

**Report submitted to the Standards Council of Canada
and the Provincial-Territorial Advisory Committee**

**Interprovincial Regulatory Barriers to Procurement in
Western Canada's Oil and Gas Sector: Potential
Standardization-Based Solutions**

Final Report

Prepared by:

The Centre for Innovation Studies (THECIS)

125 Alastair Ross Technology Centre

3553 31 Street NW

Calgary, AB, Canada T2L 2K7

Principal consultants:

Richard Hawkins

Marc Godin

Peter Josty

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Executive Summary

As part of the most recent update of the Canadian Standards Strategy (CCS), and with reference to Chapter Four of the Agreement on Internal Trade (AIT), the Standards Council of Canada (SCC) and the Provincial-Territorial Advisory Committee (PTAC) are examining issues related to interprovincial procurement in order to promote the use of standards to remedy possible trade impediments. As a first step, PTAC elected to focus upon one economic sector, namely Oil & Gas, primarily in terms of procurement by this industry in the Provinces of British Columbia, Alberta and Saskatchewan.

The Oil and Gas Sector

Canada is the third largest producer of natural gas in the world and its established crude oil reserves (most of which are contained in Oil Sands) rank second only to Saudi Arabia. In 2006, capital expenditures by the Oil & Gas industry in western Canada were estimated at \$31.6 billion for the conventional Oil & Gas segment and \$11.6 billion for the Oil Sands segment. The Canadian Energy Research Institute recently estimated that between 2000 and 2020 \$101 billion of construction investment would be spent to build Oil Sands facilities. An additional \$111 billion would be required to sustain production. Of these amounts, approximately 38%, or \$80 billion over 20 years, would be spent on procuring manufactured products, including structural steel, pressure vessels, tanks, heat exchangers, turbines, pumps and pre-fabricated modules. Of the \$80 billion estimated for manufactured products, 48% is forecasted to be supplied by foreign manufacturers, 35% by Alberta-based firms and 17% by companies located in other Canadian Provinces. While Alberta-based companies have an obvious location advantage, the \$38 billion of manufactured goods that are forecasted to be supplied by foreign entities represents a significant opportunity for the Canadian manufacturing sector and interprovincial trade.

Scope of the Present Study

Accordingly, the present study was commissioned by the SCC and PTAC with the following goals:

- to review the regulatory environment pertaining to the Oil & Gas industry in western Canada, in order to identify any impediments to the interprovincial procurement of goods and services that are required by this industry,
- to identify possible solutions based upon the development and/or application of voluntary industry standards.

The study reviewed and analyzed the literature and pertinent reports concerning interprovincial trade and standards. Stakeholders from the four following groups were also consulted: procurement divisions of Oil and Gas companies; suppliers to the Oil and Gas industry; government officials; and individuals with particular expertise and experience. A total of 50 people representing companies, associations, and the federal and provincial governments in Quebec, Ontario, Saskatchewan, Alberta and British Columbia were interviewed.

Standards and Regulations

The National Standards System (NSS) oversees the development of voluntary standards which are developed under the auspices of accredited Standards Development Organizations (SDO). Such standards are most commonly applied by industry. They may also be adopted by regulators when deemed to meet public policy objectives. Although standards are in essence voluntary, they become mandatory when adopted by regulatory authorities. Voluntary standards can have very complex relationships with regulations. Directly related to codes and standards are issues of conformance: inspection, testing, approval, registration, verification and enforcement. In practice, conformance processes can have as much impact on trade and commerce as the standards themselves.

In general, regulations that affect the movement and use of products and equipment used in the Canadian Oil & Gas industry are the domain of Provincial jurisdictions. Electrical codes, boiler and pressure vessel codes, building codes, pipeline codes and many other types of codes are stipulated by Provincial governments. Provinces often base their codes on much the same source materials, which typically are either specifications issued by a Federal government agency or standards from national standards organizations such as the Canadian Standards Association (CSA). Depending upon the circumstances, Provinces may or may not add amendments or supplements to these basic instruments.

A review of Provincial technical regulations was completed recently by the Government of Ontario. All Provinces were found to have adopted the CSA Electrical Safety Code, some with amendments. Most Provinces have adopted the National Building Code, with or without amendments. Other regulations relevant to the Oil & Gas industry that are already harmonized to a significant extent include the boiler and pressure vessel codes and pipelines regulations. However, differences exist between Provincial regulations governing gasoline volatility, ozone depleting substances, fuel oil, liquid fuels, compressed natural gas and propane storage and handling. Differences also arise regarding which Provincial authority administers the regulations.

The Provincial practice of adopting a national-level regulatory instrument but with Provincial supplements provides flexibility and recognizes the need to strike a balance between the benefits of a having a single Canadian regulation and the need to respond to diverse local concerns that may arise from history, geography or other circumstances. In effect, products may be regulated by up to 14 Federal, Provincial or Territorial codes that are substantially similar but may differ on a small number of requirements.

However, the more commercially significant impact is not in the codes themselves but in the processes prescribed to demonstrate and maintain conformance, which are administered at the Provincial level and are generally not portable between Provinces. For example, a pressure vessel manufactured in Ontario would need to be inspected and certified by the Technical Standards and Safety Authority (the relevant Ontario agency). If this pressure vessel is destined to be installed in Alberta, then, in principle, it would also need to be inspected and registered by the Alberta Boilers Safety Association (the corresponding Alberta agency). Provincial regulatory agencies generally strive to avoid unnecessary duplication. Harmonization and consistent administration of safety

codes are also major objectives of the National Public Safety Advisory Committee (NPSAC) and of the Provincial Territorial Policy Advisory Committee on Codes (PTPACC).

Regulators in British Columbia, Alberta and Saskatchewan report that the four western Provinces have very similar standards with respect to Oil and Gas. Standards are based on documents from the CSA and other specialized standard-setting organizations. When differences exist, they are described as minor and justified by specific circumstances. Provincial regulators also report that they work closely and regularly with each other and with industry to address issues relating to regulations. Committees composed of government and industry representatives discuss problems and exchange information. One output has been the publication of Industry Recommended Practices that describe how to perform certain tasks or procedures in conformance with regulations, highlighting differences that may exist between western Provinces.

The governments of British Columbia and Alberta are currently implementing the Trade, Investment and Labour Mobility Agreement (TILMA) which covers the Oil and Gas sector. The process of reconciling or mutually recognizing standards and regulations is just starting. The first step will be to prepare lists of standards and regulations in each Province. The second step will be to compare equivalent regulations. The third step will be reconciling or developing mutual recognition schemes for those standards and regulations that restrict or impair trade, investment, or labour mobility. Additionally, the agreement obligates both Provinces to specify standards and regulations in terms of results, performance or competence where it is appropriate and practical to do so. Should significant changes be required, the affected industry will be consulted. The goal is to reconcile or develop mutual recognition schemes for all regulations and standards that restrict or impair trade, investment or labour mobility by April 1, 2009.

Impact on Procurement

During interviews, procurement managers of Oil and Gas companies generally reported that Canadian standards and regulatory codes posed no significant barriers to procurement. While they acknowledged differences between Provincial regulatory codes, and some complexities and possible redundancies with respect to conformance, these issues were described as “manageable.” Buyers appear to have satisfactorily adapted to interprovincial differences and certification requirements and these are deemed to be more irritants than obstacles to trade. Generally, no suggestions were offered by procurement managers for new undertakings to improve harmonization between Provinces beyond the existing activities of coordinating committees and councils.

Companies supplying the Oil and Gas sector also reported no significant issues with respect to regulatory standards. Most suppliers rely on standards that are used internationally by the Oil & Gas industry, such as those issued by specialized organizations and by CSA. When products are required to meet Provincial regulatory codes, companies reported that they maintain registration for their products at the Provincial level. Differences in regulations between Provinces did not appear to affect the marketing or movement of products. In general, the feedback from companies

based outside the Oil & Gas producing regions was that an investment of time and effort needs to be made up front in order to understand and adapt to differences in regulations, but that this effort is not unreasonable and, once completed, provides access to the marketplace.

In summary, it would appear that the standards regimes pertaining to the Oil & Gas industry in western Canada are functioning effectively in most cases. Moreover, it would appear that most of the Oil & Gas firms and their suppliers, both in the producing regions and elsewhere in Canada, have developed reasonably effective ways of dealing with the regulatory discrepancies that currently exist, such that they consider them to be more of irritants than obstacles to trade.

Opportunities for Standards Development

Three major areas were identified as prime candidates for specific actions within the National Standards System:

Modular Transport Platforms

High-and-wide load restrictions on Provincial highways mostly affect the supply of large prefabricated modules. Oil Sands companies favour prefabricated modules because of superior quality and shortages of skilled workers in sparsely populated northern Alberta. Therefore, an opportunity exists to develop standards for modular high-and-wide loads that are designed for assembly at destination and that would circumvent many of the highway codes and permit restrictions arising from actual road limitations.

In addition to circumventing many of the regulatory barriers associated with road transport between Provinces, the development of shipment platform standards for prefabricated modules designed for on-site assembly could open up markets and encourage more contractors and manufacturers to invest in the design of Oil & Gas-related heavy components. They also could lower engineering costs for both manufacturing companies and their customers. The example of such an initiative could also be transferred to other industrial sectors that are subject to similar restrictions.

Regulatory Conformance Procedures

The requirement for companies to obtain separate approvals from each Province or the Federal government for products, services and operations has resulted in increased costs because of the duplication of conformance processes and regulatory procedures. Due to the fact that products and services may be regulated by up to 14 Federal, Provincial or Territorial Codes, securing the equivalent of a national certification requires companies to wade through a maze of regulations.

For traders seeking a presence in new markets, obtaining this information is in itself potentially a significant source of trade inefficiencies. The development of correspondence tables between Federal, Provincial and Territorial regulations for specific products and services would be a valuable tool for companies that need to negotiate the regulatory conformance system across Canada. Such an effort may also be thought of as a necessary first step to document the extent of differences in regulatory compliance requirements between Provinces and Territories, identifying areas

where harmonization efforts would have the most benefit. Substantial harmonization of both regulations and conformance processes would pave the way for streamlined administration of the regulatory system across Canada, through approaches such as one window services, accredited nongovernmental organizations or Mutual Recognition Agreements (MRA).

In this case, the solution is not the development of technical standards, but the development of a standard information disclosure and exchange format that would assemble, contrast and compare Oil & Gas-related standards and regulations in all of the Federal, Provincial and Territorial jurisdictions. The 'Handbook' could be published in electronic form and provide a platform for the development of value-added search and interpretation services. An immediate benefit of such an initiative would be to document fully all of the corresponding and conflicting regimes to which Oil & Gas products and services are subject.

Mobility of Skilled Workers

Restrictions on the mobility of skilled workers were raised frequently by stakeholders of all descriptions. This issue is not directly related to the procurement of goods and services, but it is indirectly associated with standards and regulations because inspection and approvals services required for regulatory conformance are delivered by skilled workers certified at the Provincial level. This issue brings us into the now quickly emerging area of standards for services.

The development of service standards for technical and inspection activities of importance to the Oil & Gas industry would facilitate and support programs, committees, and councils that work at promoting increased mobility of skilled workers.

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Interprovincial Regulatory Barriers to Procurement in Western Canada's Oil and Gas Sector: Potential Standardization-Based Solutions

1. Preamble

The Standards Council of Canada (SCC) is a Federal Crown Corporation overseeing the National Standards System (NSS). The NSS mandate pertains to voluntary industry standards as established by industry and community stakeholders through its accredited Standards Development Organizations (SDO). Under the terms of the *Standards Council of Canada Act*, the SCC established the Provincial-Territorial Advisory Committee (PTAC) in 1996 with a mandate to advise the Council on standardization matters related to interprovincial/territorial cooperation and communication. As part of the most recent (2005-2008) update of the Canadian Standards Strategy, and with reference to Chapter Four of the Agreement on Internal Trade (AIT), PTAC was tasked to examine issues related specifically to interprovincial procurement in order to promote the use of standards to remedy trade impediments.

In order to reduce the problem of determining the potential role of standards in the interprovincial trade context to manageable proportions, PTAC elected to focus upon one economic sector, namely Oil & Gas, primarily in terms of procurement by this industry in the Provinces of British Columbia, Alberta and Saskatchewan, but also in terms of the economic and trade ramifications for the rest of Canada.

The Oil & Gas industry is of strategic importance to Canada as a whole. Canada is the third largest producer of natural gas in the world and its 179 billion barrels of established crude oil reserves (174 billion barrels of which are contained in Oil Sands) rank Canada second only to Saudi Arabia in terms of reserves and currently ninth in the world in terms of crude oil production.

The Canadian natural gas segment has grown only gradually in the past 10 years from 15.4 billion cubic feet per day (bcf/day) in 1996 to 17.1 bcf/d in 2006. The outlook is for stable or declining production during the next decade as conventional gas in the Western Canada Sedimentary Basin declines, while northern and unconventional gas resources are developed.

