973.8	1.05%
32	72. Alcoholic Beverages, Beer, Wine Retail*	2,876	6,140.0	0.92%
33	18. Any Other Food Product and Soft Drink Industries Manufacturing	531	6,050.2	0.91%
34	13. Services incidental to the production of Crude Petroleum & Natural Gas	3,782	6,030.1	0.91%
35	50. Natural Gas Distribution	137	5,596.6	0.90%
36	60. Drugs Wholesale*	182	5,460.0	0.82%

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37	24. Distilleries, Breweries, Wineries & Govt. Liquor Board	122	5,450.0	0.82%
38	67. Industrial & Household Chemicals Wholesale*	1,228	5,421.0	0.81%
39	31. Cement/Concrete Manufacturing	976	4,935.0	0.74%

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Table 4 (continued)

Ranking	Industry Description	# of Firms	Annual Revenue (\$millions)	% of Total Annual Revenues
40	63. Metal Scrap (other than automobile wrecking), Recycling	2,880	4,913.4	0.74%
41	41. Ship Transportation	334	4,837.0	0.73%
42	1. Dairy Farms (Raw Milk, Cream)	23,800	4,608.5	0.69%
43	16. Fruit and Vegetable Industries, Manufacturing	194	4,331.4	0.65%
44	83. Automobile and Truck Rental and Leasing Services	2,542	4,119.4	0.62%
45	59. Alcoholic Beverages, Liqueurs, Beer and Wine Wholesale*	165	4,107.0	0.62%
46	15. Fish and Other Seafood Products Manufacturing	400	3,970.0	0.60%
47	20. Bakery Products Industries Manufacturing	485	3,957.2	0.59%
48	25. Tobacco Manufacturing	16	3,879.0	0.58%
49	52. Steam Generation	3,079	2,939.9	0.44%
50	53. Waste	3,079	2,939.9	0.44%
51	6. Fruits and Vegetables Agriculture	15,215	2,862.0	0.43%
52	76. Garages (general repairs)	8,409	2,815.7	0.42%
53	61. Household Goods Wholesale*	643	2,603.0	0.39%
54	34. Agricultural Fertilizers, Pesticides, Insecticides Manufacturing	149	2,590.2	0.39%
55	23. Soft Drink Industry Manufacturing	103	2,521.1	0.38%
56	21. Sugar & Sugar Confectioneries Industries Manufacturing	103	2,429.0	0.37%
57	26. Rubber and Plastic Products Manufacturing	179	2,418.0	0.36%
58	56. Other Farm Products Wholesale*	451	2,406.0	0.36%
59	46. Grain Elevator Industry	...	2,087.3	0.31%
60	19. Any Other Food Products & Soft Drink Manufacturing Industries	11	2,024.0	0.30%
61	29. Other Paper Products Manufacturing	133	2,022.0	0.30%
62	8. Fishing	...	1,763.6	0.27%
63	80. Food and Beverage Service Industry*	4,407	1,626.6	0.24%
64	37. Other ... Fur Dressing and Dyeing Manufacturing	1,019	1,483.0	0.22%
65	64. Feeds Wholesale	462	1,382.6	0.21%
66	78. Precious Metals and Stones Retail	3,493	1,202.2	0.18%
67	74. Floor Covering & Drapery Stores	2,001	1,202.0	0.18%
68	12. Quarries and Sand Pit Industries	488	984.0	0.15%
69	66. Precious Metals Wholesale	746	875.4	0.13%
70	7. Services Industries Incidental to Agriculture	2,910	835.0	0.13%
71	44. Other Transportation	1,058	810.0	0.12%
72	65. Seeds Wholesale	195	648.6	0.10%
73	36. Jewelry & Prec. Metal, Prec. & Semi-Prec Stones Manufacturing	298	545.6	0.08%
74	68. General Merchandise Wholesale*	324	539.0	0.08%
75	73. Fabric & Yarn Stores	935	517.2	0.08%
76	69. Forest Products, Wholesale*	78	510.0	0.08%
77	43. Taxicab Industry	9,841	503.3	0.08%
78	82. Power Laundries and/or Dry Cleaners	1,877	485.6	0.07%
79	79. Vending Machines	584	391.4	0.06%

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80	4. Furs and Skins	4,995	367.7	0.06%
81	84. Parking Spaces, Parameters	263	361.0	0.05%
82	81. Boat Rentals and Marinas	1,152	326.1	0.05%
83	51. Water Utilities	292	57.1	0.01%
84	3. Honey and Other Apiary Product Farms	545	50.8	0.01%
	Total	438,799	665,182.3	100.00%

Notes

The symbol "... " indicates the figures are not appropriate, not available or not applicable

The symbol "*" indicates the data contains 1994 values.

Annual revenues for most industries are "sales of goods & services" however there are a few industries (see Source of Data table in appendix 1) that use value of shipments or value of production as a proxy for revenues.

Table 5 also shows the 1995 annual revenue by 9 industry divisions. This table summarizes the industry groups by 9 sub-sectors. It indicates that manufacturing and wholesaling industries represent over 50% of all revenue of the selected industries. Manufacturing leads the list at \$205 billion or 30.8% of the total. At the other end the smallest groups are Fishing, Logging, Agriculture, Transportation and Mining. This entire group represents less than 25% of the total revenue.

Table 5

Custom Tabulation for Measurement Canada's Business Scope Project

Number of Firms and Ranking of Annual Revenues

For Selected Industry Divisions in 1995

Industry Division Description	# of Firms	Annual Revenue (\$millions)	% of Total Annual Revenues
E. Manufacturing Industries	13,875	205,075.0	30.8%
I. Wholesale Trade Industries*	19,598	149,990.0	22.5%
J. Retail Trade Industries*	78,025	94,646.0	14.2%
H. Communication and Other Utility Industries	...	69,039.0	10.4%
D. Mining (including milling), Quarrying and Oil Well Industries	7,369	48,108.0	7.2%
G. Transportation and Storage Industries	...	46,114.0	6.9%
A. Agriculture and Related Services Industries	269,804	38,768.0	5.8%
C. Logging and Forestry Industries	9,636	11,716.3	1.8%
B. Fishing and Trapping Industries	...	1,763.6	0.3%
Total		665,219.9	100.0%

Notes

The symbol "... " indicates the figures are not appropriate, not available or not applicable.

The symbol "*" indicates the data contains 1994 values.

Annual revenues for most industries are "sales of goods & services" however there are a few industries (see Sources of Data table in appendix 1) that use value of shipments or value of production as a proxy for revenues.