By contrast, the crude oil segment has grown by 30% in the same period – from 1.8 million barrels per day in 1996 to 2.4 million barrels per day in 2006. New Oil Sands production has more than replaced declining conventional oil output. Significant growth is expected for oil sands based on new projects currently being constructed in Alberta and Canadian crude oil production overall could double to between 4 and 5 million barrels per day by 2020.

The vast bulk of the Canadian Oil & Gas industry is headquartered in western Canada. The Provinces of British Columbia, Alberta and Saskatchewan jointly account for approximately 95% of Canadian natural gas production and 85% of crude oil production. Alberta is by far the largest producer, contributing 78% of natural gas production and 68% of crude oil production. Alberta and Saskatchewan are the only Provinces with Oil

Sands (the vast bulk of this endowment is situated in Alberta), the output from which is expected to grow fourfold within the next 20 years (CAPP 2007a, 2007b, 2007c).

Clearly, the rapid pace of development in the Oil & Gas producing regions represents a major opportunity for suppliers of goods and services of many kinds situated right across Canada. Significant avoidable discrepancies in regulations and technical specifications would likely have detrimental effects upon interprovincial trade efficiency. Accordingly, the present study was commissioned by the SCC and PTAC with the following specific aims:

- to review the regulatory environment pertaining to the Oil & Gas industry in western Canada, in order to identify any impediments to the interprovincial procurement of goods and services that are required by this industry,
- to identify possible solutions based upon the development and/or application of voluntary industry standards.

It is important to stress that the study is not concerned primarily with the dynamics of standardization in the Oil & Gas industry as such – i.e. with how, why and where standards are developed and applied in this industry. Rather, we are concerned with the relationship between voluntary standards and the various Provincial or Territorial regulations pertaining to this industry. Thus, the interprovincial trade barriers that we examine in this study are those that arise from *conflicting 'technical' provisions in regulations between Provincial or Territorial jurisdictions that may impede Oil & Gas undertakings located in one jurisdiction from procuring products and services from suppliers based in other jurisdictions.*

Before we could begin to examine these issues, we found it necessary to define some criteria for focussing the study:

- As not all technical incompatibilities are unavoidable, we focussed on identifying specific technical barriers that constituted *unreasonable* impediments to interprovincial trade as defined by the AIT.
- As clearly not all of the barriers we might locate would be technical in nature, at least not directly, we focussed on those that might be most suitable for standards-based solutions (i.e., solutions that would not require new legislative frameworks, formal interprovincial agreements etc.).
- Where standards-based solutions were possible, we focussed on solutions that would fall within the competency of SCC accredited SDOs or of organizations with which these agencies correspond, for example, the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the European Committee for Standardization (CEN), and the American National Standards Institute (ANSI).
- As many of the required goods and services in the Oil & Gas industry are generic and likely not amenable to (even partial) solution within this industry alone, we focussed on procurement areas that were specific to Oil & Gas or in which this industry had unique requirements for otherwise non-specific goods.

By setting these parameters, we confined ourselves to exploring those goods and

services environments that have unique associations with Oil & Gas or whose use in this industry has specific characteristics, and to exploring standards-based solutions that could reasonably be pursued within the NSS as currently constituted.

2. Standards and Interprovincial Trade

2.1. Voluntary Standards and Regulations

Standards as promulgated within the NSS are ‘voluntary’ in that they are both developed and applied voluntarily by various stakeholders through the auspices of accredited SDO. In contrast, compliance with Federal and Provincial regulations is mandatory. However, in some instances, regulators have the authority to ‘forbear’ the application of specific regulatory measures provided that it can be demonstrated that the regulatory objectives are being met by other means (Anderson et al 1998, Janisch & Romaniuk 1985). These ‘other means’ can include non regulatory measures such as voluntary codes of practice and standards.

In Canada, voluntary standards are increasingly being used as the basis of regulation. This supports good regulatory practice and is based on the SCC Guide on Use of Standards in the Regulatory Regime.

Voluntary standards also can have very complex *formal* relationships with regulations. Some of the most common ways in which voluntary standards and regulations become intertwined are as follows:

- A regulation may reference a voluntary standard. This reference may be to a specific *dated* version of the standard or it may be an *open* reference to the content of the standard in its most recent version as published by the promulgating agency. Referencing voluntary standards is common where regulatory agencies depend upon technical input from an industry. Examples include Building Codes and Electrical Codes (Lecraw 1981).
- Regulations may specify ‘mutual recognition’ of voluntary standards from different sources. This action normally is undertaken in connection with agreements between countries and regions to open up cross-border trade. Stakeholders agree (sometimes subject to specific caveats) that voluntary standards recognized in one jurisdiction will be recognized in the other relevant jurisdictions (NRC 1995). Concerns with providing a competitive advantage to countries with the least rigorous standards have limited the establishment of Mutual Recognition Agreements (MRA). The early stages of European integration saw a desire to apply mutual recognition of standards. However this has since been modified by the “New Approach” whereby the European SDO develop standards which incorporate “essential requirements” of European regulations (European Norms). These standards are voluntary but if adopted by EU Member States, they are “deemed to comply” with the essential requirements.
- A country may unilaterally recognize another country’s standards for regulatory purposes. For example, Canada has adopted a number of standards developed

by United States SDO as the basis of regulations in the federal regulatory regime.

- Regulations may specify a certification or licensing requirement which specifies compliance with a specific regime of voluntary (and/or mandatory) standards (NRC 1995).
- Regulations may exist because there is no industry standard. Industry standards are usually designed to promote competitiveness and facilitate trade among firms. However, it is generally considered that a valid reason for industries to undertake a voluntary standardization initiative is to avoid intervention by a regulatory authority (Breyer 1982). Market failure may compel government intervention through regulation. In choosing regulatory alternatives, through, for example, regulatory impact assessment, authorities generally seek the least burdensome and cost effective means to achieve the regulatory objective. This may include reference to voluntary standards, codes or industry self-regulation.

These are just a few prominent examples of how regulations and standards interact. The examples indicate also that there may be *many types of solutions* to trade problems that could involve standards. A few of the most obvious solutions include:

- A voluntary standard can replace a regulation.
- Regulations in different jurisdictions can be harmonized such that they refer to the same regimes of voluntary standards.
- MRA can be negotiated, although in practice they are now almost exclusively referred to in the context of recognition of conformity assessment results.
- New regional standards can be developed that are common to all of the relevant jurisdictions.
- Agreements to use only international or regional standards can be negotiated. The World Trade Organization (WTO) Technical Barriers to Trade (TBT) Agreement requires members to use international standards, where appropriate, as the basis of technical regulations. Harmonization of technical regulations is achieved through the development of international standards.
- Regulators can 'forbear' subject to the performance of an industry-led voluntary standards regime.
- Regulators can defer conformance determinations to accredited third-party certification authorities.
- Multiple jurisdictions can agree to coordinate disclosure of revisions and amendments to national or regional standards and certification regimes.

In the present context of exploring the impact on trade of standards and regulations, it must be acknowledged that many standards are referenced in regulations for reasons that are entirely unrelated to trade and commerce in the first instance, and, in particular, they have no primary association with promoting or inhibiting cross-border trade flows. Some may reflect local conditions – for example civil engineering regulations (and standards) may be different in earthquake zones than in geologically stable zones.

Many other regulations in which standards may be referenced exist primarily to support the implementation of government policies. This is common in areas such as public safety, health and the environment. Accordingly, in some instances, it is not the standards and/or regulations as such that impact trade, but the different underlying policy goals that occur commonly between jurisdictions. Setting these goals is a government prerogative (and responsibility), even though they can and often do raise costs for importers and exporters. However, when governments adopt regulations to achieve policy objectives in areas such as health and safety, they are generally expected to design the regulations in such a way that they do not become unnecessary obstacles to trade.

Given today's complex and constantly changing markets and technologies, products can be subject to standards that change frequently over time. Moreover, each facet of a product (materials, performance, applications, packaging, labelling etc.) can fall into a different standards regime. As a result, product regulatory compliance can be a maze of evolving regulations issued by different agencies, each with their own attendant standards.

2.2 Regulations, Standards and Conformance

Directly related to standards are issues of conformance: inspection, testing, approval, registration, verification and enforcement. In practice, conformance processes can have as much impact on trade and commerce as the standards themselves.

For voluntary standards, organizations such as CSA, UL and others may provide inspection, approval and registration services that by definition are identical across Canadian Provinces and indeed sometimes globally. However, with respect to regulatory conformance, the situation is markedly different. In general, regulations that affect the movement and use of products and equipment used in the Canadian Oil & Gas industry are the domain of Provincial jurisdictions. Electrical codes, boiler and pressure vessel codes, building codes, pipeline codes and many other types of codes are stipulated by Provincial governments. Provinces often base their codes on much the same source materials, which typically are either specifications issued by a Federal government agency or standards from national standards organizations such as the CSA. Depending upon the circumstances, Provinces may or may not add amendments or supplements to these basic instruments.

A review of Provincial technical regulations was completed recently by the Government of Ontario in the context of the Canadian Internal Trade Initiative (Shaker 2005). This effort examined Provincial regulations that were found to affect trade and classified them into different categories according to their degree of similarity with the relevant Ontario regulations. All Provinces were found to have adopted the CSA Electrical Safety Code, some with amendments. All Provinces have adopted the National Building Code, with or without amendments, with the exception of New Brunswick, Newfoundland and Prince Edward Island, where power to draft Building Codes has been ceded to municipalities. However, many of these municipalities have also adopted the National Building Code. Other regulations relevant to the Oil & Gas industry that are already harmonized to a significant extent include the boiler and pressure vessel codes, and pipeline regulations.

Differences exist between Provincial regulations governing gasoline volatility, ozone depleting substances, fuel oil, liquid fuels, compressed natural gas and propane storage and handling. Differences also exist as to which authority issues or administers the regulations. For example, in Ontario, liquid fuels and fuel oil are regulated by the Ministry of Consumer and Business Affairs while in some other Provinces these products are regulated through the Environment Departments or Ministries.

While the Provincial practice of adopting national model codes promotes uniformity, differences may arise because Provinces may do so at different times, sometimes years apart. Provincial jurisdictions may have adopted different editions of the codes. As a result, Provincial codes may allow products, processes or activities in one provincial jurisdiction and not in another simply as a consequence of different editions of model codes having been adopted. The uneven pace at which different regulatory authorities update codes and regulations may create unintended differences between Provinces, and, in some cases, between Canada and global standards.

Nevertheless, the Provincial practice of adopting a national-level regulatory instrument but with Provincial supplements provides flexibility and recognizes the need to strike a balance between the benefits of a having a single Canadian regulation and the need to respond to diverse local concerns that may arise from history, geography or other circumstances. In effect, products processes or activities may be regulated by up to 14 Federal, Provincial or Territorial codes that are substantially similar but may differ on a relatively small number of requirements.

However, the more commercially significant differences between Provinces with respect to the regulatory codes are not in the codes themselves but in the processes prescribed to demonstrate and maintain conformance. Regulatory conformance is administered at the Provincial level and is generally not portable between Provinces. For example, a pressure vessel manufactured in Ontario would need to be inspected and certified by the Technical Standards and Safety Authority (the relevant Ontario agency). If this pressure vessel is destined to be installed in Alberta, then in principle, it would also need to be inspected and registered by the Alberta Boilers Safety Association (the corresponding Alberta agency).

Provincial regulatory agencies generally strive to avoid unnecessary duplication. Harmonization and consistent administration of safety codes are also major objectives of the National Public Safety Advisory Committee (NPSAC) and of the Provincial Territorial Policy Advisory Committee on Codes (PTPACC).

The fact that regulatory conformance is governed at the Provincial level ushers in the related issue of the mobility of skilled workers. Specialists who provide regulatory conformance services are also certified at the Provincial level. In this area as well, programs exist to promote harmonization. The Interprovincial Standards Red Seal program is an effort to encourage the portability of qualifications and skilled workers mobility between Provinces.

2.3 Voluntary Standards and Trade

The facilitation of trade and commerce is one of the most commonly claimed benefits of standardization. Certainly standards perform this function, but the relationship between standardization and trade is extremely complex, particularly across internal or international boundaries. Positive effects are relatively easy to identify at the firm or industry levels (i.e. in the exchange of specific goods between specific firms or within discrete industries). But it is much more challenging to demonstrate a macro-economic effect, which would be necessary before determinations could be made concerning whether standards affect the trade efficiency of a whole country or region. It is even more challenging to determine whether the harmonization of national standards or the use of international standards affects this relationship.

On the one hand, there is empirical evidence that increased standardization activity can be associated with increased trade. Looking only at the UK and Germany, Swann et al (1996) demonstrated that generally there was a positive relationship between the intensity of standardization activity in a given country and the quantity of international trade in which this country was engaged. These results were confirmed by Blind (2001) and Blind & Jungmittag (2001). But mainly these effects were associated with the strength of *national* standards in the international marketplace, indicating also a strong strategic dimension for standards in both national and international trade.

On the other hand, many studies have indicated how standards also can become tools for gaining competitive advantage, especially in industries where technology changes rapidly and/or where large infrastructural investments are required (Besen & Johnson 1986, Besen & Farrell 1994, Hawkins 1996, Hawkins & Ballon 2007). Standards also can be used by governments to leverage the conditions of access to national markets, sometimes involving regulations, but sometimes involving reference to standards in public procurement practices and rules (Molas-Gallart & Hawkins, 1997, Krislov 1997, NRC 1995, Geroski 1990).

Since the earliest days of the General Agreement on Tariffs and Trade (GATT), formally promulgated national standards that act to restrict cross-border trade flows have been defined explicitly in the parlance of international trade negotiations as ‘technical barriers to trade’ (Middleton 1980). This practice has continued into the current WTO regime (NRC 1995). While national standards may become barriers to trade, the TBT Code of Good Practice, which has been adopted by virtually all national standards bodies, is designed to minimize their trade distorting effects. However, under the international trade rules, technical barriers are allowed in certain circumstances – e.g. where they concern health and safety – and normally they become an issue only where the *costs of adjustment* are considered to be *unreasonable*. Under the WTO TBT Agreement, no country is prevented from implementing measures to protect health and safety. Such measures are permitted so long as they are not discriminatory and a disguised restriction on trade.

The success of standards-based solutions to trade impediments is largely dependent upon adjustment costs. For example, in examining the economic implications for European industry of international trade barriers posed by variations in measurement

standards (e.g. dimensions of raw materials, clothing sizes etc), Tang & Hawkins (1998) found virtually no industry support for harmonizing these regimes. The simple reason was that for most industries, the costs of adjusting to different national metrology regimes were deemed to be far less than the costs of establishing a universal metric. Indeed, many companies viewed their ability to conform quickly to different standards to be a significant source of competitive advantage. This merely demonstrates one of the most fundamental observations about the stakeholder motivation to seek any kind of standards-based solution; namely, that pressure for standardization will emerge only when coordination costs are less than switching costs, or less than the costs of conforming to several standards (Thomson 1950, Farrell & Shapiro 1988, Weiss & Sirbu 1990).

2.4 The Interprovincial Trade Regime

Both the *BNA Act* of 1867 and the *Constitution Act* of 1982 establish the broad principle that there should be free movement of goods and services between Provinces. The problem is that the trade and commerce provisions in both Acts are somewhat obscure and have been open to interpretation. The Macdonald Commission of 1986 interpreted the internal trade provisions in Article 121 of the *BNA Act* to mandate elimination of all internal trade barriers and argued that this interpretation applied also the 1982 *Constitution Act*. However, another more common interpretation of Article 121 was that it prohibited only interprovincial *tariffs* – i.e. that non-tariff barriers, such as regulations or technical specifications were not specifically prohibited. Beaulieu et al (2003) note that although Section 92 of the present *Constitution Act* gives the Federal government explicit and exclusive powers to legislate on matters of internal trade, to date the Federal authorities have shown reluctance to use these powers.

Against this background, internal trade relations pertaining to western Canada are governed currently by two frameworks:

- At a national level, the Federal Government, the Provinces and the Territories are coordinating internal trade rules through the Agreement on Internal Trade (AIT) which first came into force in July 1994.
- On April 1, 2007, the British Columbia-Alberta Trade, Investment and Labour Mobility Agreement (TILMA) came into force. Although this agreement covers only two Provinces, the trade volume covered by the agreement represents a very substantial portion of total trade between all four western Provinces.

Consistent with the international trade regime, the AIT, does not call for the elimination of all possible trade impediments, specifying only those impediments that parties to the Agreement deem to be “unreasonable” (see Article 403 of the AIT). Indeed most of Articles 401 through 406 stress mainly the need to refrain from creating new potential obstacles and to make the interprovincial trade environment more transparent, while not impinging upon the constitutional authority of Provinces to rule in their areas of jurisdiction. Indeed, the Summary of the AIT sets out explicit exceptions:

[The AIT] “Recognizes that, in pursuing certain non-trade objectives, such as consumer and environmental protection, public health and safety, it may be necessary for a

government to deviate from the three preceding trade rules. In such cases, governments will need to ensure that any legislation or regulations they introduce:

- do not impair unduly the mobility of persons, goods, services or investments;
- do not restrict trade, more than absolutely necessary; and
- do not create a disguised restriction on trade.

Example:

A province may prohibit the transportation of hazardous goods through its territory in unsafe containers. However, insisting on a particular container design rather than a performance standard for the containers may be more trade restrictive than necessary and could be a disguised trade barrier (i.e. if the only firm manufacturing that particular design is located in-province)".

The BC-Alberta TILMA adopts virtually the same form and virtually all of the principles and objectives of the AIT. All of which leads to the obvious question – Why is the TILMA needed when we have the AIT? The officially stated reasons for entering into the TILMA can be found in the April 2003 Alberta-British Columbia Protocol of Cooperation and the Internal Trade Framework agreed by the two Provinces in May of 2004. These include wanting to establish an open, efficient and stable domestic market in Alberta and British Columbia and a desire to enhance competitiveness, economic growth and stability.

Significantly for the present study, however, it is important to note that the AIT provisions for energy under Article 1810 are still in negotiation. Provisions under Chapter Eleven of the AIT (natural resource processing) that might appear to encompass the Oil Sands (which is a processing rather than an extraction industry) make no mention whatsoever of the Oil Sands whilst being quite explicit about other forms of mineral processing.

Likewise, TILMA does not specifically mention the Oil and Gas sector. At this point, Article 15 of the TILMA specifies only the compatibility of standards for the electrical grid, and contains only a commitment to work towards inter-jurisdictional trade in energy. Moreover, it should be noted that the energy provisions of both agreements are oriented solely to energy products (electricity, petrochemicals etc.). Many of the provisions that might affect Oil & Gas industry procurement – like transport, investment or labour mobility – are outlined with no specific reference to this sector. The same is true for the provision on standards and certification.

However, TILMA is inclusive of the Oil and Gas sector. The General Rules of TILMA apply to Oil and Gas (Except for the special provisions and exceptions relevant to this sector).

2.5 Extent and Significance of Interprovincial Trade Barriers

The issue of interprovincial trade barriers is broad and somewhat contentious. We reviewed many claims and counter-claims in several recent policy documents and reports about the economic impact of such barriers (e.g. Alberta Economic Development Authority 2004, CCC 2004, Committee on Internal Trade 2005, Conference Board of Canada 2005, Darby et al 2006, Lee & Weir 2007, Paradis et al 2003, PROLOG Canada

and The Van Horne Institute 2005, and Shaker 2005). But we also scanned some recent independent scientific studies of this issue.

We learned very early on that this issue is highly politicized in Canada. What is interpreted by the industrial community (particularly the manufacturing industries) as removing internal trade barriers, is viewed by labour unions and many public welfare advocates as an attempt to harmonize social costs and benefits nationally at the lowest possible level. Arguments tend to be polarized by one or the other position, but both tend mostly to obscure the actual evolution and dynamics of internal trade.

The general argument as to the harm caused by interprovincial barriers is that if it is easier to establish trading relationships with another country than with another Province, foreign imports will preclude development of markets for domestic suppliers – that the ‘density’ of trade will shift offshore, resulting not only in lost revenues for domestic companies, but also in lower productivity.

However, we could find no conclusive corroborating evidence in the scientific literature that harm of this nature occurs, or at least that it occurs in the ways or to the extent claimed in many of the policy and advocacy documents we reviewed. For example, two independent and methodologically rigorous studies by Heliwell (1997) and Helliwell & Verdier (2001) have indicated that although indeed proximity to a local source of supply is a factor in procurement decisions, the rise in international trade that Canada has experienced in the NAFTA era has not negatively affected the density of interprovincial trade. Nevertheless, Coulombe (2003) indicates that in the NAFTA era, the rate of growth in interprovincial trade is less than that of international trade (internal trade virtually has stabilized relative to international trade). He notes however that whereas both international and internal trade generate jobs, only international trade appears to generate higher productivity.

Moreover, in the specific case of the TILMA, the very conditions that are claimed to indicate the necessity for such an agreement could also be interpreted to indicate no such need. Even accepting that Coulombe (2003) is correct in noting no significant growth in internal trade relative to international trade, this does not preclude bilateral increases in internal trade. And indeed, trade between Alberta and BC has increased dramatically in the 1990 – 2005 period. Between 2001 and 2005, BC-Alberta trade increased by over 29% and Alberta-BC trade increased by 26%. The framers of the TILMA infer that this growth is related to the AIT. Thus, the rationale behind the TILMA is that if internal trade is already this active, then with further action to remove even more trade barriers it will grow even more spectacularly. But of course the rate of growth in the first place is of an order that would not ordinarily be associated with a trade relationship that is significantly restricted by non-tariff barriers. Furthermore, the growth pattern was already well established before the AIT could be expected to have had any appreciable effect.

However, even if we accept fully the arguments that interprovincial barriers are a major obstacle to growth, we have to figure in the degree to which many companies actually benefit from these barriers and the degree to which any harm is offset. According to the studies by the main industry bodies, all of the Provinces erect barriers to protect key industries within their jurisdictions. But none of these studies assesses the assumed

gains from access to new interprovincial markets against the presumed cushion provided by barriers maintained by their Province of incorporation.

2.6 Interprovincial Trade Barriers in the Oil & Gas Industry

Taking these observations into account, we parsed all of the relevant studies on the subject of interprovincial trade barriers for examples of specific barriers to procurement in the Oil & Gas industry. Only two of these reports cited specific examples.

The Conference Board of Canada report *An Impact Assessment of the BC/Alberta Trade, Investment and Labour Mobility Agreement* (The Conference Board of Canada 2005) notes:

- “For example, due to different electrical codes between Alberta and British Columbia, oil and gas companies must rewire their exploration rigs before taking them from one Province to the next. The different standards and regulations thus add to the cost of oil and gas companies doing business between the Provinces.” (p. 21)
- “Another example is related to TransAlta’s experience in exporting its natural gas from Alberta to the north-western United States. Since there is no transmission line in southern Alberta, the company has to rely on the transmission pipeline through B.C. in order to reach the United States. The different regulations and standards governing access to transmission pipelines in the two Provinces makes it difficult for TransAlta to ship its natural gas. In addition, Alberta also requires that energy companies must maintain an office and management in Alberta in order to engage in their energy-related businesses in Alberta. This has severely restricted the development of an oil and gas industry in B.C.” (p. 21)
- “As a consequence, many technical standards and regulations continue to differ among the Provinces and territories. In addition, many companies have to deal with many regulatory bodies in order to conduct the business across the country. According to Mr. Patrick Daniel, President and the Chief Executive Officer of Enbridge Inc., the duplication of regulators costs his company about 5-10 million dollars per year in addition to the legal fees and manpower in order to comply with the rules and regulations of different jurisdictions.” (p. 24)

Of the barriers identified in the Canadian Chamber of Commerce report *Obstacles to Free Trade in Canada: A Study on Internal Trade Barriers* (The Canadian Chamber of Commerce 2004), those that potentially are especially relevant for the Oil & Gas industry include:

- “Equipment movement: e.g.: in mining...regulations may make it difficult to move equipment from B.C. to Alberta.” (p. 10)
- “Transportation: load regulations, etc. can move a large load from Mexico to Fort McMurray in one piece. If it had to cross into B.C., it would require breakdown!” (p. 10)

Beaulieu et al (2003) echo much the same examples, referencing interviews with chief executives of Oil & Gas companies. However, as noted in more detail below, when

during our own stakeholder consultations these specific examples were discussed with industry representatives who were arguably closer to the actual procurement process than CEOs (including representatives of firms not based in the western Provinces), no significant effects or problems relating to these particular barriers were noted. In almost all cases, the reasons for discrepancies in the regulatory regimes was accepted either as being rooted in government policies, or unavoidable because of differences in local geographical and infrastructural conditions, or otherwise not being a source of unusual or unreasonable adjustment costs.

As Timilsina et al (2005) show (based upon Statistics Canada data), what can be established beyond reasonable doubt is that in roughly the period since the signing of the AIT, the total share of international imports into the principal Oil & Gas producing regions has risen whereas imports from other Provinces have declined. In Alberta, the percentage of foreign imports rose by roughly 10% between 1992 and 2001, with imports from the rest of Canada declining by roughly the same amount.

With respect to the share of all imports procured specifically by the Oil Sands industry (one of the largest single procurers of capital goods), the situation is even more unbalanced. Table 1 shows data assembled by Timilsina et al (2005) that indicate the shares of goods and services in key import categories that in 2005 were purchased specifically by the Oil Sands industry.

The data show that in the three main segments of this industry (see discussion below for a more detailed description of what is contained in each of these segments), the share of goods and services imported from other Canadian Provinces is very small relative to the share of purchases from within Alberta or from foreign sources. The main type of capital goods is related to manufacturing and, with the exception of 'In Situ' activities, the majority of these goods are imported from foreign sources.

The problem is that no data are available (nor was it possible to produce such data within the remit of the present project) that indicate precisely the reasons for these distributions. Timilsina et al (2005) indicate that many of the capital goods requirements of the Oil Sands industry are highly specialized and that the technology advantage and applications experience resides either with foreign firms, or with first-mover firms within Alberta.

But all firms wishing to enter emerging specialized markets virtually always incur substantial new investment costs related to designs and processes. At this point, the degree to which firms not situated in oil-producing Provinces have made these adjustments in order to enter the Oil & Gas industry marketplace is unknown. Therefore, it is not yet possible to say whether their low profile in procurement markets for Oil Sands development or for conventional extraction might be due to regulatory and/or technical trade barriers, or simply due to failure to recognize the potential of this emerging market and to invest accordingly.

The above review of relevant studies and scientific literature raises many questions and points to many gaps in our knowledge about the role that internal regulatory barriers and conflicting standards may or may not play in impeding interprovincial trade in the Oil & Gas industry. However, we hasten to point out that none of the opinions and positions

we reviewed as to the existence and significance of regulatory barriers in the Oil & Gas industry, or to the magnitude of their effects, could be corroborated independently one way or the other.

Table 1 - Jurisdictional Shares of Major Purchases by the Alberta Oil Sands Industry

	Mining			Mining & Upgrading			In Situ		
	Alberta	Rest of Canada	Foreign	Alberta	Rest of Canada	Foreign	Alberta	Rest of Canada	Foreign
Development									
Manufacturing	38	16	46	34	16	50	64	14	22
Construction	0	0	0	0	0	0	100	0	0
Gas Utilities	0	0	0	0	0	0	0	0	0
Business services	100	0	0	100	0	0	95	4	1
Total goods and services	44	14	42	44	14	43	73	11	16
Labour	100	0	0	100	0	0	93	7	0
TOTAL	55	12	33	61	13	25	80	10	11
Production									
Manufacturing	29	26	44	17	20	63	67	13	20
Construction	0	0	0	0	0	0	0	0	0
Gas Utilities	100	0	0	100	0	0	100	0	0
Business services	0	0	0	0	0	0	0	0	0
Total goods and services	61	11	28	34	16	50	-	-	-
Labour	100	0	0	100	0	0	100	0	0
TOTAL	77	6	16	61	9	30	-	-	-
Source: (Timilsina, LeBlanc et al. 2005), constructed from data submitted in Environmental Impacts Assessments to the Alberta Energy & Utilities Board and Alberta Environment									

Nevertheless, although in general the evidence suggests that claims of harm from internal trade barriers should be re-evaluated critically, we must be careful not to exclude the possibility that the *overall* costs of some of these barriers in specific industries might indeed be significant, even where companies have become accustomed to managing these costs. Or even where these costs may be modest, there still could be effective ways of reducing them, some of which could well involve standardization initiatives. But before we can indicate these possibilities for the Oil & Gas industry specifically, we must first review the composition of this industry and the relationships with standards that apply in each segment.

3. Standards and the Oil & Gas Industry

The Oil & Gas sector is composed of the following segments:

- conventional oil and natural gas;
- conventional heavy oil;
- unconventional gas; and,
- oil sands.

Each segment has different associations with standards, or, in some cases, as yet little association at all except at very generic levels that have no specific association with Oil & Gas industry processes or products.

3.1 Conventional Oil and Natural Gas

Conventional oil and natural gas have the longest history. The Canadian oil industry became commercially significant during the winter of 1946-47 with Imperial Oil's Leduc No. 1 discovery well south of Edmonton. These conventional resources can be produced and transported to market with relatively simple equipment and technology. They are characterized by a relatively high depletion rate which implies that the production life of a given pool is generally less than one or two decades. Production equipment is installed when the resource is brought into production. While the equipment is maintained over the life of the asset, it is not usually substantially modified or replaced.

The principal challenge with these resources is exploration and discovery. Most of the relatively accessible resources have already been identified. In the US, production of conventional light oil peaked in 1971 and has been decreasing since. Alberta's production of light oil also peaked in the same time period (1973), while natural gas production is currently flat with 2001 being the peak year by a small margin (AEUB 2007). As a result, the focus of investment and technology for this segment is exploration for hard to find resources (such as deep pools) and opportunities in frontier regions such as the Mackenzie Delta and offshore Nova Scotia and Newfoundland.

Conventional oil and natural gas is a global industry. The same technology, expertise and equipment that are applied in western Canada are applied in all of the other Oil & Gas producing regions of the world. Exploration and production companies operate globally in order to diversify risk. Specialized service and technology companies also operate globally, sharing knowledge and transferring expertise between regions as required.

Thus, most of the technical standards that are specific to the Oil & Gas industry originate from the conventional oil and natural gas segment. The standards issued by the American Petroleum Institute (API) and other petroleum associations are likely the most frequently used public standards specific to the Oil & Gas industry. In Canada, the CSA and the Canadian General Standards Board (CGSB) also issue standards related to the petroleum industry.

3.2 Conventional Heavy Oil

Conventional heavy oil is incrementally more difficult to produce than light oil. In past decades, when these resources were discovered, they were not usually the object of active developments because of their marginal economics. As a result, there is a large volume of discovered but un-recovered heavy oil. Significant increases in the price of oil in recent years have made heavy oil viable economically and companies are starting to exploit known deposits to a larger extent.

The high viscosity of conventional heavy oil results in slower production rates and hence a longer production life as compared to light oil. Higher prices and a longer economic life-span mean that investments in more equipment and technology can be justified. Heavy oil fields present potential opportunities for volume deployment of standardized equipment. However, this opportunity is tempered at this point in time by the highly developmental nature of much of the technology. In many cases, it is probably premature to specify industry-wide standards.

3.3 Unconventional Gas

Unconventional gas refers broadly to resources such as coal bed methane, shale gas, tight gas and, in the longer term, gas hydrates. Each resource presents specific technical challenges that are the object of technology development and piloting. It is too early in the life cycle of these resources to be considering standardization of equipment or technologies.

3.4 Oil Sands

Oil sands generally refer to mixtures of sand and bitumen, which is extra heavy oil that will not flow naturally to a well. Alberta's oil sands constitute a very large resource, by far exceeding the size of all conventional resources in Alberta and of comparable magnitude to Saudi Arabia's oil reserves. In concert with higher oil prices and a favourable royalty regime, the adaptation and development of technologies such as surface mining, Cyclic Steam Stimulation (CSS) and Steam Assisted Gravity Drainage (SAGD), have led to significant growth in the oil sands segment in recent years.

Oil sands are not an exploration challenge. Their location and size have been known for decades. Oil sands are a technological and manufacturing challenge. Given the large size of the resource and its concentration in northern Alberta, oil sands are a long life asset that likely will last for a century. Therefore, oil sands present a significant opportunity for technology development and the eventual standardization of production methods.

Surface mining operations are mechanized recovery and extraction operations. Recovery technology has evolved from bucket wheels and drag lines to the current method of large shovels and oversized trucks. Much of this equipment can be procured in the form of standard product lines from specialized suppliers. But given the short history of oil sands, the small number of participating companies and the reliance on relatively few proprietary sources of equipment, there is little incentive to codify more than generic components in formal voluntary standards. Furthermore, with the

introduction of 'at-face' mining approaches involving mobile crushing systems and fewer trucks, production technology is still evolving, thus further complicating the introduction of standards.

In Situ recovery operations are also witnessing significant expansion. CSS has been practiced in Cold Lake for over 20 years and standard approaches to the technology have appeared. However, only a very small number of large companies, such as Imperial Oil, actually operate this technology. Thus, most standards are likely to be proprietary specifications and the motivation to place them in the public domain may not be strong.

The technology of choice in Athabasca is SAGD, which has a shorter history than CSS. Many operators are still in the learning phase and early developments are considered confidential by most companies. It is reported that attempts to benchmark SAGD performance parameters have met with little enthusiasm from corporate participants. At this point, the motivation to set industry-wide standards is weak.

3.5 Upgrading and Refining

Upgrading refers to the process of converting bitumen and extra heavy oil into a synthetic crude oil (SCO) that can be accepted by typical refineries. Most oil sands operators upgrade their bitumen into SCO to maximize market opportunity and reduce the risk of price fluctuations. In 2006, Alberta crude bitumen production was approximately 200,000 m³ per day, of which approximately 120,000 m³ per day (60%) was upgraded into 105,000 m³ per day of SCO (AEUB 2007).

Refining is the manufacturing process by which crude oil is transformed into useful transportation fuels such as gasoline, diesel and aviation fuel. Crude oil and SCO are refined in Alberta to meet regional demand. However, the general industry pattern is that western crude oil and SCO are transported by pipeline and refined in consuming regions such as Ontario, British Columbia and the United States.

Refining and upgrading technologies are global in scope. Refineries in Europe or the Middle East contain all the same process operations as Canadian and American refineries. Companies that develop and license refining technologies operate and compete globally.

Upgrading of Alberta bitumen required the adaptation of existing technologies. Two decades ago, the Alberta Government and the Federal Government each attempted to develop a new upgrading technology for bitumen. The technologies were never commercialized. Instead, existing technologies such as coking and fluid bed hydrocracking were adapted by commercial vendors and implemented in the existing upgraders in Alberta and Saskatchewan.

Refining and upgrading remain the domain of global technology companies and the impetus for developing public domain standards is likely to be weak in this highly competitive segment.

4. Demand for Manufactured Goods in the Western Oil & Gas Industry

In 2006, capital expenditures by the Oil & Gas industry in western Canada were estimated at \$31.6 billion for the conventional Oil & Gas segment and \$11.6 billion for the Oil Sands segment (CAPP 2007c). As noted above, the conventional segment is mature, with most future growth coming from the Oil Sands segment. Procurement of manufactured goods and equipment represent only part of capital expenditures because the industry will generally capitalize all development and construction costs including land and labour.

Detailed information on the composition of capital expenditures in the conventional segment was not immediately available with respect to procurement of manufactured goods. Table 2 presents the allocation based on categories typically used in the industry. It can be noted that drilling and field equipment represents approximately 50% of total expenditures which would imply annual expenditures in the order of \$15 billion per year. Some of this amount would include labour costs but drilling and field equipment are the categories most likely to involve manufactured goods, such as steel pipe, tubing, valves, pumps and associated instrumentation.

Table 2 - Expenditures by the Conventional Oil and Gas Segment in Western Canada	
Exploration	
Geological and geophysical	1.9%
Drilling	8.9%
Land acquisitions and rentals	4.4%
Total	15.2%
Development	
Drilling	27.7%
Field equipment	14.3%
Enhanced recovery & pressure maintenance	0.4%
Natural gas plants	1.7%
Total	44.1%
Operating	
Field, well & gathering operations	17.1%
Natural gas plants	3.6%
Total	20.6%
Royalties *	20.1%
TOTAL EXPENDITURES	100.0%
Source: CAPP 2007c	

As mentioned earlier, the Canadian Energy Research Institute (CERI) recently studied the potential economic impact of Oil Sands developments (Timilsina, LeBlanc et al. 2005). Their findings concerning the prominent role played by international vendors and

the decline of interprovincial trade were highlighted above. The authors also determined that, between 2000 and 2020, \$101 billion of construction investment would be spent to build Oil Sands facilities. In a separate report (Canadian Energy Research Institute 2005), CERI developed estimates of oil sands production costs. Based on these cost data, it can be forecasted that \$111 billion would be required to sustain production activities between 2000 and 2020. These cost estimates were based on 2004 data (construction) and 2005 data (production) and are likely to be higher in future years due to recent significant cost increases.

Of these amounts, approximately 38%, or \$80 billion over 20 years, would be spent on procuring manufactured products. The authors then estimated the jurisdictional shares of major purchases. Of the \$80 billion estimated for manufactured products, 48% is forecasted to be supplied by foreign manufacturers, 35% by Alberta-based firms and 17% by companies located in other Canadian Provinces. Table 3 summarizes the information calculated from data provided in the CERI report.

The study indicates that in Alberta (where most of the Oil & Gas industry is located) about half of the capital equipment is procured from foreign vendors. But there may be reasons for this preponderance of imported goods that have no necessary association with the interprovincial trade situation. Put simply, on a continental basis, the historical orientation of the Canadian Oil & Gas industry has been north-south. Moreover, where an east-west procurement orientation exists, historically this has been with European-based companies (chiefly Shell and BP) rather than with central Canada.

Table 3 - Forecasted Share of Manufactured Goods Expenditures by the Oil Sands Industry (\$ billion; 2000 to 2020)				
	Alberta	Rest of Canada	Foreign	Total
Related to Construction Activities	\$19.5	\$7.6	\$21.6	\$48.8
Related to Production Activities	\$8.1	\$6.2	\$16.5	\$30.8
Total	\$27.6	\$13.9	\$38.2	\$79.7
Percentage	34.7%	17.4%	47.9%	100.0%
Adapted from: ((Timilsina, LeBlanc et al. 2005)) and (Canadian Energy Research Institute 2005)				

While Alberta-based companies have an obvious location advantage in supplying the Oil Sands industry, the \$38 billion of manufactured goods that are forecasted to be supplied by foreign entities represents a significant opportunity for the Canadian manufacturing sector. Oil Sands development involves the procurement of substantial quantities of

ancillary and supporting equipment from housing for construction camps, to valves and piping, to skid mounted electrical and thermal utilities.

Manufactured products in high demand by Oil Sands companies include structural steel, pressure vessels, tanks, heat exchangers, turbines, pumps and pre-fabricated modules. Canadian government and industry bodies have dedicated resources to facilitate procurement of this equipment in order to meet demand but also to share economic opportunities with other regions of Canada. For example, the Canadian Manufacturers and Exporters (CME) in conjunction with the Federal, Alberta and Ontario governments, operate the website Innovative Canadian Oil Sands Manufacturing Opportunities (www.icosmo.ca). In addition, trade missions have been organized to bring together oil sands companies and potential suppliers from other Provinces. These efforts are likely to raise awareness and encourage the Canadian manufacturing sector to invest in the development of markets in the western Oil & Gas sector.

5. Findings from the Stakeholder Consultation

All of the discussion above suggests several interim observations:

- The effects of internal trade barriers appear to be somewhat weaker in the Oil & Gas sector than assumed or predicted by most studies of interprovincial trade barriers in general.
- As yet, the cost of coordinating and harmonizing regulations and standards pertaining to the Oil & Gas industry appears to be greater than the costs of adjustment, indicating a low incentive to standardize in many cases.
- The fluid state of many key Oil & Gas technologies and/or the relatively small production of these technologies by specialized suppliers appear to dampen the general demand for industry-wide standards in many high capital investment areas.
- Interprovincial trade related to Oil & Gas has declined in the last decade and procurement patterns appear to favour local and international suppliers rather than suppliers from other Canadian Provinces. But interprovincial trade barriers would appear to be only one of many factors influencing this balance and on the present evidence this would not appear to be a major factor.

In order to test the validity of these observations, we engaged in a stakeholder consultation exercise involving interviews with public and private sector stakeholders, both within the Oil & Gas producing regions and outside of these regions.

A total of 112 people were contacted and 50 interviews were completed between August 9 and November 6, 2007. Companies interviewed were located in the Provinces of Quebec, Ontario, Saskatchewan, Alberta and British Columbia. Representatives from the governments of Canada, Ontario, Saskatchewan, Alberta and British Columbia were also interviewed. Most interviews were conducted by telephone but some were conducted using email. The questionnaire is reproduced in Appendix 1. The list of people contacted and interviewed is presented in Appendix 2.

Stakeholders from the following four groups were interviewed:

- procurement divisions of oil and gas companies (located in Alberta, British Columbia and Saskatchewan);
- suppliers to the oil and gas industry;
- government officials;
- individuals with particular expertise and experience in Oil & Gas procurement.

The following pages provide a summary of stakeholder perspectives. More details can be found in Appendix 5 where complete highlights of stakeholder comments are presented.

5.1 Summary of Stakeholder Perspectives

5.1.1 General Perspectives on Technical Barriers

5.1.1.1 The view from within the Oil & Gas producing regions

Interviews were conducted with procurement managers at major Oil & Gas companies as well as at major Engineering, Procurement and Construction companies that provide engineering and procurement services to the Oil & Gas industry.

The basic stages of a typical procurement process are:

- bidding,
- evaluation,
- selection and award,
- contract administration.

As such, procurement specialists are not engaged directly with setting or adopting technical standards. Where the procurement process makes reference to standards, these are specified by the relevant engineering departments. It is typical for common items to fall into several standards regimes. For example, if a pressure vessel is being procured, the vessel itself would fall under a Boiler Code standard, any electrical instrumentation would fall under a CSA Electrical Code standard and any platforms or structures attached to the vessel would involve the Building Code. Engineers would identify which specific standards are appropriate and then develop a requisition that would reference the standards.

The engineering standards specified by the Oil & Gas industry include those mandated by regulatory codes such as:

- electrical codes;
- boiler and pressure vessels codes;
- building codes;
- plumbing codes;
- pipeline regulations;
- regulations related to Oil & Gas activities;
- regulations related to the handling of Oil & Gas products

- environmental regulations.

But with respect to regulatory codes generally, interviewees reported that they posed no significant barriers to procurement. While procurement managers acknowledged minor differences between Provincial regulatory codes, and some complexities and possible redundancies with respect to conformance, these issues were described as “manageable.” Buyers and vendors appear to have satisfactorily adapted to interprovincial differences and certification requirements. Generally, no suggestions were offered for new undertakings to improve harmonization between Provinces beyond the existing activities of coordinating committees and councils.

Some difficulties were reported regarding the importation of equipment into Canada. American suppliers are not all aware of Canadian regulatory codes and revisions and this can cause delays. Some companies are interested in importing products from Asian and European manufacturers but recognize that suppliers from these regions have likely little knowledge of Canadian regulations.

Oil & Gas procurement also involves standards for products and manufactured goods that do not fall directly under regulatory codes; e.g. steel, mechanical cables, pumps, turbines etc. For these purchases, Oil & Gas companies rely on standards from major standards organizations such as:

- Canadian Standards Association (CSA);
- American Petroleum Institute (API);
- American Society of Mechanical Engineers (ASME);
- ASTM International.

Many CSA energy standards are also Canadian standards because they are cited in both federal and provincial regulations. CSA's Canadian Electrical Code, first issued in 1927, is nationally recognized and specified in Canadian federal and provincial regulations. CSA standards for oil and gas pipelines are recognized nationally and internationally and are also specified in Canadian federal and provincial regulations. More information about CSA is provided in Appendix 3.

Organizations such as API and ASME are accredited standards development organizations of the American National Standards Institute (ANSI) and many (although not necessarily all) of their standards are promulgated by ANSI as US National Standards.

Interviewees confirmed that the American Petroleum Institute (API) is probably the most significant single source of specialized standards for the Oil & Gas industry worldwide.

API publishes a directory of 2,334 companies in 69 countries that are registered under various API programs as API Certified Suppliers. This number includes only 86 Canadian companies (less than 4% of all API certified companies). As shown in Table 4, 72% of these companies are located in Alberta. As API certification is a necessary step in gaining access to many segments of the Oil & Gas marketplace, these figures indicate that as yet few firms outside of Alberta have made the commitment to supply these segments.

Interviewees reported no interprovincial difference with respect to standards from API or

any of the other relevant US-based agencies and no difficulties were reported when using these standards for procuring equipment from different Provinces in Canada. Indeed, interviewees noted that the advantage of using these standards is that they are recognized globally. Appendix 4 provides an overview of API and summarizes the scope of its standards.

Government regulators and experts in British Columbia, Alberta and Saskatchewan report that the four western Provinces all have very similar standards with respect to Oil and Gas. Standards are based on CSA, API, UL and documents from other standard-setting organizations specializing in Oil and Gas. When differences exist, they are described as minor and justified by specific circumstances.

With respect to regulations concerning safety and the environment, the western Provinces have formed a committee that includes representation from Oil and Gas companies, as well as service providers, to develop and publish Industry Recommended Practices (IRP). The IRP describe how to perform certain tasks or procedures in conformance with regulations. When there are small differences between provincial regulations, these are noted in the IRP. In other words, IRP are guides to safe and environmentally respectful work practices that comply with provincial regulations.

Table 4 - API Certified Supplier Facilities in Canada		
Province	Number of Facilities	Percent
Alberta	62	72%
Newfoundland	3	3%
Nova Scotia	3	3%
Ontario	12	14%
Quebec	3	3%
Saskatchewan	3	3%
TOTAL	86	100%
Source: http://compositelist.api.org/AdvancedSearch.asp Prepared August 9, 2007		

Provincial regulators also report that they work closely with each other and the industry to address any issues relating to regulations. There is a regulatory review committee where government representatives meet with industry representatives and discuss problems and answer questions. Suggestions are brought forward to make regulations safer and easier to administer, such as electronic submission of forms. When governments cannot change regulations, the committee offers the opportunity for explaining the reasons why changes are not possible. This committee meets regularly, approximately two or three times per year.

The governments of British Columbia and Alberta are currently implementing the Trade, Investment and Labour Mobility Agreement (TILMA). The Oil and Gas sector is covered under TILMA, including specific measures to reconcile standards and regulations but also to remove regulations when they are not compatible with the Agreement.

The reconciliation process is just starting. The first step will be to draw up inventories of standards and regulations in each Province. The second step will be to compare equivalent regulations between the two Provinces. The third step will be reconciling or developing mutual recognition schemes for those standards and regulations that restrict or impair trade, investment or labour mobility. In some cases regulations will need to be amended or repealed because they contradict the agreement. For example, Alberta has regulatory measures that require portions of the management of Oil and Gas companies operating in Alberta to be located there. These regulatory measures contradict TILMA and will need to be removed by October 2008. In most cases however, the reconciliation or mutual recognition of standards and regulations will be done on a case-by-case basis. Ideally the reconciled regulations will not be prescriptive; instead they will be expressed in an outcomes based manner. The first pass at reconciling, or developing mutual recognition schemes, for Oil and Gas regulations will be done by government, including Oil and Gas regulators in Alberta and BC. Should significant changes be required, industry will be consulted during the development of new regulations. The goal is to either reconcile or mutually recognize any regulation that applies to the Oil and Gas sector and that restricts or impairs trade, investment or labour mobility by April 2009.

5.1.1.2 The view from outside the Oil & Gas producing regions

We contacted fifteen manufacturing companies located in Ontario or Québec and ten located in British Columbia, Alberta or Saskatchewan that are supplying the Oil & Gas industry in western Canada and it was possible to arrange interviews with eleven of them. In addition, interviews were conducted with Federal Government and Trade Association representatives involved in assisting small and medium sized enterprises in selling to the Oil & Gas sector. The products supplied by these companies include fabricated storage tanks, silos, duct works, custom-fabricated steel products, mechanical cables, pipes, tubing, flanges, valves and fittings.

By and large, the companies reported no significant issues with respect to regulatory or industry standards. Most companies rely on standards that are used internationally by the Oil & Gas industry, such as those issued by the (mainly US-based) bodies listed above. Standards issued by CSA were also mentioned as being recognized uniformly across Canada. Some products are required to meet Provincial regulatory codes. In these instances, companies reported that they maintain registration for their products at the Provincial level. Differences in regulations between Provinces, if any, did not appear to affect the marketing or movement of products.

In general, the feedback from companies based outside the Oil & Gas producing regions was that an investment of time and effort needs to be made up front in order to understand and adapt to differences in regulations, but that this effort is not unreasonable and, once completed, provides access to the marketplace. Moreover, reinforcing the importance of internationally recognized standards to the Oil & Gas

sector, two companies reported that achieving certification with organizations such as the American Petroleum Institute had been a major milestone in their business plan.

This view was tempered by industry organizations such as the Canadian Manufacturers and Exporters (CME) who indicated that this situation could apply only to a small percentage of companies that have been successful in overcoming regulatory barriers and that now consider regulatory barriers as a competitive advantage and a means to prevent competitors from entering the same market. Unfortunately, these organizations could provide no data to back up these views (e.g. statistics on success or failure rates in entering Oil & Gas markets). Neither could we find corroboration from any independent source.

5.1.2 General Perspectives on Non-Technical Barriers

5.1.2.1 Mobility of Skilled Workers

In general, at least as it concerns the manufacturing, operation and shipment of goods used by the Oil & Gas industry, stakeholders reported few if any procurement issues related to differences in Provincial regimes of technical regulations and standards. However, they reported that the same is not true for conformance processes (inspection, testing, approval, verification and enforcement). These fall under Provincial jurisdictions and can result in the need to repeat the conformance processes in each Province. Even though Provincial regulatory agencies have taken measures to avoid redundancy, companies reported that the requirement to maintain certification and registration through separate Provincial processes creates an administrative burden and increases costs. However, most companies appear to have adapted to this situation and did not express a desire for dramatic changes.

The one area where both companies and industry associations advocated change concerned the mobility of skilled workers. This issue is prompted in large measure by the simple fact, particularly in the Oil & Gas producing Provinces, that there are now severe shortages of skilled workers. However, this issue has an indirect impact on the subject of standards and regulations because skilled workers are required to staff the conformance processes that certify products. Usually, the inspectors and technicians who provide regulatory conformance services are themselves regulated and certified at the Provincial level. Concerns were expressed by stakeholders with respect to the timely availability of skilled workers for certifying products.

It should be noted that the 45 year old Interprovincial Standards Red Seal Program encourages standardization of provincial and territorial apprenticeship training and certification. The Red Seal Program is managed by Canadian Council of Directors of Apprenticeship, composed of representatives of the Federal and Provincial governments. Through the Program, apprentices and certified journeypersons are able to obtain a Red Seal endorsement on their Certificates of Qualification and Apprenticeship by successfully completing an Interprovincial Standards Examination. The Red Seal Program is intended to provide greater mobility across Canada for skilled workers and allows qualified tradespersons to practice their trade in any Province or territory in Canada where the trade is designated without having to write further

examinations. To date, there are 49 trades included in the Red Seal Program on a national basis.

5.1.2.2 International Aspects

As discussed earlier in this report, approximately half of the forecasted expenditures for manufactured goods by companies involved in Oil Sands development are expected to be supplied by foreign vendors. We noted also the historically north-south orientation of the western Canadian Oil & Gas industry; being in effect part of one giant petroleum producing region extending from the Arctic to Texas whose markets are defined and controlled by a few large global energy companies. This fact explains the strong reliance by western Canadian Oil & Gas companies on international standards, most of which are of US origin. However, this does not mean that procurement from foreign-based suppliers circumvents any of the issues noted above.

The procurement managers we interviewed recognized that Canadian suppliers can be at an advantage in that they are better aware of Canadian regulatory codes and standards, and often manufacture products that are already compliant and/or registered with the relevant certification agencies. They report that purchasing equivalent products from US manufacturers may sometimes result in delays caused by a lack of familiarity with Canadian regulatory codes. Once again, however, this fact is expressed more as an inconvenience than as a major impediment.

It was noted that US manufacturers often do have the advantage when it comes to shipping high-and-wide loads. The north-south geography is such that there is a relatively uniform shipping corridor spanning from Mexico to Alberta in terms of load capacities and sizes. In contrast, the east-west shipping corridor (particularly across Canada) is relatively less uniform, with different size and load restrictions pertaining to different geographical regions. The problem is particularly acute regarding shipments to and from the west coast.

Western Canadian Oil & Gas companies are interested also in procuring equipment from Asia and Europe. But at this point they are cautious because offshore vendors are likely even less aware of Canadian regulations, possibly resulting in serious delays or cost overruns. One suggestion from the interviews that might facilitate procurement from offshore vendors is the development of equivalency tables between Canadian and foreign standards, particularly standards from China, India, Japan and Germany.

5.1.3 Code-specific Perspectives

Many of the observations in published reports and many of the comments from stakeholders reference standards codes – frameworks of standards relating to specific classes of goods, infrastructures and trades. The following is a summary of these observations relative to the four most commonly cited codes.

5.1.3.1 Boilers and Pressure Vessels Codes

The codes for boilers and pressure vessels are uniform between Canadian Provinces. They are all based on the CSA Standard 351 which itself is directly based on the relevant ASME code. CSA 351 has been adopted by all Provinces and the Federal

Government. However, in the boiler and pressure vessels area, significant differences between Provinces were reported with respect to the inspection and certification process.

5.1.3.2 Electrical Codes

All Provinces have adopted the CSA Electrical Safety Code, some with amendments. Electrical Codes are generally viewed as uniform across Canada and usually synonymous with the CSA Code.

Compliance processes are also generally uniform. Electrical installations need to be inspected and certified locally by Provincial authorities. Electrical products are also governed by the Electrical Codes. Certification and approval of electrical products is done by third-party organizations such as CSA International, Underwriters Laboratories and others. These organizations test and approve products according to the relevant specifications of the CSA Electrical Code. Approved products then bear a mark as evidence of their approval. Provincial authorities recognize the approvals granted by these standards organizations and products bearing the marks are allowed to be used within their jurisdiction.

Several of the policy documents and reports reviewed above cite the requirement that petroleum exploration rigs needed to be rewired when moving between service in Alberta and British Columbia because of differences in Electrical Codes, resulting in additional costs to oil and gas companies. However, this was not substantiated by the industry and government representatives we were able to interview. Representatives of the Canadian Association of Oilwell Drilling Contractors (CAODC) and of the Government of Alberta stated that, in general, petroleum exploration rigs are not required to be rewired for compliance with electrical codes when moving between Alberta and BC. Any electrical installation that meets the requirements of the Canadian Electrical Code is acceptable across Canada.

However, two specific issues regarding petroleum exploration rigs were mentioned:

- differences in lock out procedures; and,
- different requirements for explosion-proof heaters.

The Alberta Electrical Safety Codes Council has established a close working relationship with counterparts in BC and Saskatchewan to develop the Code for Electrical Installations at Oil and Gas Facilities. Stakeholders were confident that any issues regarding this Code could be addressed efficiently through existing coordinating councils as were other recent issues encountered regarding rigs, camps and transportation.

5.1.3.3 Building Codes

As stated earlier, all Provinces have adopted the National Building Code with some amendments with the exception of some Maritime Provinces who have delegated the power to draft Building Codes to municipalities. Our interviewees noted that differences between Provinces were minor, although sometimes they required some re-training of trades people.

5.1.3.4 Highway Codes

Although vehicle dimensions and weights are well harmonized between Provinces, there can be substantial differences in the rules governing shipments of high-and-wide loads. Most of these differences are directly related to physical limitations arising from actual road infrastructure and geography, but stakeholders noted that moving these loads between the US and Canada could be less problematic than moving them between Provinces. Permit restrictions limit the size of loads that can be shipped into Alberta from both British Columbia and Eastern Canada.

While truck dimensions and weights are fairly well standardized, there are logistics issues with moving large loads, skids and prefabricated modules to Alberta from Provinces such as British Columbia, Québec and Ontario. These issues relate to width, height and weight restrictions on highways. Alberta has the most advantageous transportation regulations in Canada for high and wide loads. In Alberta, the high and wide corridors allow loads up to 24 ft. wide. However, in British Columbia, loads are restricted to widths of 14 ft. when crossing the Rocky Mountains. In Saskatchewan and Manitoba, the maximum width is 20 ft.

The reasons for the restrictions in BC relate primarily to the difference in actual road and bridge infrastructure. For example:

- Alberta has a much greater proportion of 4 lane highways than BC;
- For the most part BC has 1 meter of highway shoulder, while Alberta shoulders are normally up to 2 meters wide;
- Alberta highways have generally better sightlines than BC highways;
- Alberta has a 2:1 ratio on its slopes whereas BC has a 4:1 ratio;
- The BC highway system has many more bridges, the widths of which often define the width restrictions of the road beds.

In Ontario the maximum width is 18 ft. and special permits are required. A similar situation exists for height and weight restrictions. An alternative to road transport would be to ship through the Great Lakes to avoid highway restrictions on the Canadian Shield, to land shipments at Duluth, Minnesota and to reach western Canada via the U.S. interstate highway system.

In general throughout Canada, highway restrictions for high and wide loads reflect geography and infrastructure investment patterns rather than insufficient harmonization between Provincial Highway Codes.

6. Finding Standardization-Based Solutions to Interprovincial Trade Barriers in the Oil & Gas Industry

In retrospect, the Oil & Gas industry has turned out to be an intriguing and somewhat provocative case for examining the interprovincial trade barrier issue. The many faceted nature of the industry, its highly location-specific characteristics and its reliance upon an

extremely wide range of manufactured goods, value-added services and worker skills shows up most of the problems and gaps in how we perceive interprovincial trade issues. It also illustrates how an industry based mostly in one region can open up major market opportunities for companies across Canada, and how regulatory and technical specification issues can affect this outcome, irrespective of whether they might be considered trade barriers or normal costs of doing business.

Generally speaking, the conclusions we drew from our analysis of existing reports and studies were consistent with what emerged from our stakeholder consultations. To sum up, it would appear that the standards regimes pertaining to the Oil & Gas industry in western Canada are functioning effectively in most cases. Moreover, it would appear that most of the Oil & Gas firms and their suppliers, both in the producing regions and elsewhere in Canada, have developed reasonably effective ways of dealing with the regulatory discrepancies that currently exist, such that they consider them to be more of an irritant than an obstacle to trade.

However, we noted also that perceptions of the actual costs of dealing with different regimes of regulation, standardization and certification might vary considerably according to the perspective of the stakeholder and the position of various functionaries involved in the procurement process. We were careful to acknowledge that information about the effects of regulatory dissonance upon actual costs is at best fragmentary, and often anecdotal. But even an obstacle that is being well managed may still be generating more costs than necessary, especially if these costs are considered at an aggregate level – i.e. costs that seem insignificant for one firm may constitute a significant cost for an industry as a whole.

6.1 *Isolating significant barriers and solutions*

Thus, taking account of the parameters noted in Section 1, we have examined all of the above evidence with an eye to isolating specific instances in which:

- There is a widespread agreement that an obstacle to interprovincial trade exists, even if there is no consensus that the obstacle is a significant source of costs or competitive disadvantage.
- There is real potential to address the obstacle through the development and/or application of standards that fall within the orbit of the Canadian National Standards System.
- There is reasonable likelihood that an initiative to address the obstacle via a standards-based initiative would attract industry interest and support.
- There is high general relevance in terms of indicating how standards-based solutions to interprovincial trade issues might be applied in a variety of other industrial contexts.

We were able to identify three major areas that correspond to these criteria and that could well be prime candidates for specific actions within the NSS:

6.1.1 Modular Transport Platforms

We noted in several places that high-and-wide load restrictions mostly affect the supply of large prefabricated modules into the Alberta Oil Sands. Oil Sands companies favour prefabricated modules for the following reasons:

- prefabrication is generally done indoors under controlled conditions which generally results in superior quality; and,
- prefabrication is done by manufacturing companies located in populated areas with good access to skilled workers which generally alleviates issues related to shortages of skilled workers in northern Alberta.

While it may not be possible to ship very large prefabricated modules from Ontario to Alberta due to actual road limitations, manufacturing companies could consider designing their products as smaller prefabricated modules that could be bolted together on-site. So whereas there may be little opportunity for further harmonization of highway codes and permits, an opportunity exists to develop standards for modular high-and-wide loads that are designed for assembly at destination that would circumvent many of these code and permit restrictions.

We note that the concept of standards for shipment platforms and analogous applications is not new and that they have been developed successfully in other jurisdictions, even for highly specialized applications. A good example is standards for space launch payloads. A similar approach could be pursued for prefabricated modules and utilities required by the Oil and Gas industry in western Canada and allow manufacturing companies in other Provinces to maximize their opportunity through high and wide corridors restricted by geographical considerations.

6.1.2 Regulatory Conformance Procedures

The requirement for companies to obtain separate approvals from each Province or the federal government for products, services and operations has resulted in increased costs because of the duplication of conformance processes and regulatory procedures.

A good example of the problem concerns natural gas pipelines. As Alberta does not have a natural gas transmission pipeline crossing directly into the United States, exports need to transit via British Columbia (leaving Alberta near Crowsnest Pass on the Foothills Systems or through the interconnection between the Alberta and B.C. systems) or via Saskatchewan (leaving Alberta near Empress on the Canadian Mainline). Differences in regulations and standards governing access to natural gas pipelines reportedly create difficulties for companies planning to export natural gas from Alberta.

Stakeholders reported that standards for the technical construction and operation of pipelines are very uniform across Canada. However, these pipelines are a regulated business in Canada and the regulatory processes that determines access and sets commercial terms vary by jurisdiction. Pipelines and shipments inside provincial boundaries fall under Provincial oversight while interprovincial pipelines and exports are regulated by the National Energy Board. There are significant differences between jurisdictions with respect to information requirements, approval processes and rules governing access. Each jurisdiction has its own approval process and companies that

operate under more than one jurisdiction must follow different processes for each jurisdiction. There are also instances where different Provinces or different Federal departments interpret or apply the same standard or regulation differently. Differences in approval criteria and regulations governing access are also likely to arise because of different policy goals pursued by different jurisdictions. This means that regulatory processes to obtain approval for pipeline construction and natural gas shipments are often long and complicated. In this example, the need to conform to possibly overlapping Federal and Provincial approval processes creates complexities, costs and delays for business.

Another example is that in Alberta, areas known as Oil and Gas Exploration Sites are regulated by the Energy Resources Conservation Board (successor to the Energy and Utilities Board as of January 1, 2008). These areas are exempted from the Alberta Fire Code. Areas that are not Oil and Gas Exploration Sites are under the jurisdiction of the Alberta Fire Code. Tanks used to store combustible and flammable liquids are more strictly regulated and face more stringent requirements when under the jurisdiction of the Alberta Fire Code. This situation may create confusion in the industry, and at times among regulators, as to which set of regulations applies to oil and gas. An incorrect interpretation is that oil and gas equipment is exempt from the Alberta Fire Code. An example may be a company attempting to store American Petroleum Institute (API) standard tanks in a municipality where a ULC standard referenced under the Alberta Fire Code is required. Therefore, some aspects of oil and gas activities may be regulated by one of two Provincial jurisdictions, depending on circumstances. In this example, the need to conform to possible overlapping Provincial regulatory processes may result in confusion, costs and complexities for industry.

There can be no question that a greatly streamlined system of conformance to regulatory codes that are acknowledged to be similar across Canada, would remove an unintended barrier to companies wishing to access markets in other Provinces. Provincial regulatory agencies generally strive to avoid unnecessary duplication. For example, a simpler approval process may be stipulated for products already approved in another Province. Another example is that some agencies offer a 'one window' service where a product may be certified and registered simultaneously in more than one Province thereby reducing some of the procedural burden. Non-governmental organizations may also be involved as it is the case for electrical products which are tested by accredited organization recognized by several provincial authorities.

An analogous situation exists with respect to reconciling securities regulations in Canada. While the subject is highly controversial, some of the avenues being pursued for securities regulations may offer ideas for safety codes compliance processes. Provincial and Federal governments are generally agreed on the need to reconcile their legislative and regulatory frameworks. However two distinct avenues are being proposed regarding conformance and enforcement. One proposal concerns the establishment of a National Securities Regulator. Most Provinces appear not to support this path because it would impinge on their jurisdiction. The other proposal is called the Passport System which would entail mutual recognition by participating jurisdictions. Under the Passport System clients would be able to obtain approval from the regulator in their home

Province or Territory and have that decision automatically apply in all other passport jurisdictions.

Due to the fact that products and services may be regulated by up to 14 Federal, Provincial or Territorial Codes, securing the equivalent of a national certification requires companies to wade through a maze of regulations. As discussed earlier, the government of Ontario reviewed provincial technical regulations across Canada and found that many regulatory codes of importance to the Oil and Gas industry were already substantially harmonized (Shaker 2005). Despite that fact, there were differences in the competent authorities to administer the regulations. In addition, there were instances where no corresponding regulations were found for some Provinces. The author noted that this did not necessarily imply that the regulations did not exist but that more research may be required to identify where they are located in a Province's regulatory framework.

For traders seeking a presence in new markets, obtaining this information is in itself potentially a significant source of trade inefficiencies. The development of correspondence tables between Federal, Provincial and Territorial regulations for specific products and services would be a valuable tool for companies that need to negotiate the regulatory conformance system across Canada. Such an effort may also be thought of as a necessary first step to document the extent of differences in regulatory compliance requirements between Provinces, identifying areas where harmonization efforts would have the most benefit. Substantial harmonization of both regulations and conformance processes would pave the way for streamlined administration of the regulatory system across Canada through approaches such as one window services, the use of accredited nongovernmental organizations or mutual recognition agreements.

6.1.3 Mobility of Skilled Workers

Restrictions on the mobility of skilled workers were raised frequently by stakeholders of all descriptions. This issue is not directly related to the procurement of goods and services, but it is indirectly associated with standards and regulations because inspection and approvals services required for regulatory conformance are delivered by skilled workers certified at the Provincial level.

This issue brings us into the now quickly emerging area of standards for services. The European Union has already recognized the growing importance of services and in 2006 the European Parliament issued Directive 2006/123/EC encouraging the development of European standards to facilitate compatibility between service regimes in different countries. Responding to this Directive, the European Committee for Standardization (CEN) is now engaged in an important program for the development of service standards. The scope of the program is illustrated by the elements listed in Table 5.

Table 5 – CEN Service Standards Work Program	
CEN/TC 319	Maintenance
CEN/TC 320	Transport – Logistics and services
CEN/TC 328	Standard measuring system for cleaning performance
CEN/TC 329	Tourism services
CEN/TC 330	Qualification of Construction enterprises
CEN/TC 331	Postal services
CEN/TC 348	Facility management
CEN/SS A07	Translation services (BT/TF 138)
CEN/SS A08	Funeral services (BT/TF 139)
CEN/SS H011	Security Services (BT/TF 167)
CEN/SS H01	Cinematographic works (BT/TF 179)
CEN/SS A10	Services of real estate agents (BT/TF 180)
CEN/SS A99	Business support services to SMEs (BT/TF 181)
CEN/SS A99	Print media analyses (BT/TF 186)
CEN/SS A99	Customer Contact Centres (BT/TF 182)
	Supply Chain Security (BT/TF 199)
	Hearing Aid Specialists Services(BT/TF 200)
Source: CEN 2007 http://www.cen.eu/cenorm/businessdomains/businessdomains/services/index.asp	

6.2 Proposals for developing standardization initiatives

In our view each of the above solutions could generate substantial industry and government supported standardization initiatives, involving the coordination of existing standards and/or the development of new ones. We propose that the SCC could investigate the feasibility of the following actions:

6.2.1 Platform Code for Heavy Oil & Gas Component Shipment

In addition to circumventing many of the regulatory barriers associated with road transport between Provinces, the development of shipment platform standards for prefabricated modules designed for on-site assembly could open up markets and encourage more contractors and manufacturers to invest in the design of Oil & Gas related heavy components. They also could lower engineering costs for both manufacturing companies and their customers in the Oil & Gas sector. The example of such an initiative could also be transferred to other industrial sectors that are subject to similar restrictions.

6.2.2 *Regulatory and Technical Specification Handbook for the Oil & Gas Industry*

The current regime of regulations, standards and approval procedures is complex and diffuse, creating unnecessary search costs and risks for new suppliers. In this case, the solution is not the development of technical standards, but the development of a standard information disclosure and exchange format that would assemble, contrast and compare Oil & Gas related standards and regulation in all of the Federal, Provincial and Territorial jurisdictions. The 'Handbook' could be published in electronic form and provide a platform for the development of value-added search and interpretation services. Updating of the Handbook could be assured through a Memorandum of Understanding (MoU) with government authorities, SDOs and industry associations. An immediate benefit of such an initiative would be to document fully all of the corresponding and conflicting regimes to which Oil & Gas products and services are subject.

6.2.3 *Service Standards for Oil & Gas Certification and Approval Personnel*

The development of service standards for technical and inspection activities of importance to the Oil & Gas industry would facilitate and support programs, committees, and councils that work at promoting increased mobility of skilled workers.

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Appendix 1 - Interview Questions

1. Which organization publishes the technical standards used by the oil and gas industry to:

- Procure equipment and services?
- Provide and market petroleum products?

Example of standards organizations are: API, CSA, CGA, CGSB

2. Are there differences in standards and regulations between British Columbia, Alberta and Saskatchewan?

3. Are there regulatory or standards-related barriers to supply the industry with equipment and services?

4. Are certifications required from standards organizations?

5. Are there are missing standards or certifications?

Appendix 2 - Interview List

Interview List		
Organization	Location	Title
Procurement Division of Oil and Gas Companies (Located in Alberta, British Columbia and Saskatchewan)		
Canadian Association of Oilwell Drilling Contractors	Calgary, Alberta	Manager, Technical Services
Canadian Association of Petroleum Producers	Calgary, Alberta	CAPP Public Affairs
Canadian Association of Petroleum Producers	Calgary, Alberta	CAPP Public Affairs
Canadian Natural Resources	Calgary, Alberta	Manager, Procurement
Churchill Energy	Calgary, Alberta	Engineering
ConocoPhillips Canada	Calgary, Alberta	Vendor Query Line
ConocoPhillips Canada	Calgary, Alberta	Vendor Query Line, Drilling
Derek Resources	Vancouver, British Columbia	Marketing
Devon Canada	Calgary, Alberta	Jackfish Project
Elliott Petroleum	Lloydminster, Saskatchewan	President
EnCana	Calgary, Alberta	Supplier Contact Centre
EnCana	Calgary, Alberta	Engineering
Fluor Canada	Calgary, Alberta	Procurement
Husky Energy	Calgary, Alberta	Materials & Services Management
Imperial Oil	Calgary, Alberta	Procurement Manager, Kearl Project
Jacobs Consultancy	Calgary, Alberta	Manager of Procurement
Nexen	Calgary, Alberta	Engineering
North American Oil Sands	Calgary, Alberta	Technology
North American Oil Sands	Calgary, Alberta	Engineering Procurement
Petro-Canada	Calgary, Alberta	President, Canadian Crude Quality Technical Association
Petroleum Technology Alliance Canada	Calgary, Alberta	Knowledge Centre
Petroleum Technology Alliance Canada	Calgary, Alberta	Director, Improved Recovery
Petroleum Technology Alliance Canada	Calgary, Alberta	Director, Technology Transfer
Petroleum Technology Alliance Canada	Calgary, Alberta	Board of Directors

Petroleum Technology Alliance Canada	Calgary, Alberta	Past President
Petroleum Technology Alliance Canada	Calgary, Alberta	President
Shell Canada	Calgary, Alberta	Manager In Situ Oil Sands Research
Shell Canada	Calgary, Alberta	Manager In Situ Oil Sands Research
Shell Canada	Calgary, Alberta	Manager, Regulatory Affairs
Shell Canada	Calgary, Alberta	Electrical Engineering
SNC Lavalin	Calgary, Alberta	Mechanical Engineering Lead
SNC Lavalin	Calgary, Alberta	Vice President, Domestic Business Development
SNC Lavalin	Calgary, Alberta	Procurement Manager
Suncor Energy	Calgary, Alberta	Project Manager, Corporate Technical Standards
Syncrude Canada	Calgary, Alberta	R&D Manager
Syncrude Canada	Calgary, Alberta	Asset Recovery Leader
Syncrude Canada	Calgary, Alberta	Asset Recovery Specialist
Total E&P Canada	Calgary, Alberta	Manager, Technology Research & Development
WorleyParsons MEG	Calgary, Alberta	Procurement Manager
WorleyParsons MEG	Calgary, Alberta	Senior Buyer
WorleyParsons MEG	Calgary, Alberta	Expediting Lead
WorleyParsons MEG	Calgary, Alberta	Buyer
WorleyParsons MEG	Calgary, Alberta	Logistics Lead
Suppliers to the Oil and Gas Industry		
Aecon Industrial	Cambridge, Ontario	Marketing
Canadian Manufacturers and Exporters (CME)	Calgary, Alberta	Vice President, Alberta Division
Canadian Manufacturers and Exporters (CME)	Ottawa, Ontario	icosmo Business Manager
Canadian Manufacturers and Exporters (CME)	Toronto, Ontario	icosmo Director of Business Development
Canadian Manufacturers and Exporters (CME)	Ottawa, Ontario	Vice President Global Business Policy
Canvil, Division of Mueller Canada	Simcoe, Ontario	Sales Manager
China Steel	Sault Ste. Marie, Ontario	Marketing
Ensign Drilling	Nisku, Alberta	Technical Department
Ensign Drilling	Fort Nelson, British Columbia	Service Department

Enviro-West Drilling	Fort St. John, British Columbia	Technical Department
Fabris	Stoney Creek, Ontario	Marketing
G.L.M. Tanks and Equipment	Battleford, Saskatchewan	Technical Department
IPSCO Saskatchewan	Saskatoon, Saskatchewan	Marketing
IRAP	Edmonton, Alberta	Industrial Technology Advisor
IRAP	Calgary, Alberta	Industrial Technology Advisor
IRAP	Calgary, Alberta	Industrial Technology Advisor
Lakeside Steel	Welland, Ontario	Marketing
Maass Flange & Fitting Canada	London, Ontario	Sales
Pendemak Industries	Fort Nelson, British Columbia	Oil rig worker
Rocky Mountain Environmental	Richmond, British Columbia	Sales
Saskatoon Boilers	Saskatoon, Saskatchewan	Technical
Sicotte Drilling Tools	Fort St. John, British Columbia	Sales
Tenaris, Algoma Tubes Facility	Sault Ste. Marie, Ontario	Manufacturing
Tenaris, Algoma Tubes Facility	Calgary, Alberta	Marketing
Tri-Lad Flange and Fittings	Paris, Ontario	Marketing
TSI Tubular Services	Port Colborne, Ontario	Sales
Velan, Granby Facility	Granby, QC	Marketing
Welded Tube of Canada	Concord, Ontario	Sales
Wellmaster Pipe & Supply	Tillsonburg, Ontario	Marketing
Wire Rope Industries	Pointe-Claire, QC	Technical Services
Government Officials		
Alberta Economic Development Authority	Edmonton, Alberta	Research Assistant
Alberta Economic Development Authority	Calgary, Alberta	Executive Director
Alberta Employment, Immigration and Industry	Edmonton, Alberta	Director, Industrial Machinery and Equipment
Alberta Energy and Utilities Board	Calgary, Alberta	Executive Manager, Resource Branch
Alberta Energy and Utilities Board	Calgary, Alberta	Regulatory Affairs

Saskatchewan Industry and Resources	Regina, Saskatchewan	Director - Petroleum Development
Alberta International, Intergovernmental & Aboriginal Relations	Edmonton, Alberta	Director - Trade Policy, International Relations
Alberta International, Intergovernmental and Aboriginal Relations	Edmonton, Alberta	Trade Policy Officer, Internal Trade
Alberta International, Intergovernmental and Aboriginal Relations	Edmonton, Alberta	Manager, Intergovernmental Business and Trade Relations Trade Relations
British Columbia Oil and Gas Commission	Victoria, British Columbia	Executive Director Corporate and Government Relations
British Columbia Oil and Gas Commission	Victoria, British Columbia	Pipeline Specialist
British Columbia Office of Housing and Construction Standards	Victoria, British Columbia	Executive Director Safety & Research Branch
Saskatchewan Industry and Resources	Regina, Saskatchewan	Assistant Director - Petroleum Development
British Columbia Oil and Gas Policy Branch	Victoria, British Columbia	Executive Director
British Columbia Trade Policy Branch	Victoria, British Columbia	Manager - Trade Policy
Ontario Economic Development and Trade	Toronto, Ontario	Team Leader
Ontario Economic Development Policy Branch	Toronto, Ontario	Manager, Special Projects
Saskatchewan Industry and Resources	Saskatoon, Saskatchewan	Director - Competitiveness
Saskatchewan Industry and Resources	Regina, Saskatchewan	Manager Regulatory Reform
Individuals with Particular Expertise and Experience		
Alberta Boilers Safety Association	Edmonton, Alberta	Chief Inspector and Administrator
Canada West Foundation	Calgary, Alberta	Economist - The Western Economy Project
Canadian Energy Pipeline Association	Calgary, Alberta	Vice President, Regulatory and Financial
Canadian Gas Association	Ottawa, Ontario	Vice President, Strategy & Operations
Canadian General Standards Board	Gatineau, Quebec	Manager, Standards Division
Canadian General Standards Board	Gatineau, Quebec	Team Leader, Oil & Gas

Canadian Standards Association	Toronto, Ontario	Standards Development
Canadian Standards Association	Edmonton, Alberta	Edmonton Office
Canadian Standards Association	Toronto, Ontario	Project Manager
Canadian Standards Association	Toronto, Ontario	Senior Public Relations
Fort St. John Economic Development Commission	Fort St. John, British Columbia	Manager
NAIT Centre for Manufacturing Solutions	Edmonton, Alberta	Chair, Mechanical Engineering Technology, and Productivity Enhancement Services
University of Regina	Regina, Saskatchewan	Office of Energy and Environment
University of Calgary	Calgary, Alberta	Chair, Chemical and Petroleum Engineering
Safety Codes Council	Edmonton, Alberta	Executive Director
Saskatchewan Research Council	Regina, Saskatchewan	Vice President, Energy
Saskatchewan Trade Export Partnership	Saskatoon, Saskatchewan	President and CEO
Technical Standards and Safety Authority	Toronto, Ontario	Corporate Secretary
Technical Standards and Safety Authority	Toronto, Ontario	Team Leader and Senior Engineer
University of Alberta	Edmonton, Alberta	Professor, Mechanical Engineering
Technical Standards and Safety Authority	Toronto, Ontario	Manager of Inspection
Utility Energy Services	Mississauga, Ontario	Manager
Number of Interview Completed	50	
Number of Contacts Made	112	

Appendix 3 – Canadian Standards Association

Overview

The Canadian Standards Association (CSA) traces its roots to 1919 when the Canadian Engineering Standards Association (CESA) was established. In 1944, CESA became the Canadian Standards Association. Today, CSA Group is an independent, not-for-profit membership association, and is composed of four divisions:

- CSA with a primary focus on standards development and training;
- CSA International providing international product testing and certification services;
- Quality Management Institute (QMI), formed in 1984 as a management systems registrar; and,
- OnSpeX, launched in 2004 in Cleveland, Ohio and providing consumer product evaluation and consulting services for clients such as major retailers and manufacturers.

In 2007, CSA Group employed more than 1,400 people with offices, testing laboratories and affiliates in more than 60 countries worldwide. In addition, approximately 9,000 volunteer members participate in more than 1,300 committees. During the last 80 years CSA has published more than 3,000 voluntary standards, codes and related products. Although CSA standards are not mandatory, many CSA standards are referenced in legislation by governments or other regulatory bodies in jurisdictions throughout North America. Once a CSA standard has been referenced by a Federal, Local, State, Provincial or Municipal government, or by a regulatory authority, compliance with the standard becomes mandatory.

CSA participates in international standards groups and forums with a policy to harmonize Canadian standards with North American and international requirements wherever it makes sense to do so. CSA believes that reducing the number of standards that apply worldwide, benefits manufacturers when accessing new markets, while continuing to ensure safety and performance. In particular, CSA has adopted standards from internationally recognized organizations, such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). CSA is also involved in a standards development forum known as CANENA. Since 1992, CANENA is committed to developing draft harmonized standards for the nations of the Americas.

CSA Standards

CSA offers standards and codes in the following areas:

- Communications
- Community Safety & Well-being
- Construction
- Electrical/Electronics
- Energy

- Environment
- Gas Equipment
- Health Care
- Mechanical Industrial Equipment
- Occupational Health & Safety
- Quality/Business Management

Energy

Many CSA energy standards are Canadian standards and are cited in both Federal and Provincial regulations. CSA standards for oil and gas pipelines are recognized internationally and its nuclear standards are used for licensing CANDU reactors. CSA offers a large number of energy-related standards in four categories:

- Fire safety and fuel burning equipment, including oil and wood-fired appliances;
- Oil and gas systems and materials for oil and gas pipelines, underground hydrocarbon storage and liquid natural gas facilities;
- Performance and energy efficiency of electrical equipment and appliances, as well as the design and installation requirements for renewable energy sources such as solar, wind and photovoltaic; and,
- Nuclear, which specifies world wide requirements for the design, construction, monitoring and inspection of CANDU nuclear power plants.

Gas Equipment

CSA is a North American leader for installation codes and product safety and performance standards for natural-gas and propane-fired equipment, and is the only organization that offers both electrical and gas standards for Canada and the United States. Applications include gas-fired appliances, propane-fuelled taxis, gas-fired equipment used by campers, carbon monoxide detectors and fuel cells. CSA also provides national training programs for all aspects of gas fitting, including equipment installation, maintenance and servicing.

Electrical and Electronics

CSA's Canadian Electrical Code, first issued in 1927, is nationally recognized and specified in Canadian Federal and Provincial regulations. It has been regularly updated to address changing technology and is composed of the following parts:

- Part I: Electrical Installation Code;
- Part II: Standards for the construction, testing and making of electrical equipment; and,
- Part III: Outside Wiring.

In addition, CSA has standards for electrical engineering products and electromagnetic compatibility.

Appendix 4 – American Petroleum Institute

Overview

The American Petroleum Institute was established in 1919 in the momentum that ensued after the collaborative effort between government and industry during World War I. The initial endeavour was to produce industry statistics, particularly related to crude oil production. The second area of activity was the standardization of oilfield equipment. API developed industry wide standards which were first published in 1924. API now maintains over 500 standards and recommended practices addressing all segments of the oil and gas industry. The third initial effort was working with federal and state governments in the area of taxation.

Today, API is a national trade association composed of over 400 corporate members and representing all aspects of the United States oil and gas industry, including producers, refiners, suppliers, pipeline operators, marine transporters and service and supply companies. API's current areas of activities are as follows:

Advocacy: as a trade association, API is the voice of the industry to the public and governments, negotiating with regulatory agencies, representing the industry in legal proceedings and promoting the public policy goals of the industry.

Research and Statistics: API collects, maintains and publishes statistics on the US oil and gas industry. The association also conducts or sponsors research ranging from economic analysis to toxicological testing.

Standards: API maintains and publishes over 500 standards and recommended practices. A number of them have been incorporated into state and federal regulations. Some are also been adopted by the ISO.

Certification: API certifies manufacturers and suppliers of equipment used for production, drilling and refining and verifies that manufacturers are in compliance with industry standards. API also provide certification services for quality, safety, environmental and occupational health systems as well as certifying third-party providers of inspection and training services. Finally, API offers a voluntary licensing and certification program for engine oil marketers.

Education: API provides training programs related to regulatory requirements and industry standards and offers educational resources available to teachers and students in K - 12 schools. API also organizes and coordinates seminars, workshops and conferences on technical and public policy issues.

API Standards

API is a SDO accredited by ANSI. API is also actively involved with ISO. API develops and maintains standards, recommended practices, specifications and codes covering every segment of the oil and gas industry. The association also produces technical publications, reports and studies.

The specific areas of API's standardization activities are as follows:

- Oilfield Equipment and Materials
 - Offshore Structures
 - Tubular Goods
 - Valves & Wellhead Equipment
 - Drilling Structures & Equipment
 - Well Cements
 - Field Operating Equipment
 - Drill Completion & Fracturing Fluids
 - Fiberglass & Plastic Tubulars
 - Drilling Well Control Equipment
 - Subsea Production Equipment
 - Quality
 - Completion Equipment
 - Supply Chain Management
- Refinery Equipment
 - Corrosion & Materials
 - Electrical Equipment
 - Heat Transfer Equipment
 - Inspection
 - Instruments & Control Systems
 - Mechanical Equipment
 - Piping & Valves
 - Pressure-Relieving Systems
 - Aboveground Storage Tanks
 - Fitness-for-Service Task Group
 - International Standards Coordinating
 - Regulatory Action Program
 - Risk-Based Inspection Software User Group
- Pipelines
- Safety and Fire Protection
 - Safety Task Force
 - Fire Protection Task Force
- Petroleum Measurement
 - Evaporation Loss Estimation
 - Gas Fluids Measurement
 - Liquid Measurement
 - Measurement Accountability
 - Measurement Quality
 - Measurement Education & Training
- Petroleum Industry Data Exchange

Appendix 5 – Complete Highlights of Stakeholders Comments

Regarding: The Impact of Technical and Regulatory Standards in Oil and Gas Interprovincial Procurement

General Perspectives

Procurement Division of Oil and Gas Companies and Contractors

SNC Lavalin is an engineering company that provides engineering, procurement and construction services to the oil and gas sector. SNC Lavalin has delivered large scale construction projects to Syncrude, a major oil sands company.

The role of a procurement manager is to oversee the bidding process, the commercial evaluation, the award process and the administration of the contract. While procurement may use standards, it is the engineering department that determines which standards are to be used. For example, if a pressure vessel is being procured, the vessel itself would fall under a Boiler Branch standard, any electrical instrumentation would fall under a CSA standard and any platforms or structures attached to the vessel would involve the Building Code. Engineers would identify which specific standards are appropriate and then develop a requisition that would reference the standards.

In general, the codes and standards currently available do not cause major problems or major issues.

Jacobs Consultancy provides engineering consulting services to the petroleum, chemical and energy industries in western Canada. The scope includes capital projects, process design, technology selection, project monitoring etc.

The engineering standards used by Jacobs Consultancy include those from the major standard organizations such as CSA, API, ANSI, ASME and several others. There are no difficulties in using these standards to procure equipment from different Provinces in Canada.

There are really no issues with standards and regulations when it comes to purchasing equipment from different Provinces. The situation with standards such as API, ANSI, and CSA is quite good.

In summary, standards for industrial equipment are adequate.

There are no problems at all with engineering standards. At North American Oil Sands Corporation (NAOSC), CSA standards are used for structural steel. With respect to

electrical equipment, they must meet CSA standards by code. For pressure vessels, NAOSC uses ASME and API standards; for pumps, API and ANSI standards are employed.

There are no significant issues when procuring equipment from other Provinces for use in Alberta. Manufacturers in Ontario and Québec adhere to the codes specified in Alberta by regulators and owners. They have adapted and produce products that can be installed in Alberta. Manufacturers in Québec are a little behind those in Ontario. There is essentially no procurement from other Provinces because they do not have the required manufacturing base.

There are differences in regulation and standards between B.C., Alberta and Saskatchewan. Alberta is more advanced and the Alberta EUB is active in standards-setting committees.

Regarding the movement of equipment across Provinces, there does not appear to be significant problems. The relevant CSA standards have been adopted in each Province with few, if any modifications. In the pipeline industry, there are only a few companies. These companies are generally all present at meetings to develop and maintain technical standards. This ensures consistency between Provinces. Technical standards are not an issue.

There does not appear to be many issues with technical standards and regulations pertaining to the Oil & Gas industry.

Elliott Petroleum produces oil in Saskatchewan and sells it in Alberta. There are no issues with technical standards. The product made by the company exceeds provincial standards and there have been no problems.

With respect to equipment, the company has had no need to purchase equipment from other Provinces such as Ontario and Alberta and as a result cannot comment on potential differences in technical standards for equipment.

There are no specific barriers preventing Shell Canada from purchasing electrical equipment from other Provinces for installation in Alberta. Most of Shell Canada's purchases of manufactured equipment are for installation in Alberta. In Canada, electrical equipment needs to meet the Canadian Electrical Code which is published by the CSA. Alberta has adopted the Canadian Electrical Code with no changes while some other Provinces have made minor amendments. For electrical equipment to be acceptable in Alberta verification of its compliance with the Canadian Electrical Code must be done by one of the accredited testing agencies. There are generally no issues

for Shell Canada when purchasing electrical equipment made in other Provinces, such as Ontario, for installation in Alberta.

Suppliers to the Oil and Gas Industry

Located in Sault Ste. Marie, Ontario, China Steel produces and markets custom manufactured industrial and commercial equipment in steel and other alloys. Products include shop fabricated storage tanks, silos, stacks, duct work, stairs, railings and other fabricated steel products.

There are no significant issues with respect to regulatory standards involved in the products produced by China Steel. Differences in standards between Provinces, if any, do not affect the marketing or movement of products.

Lakeside Steel Corporation is located in Welland, Ontario. It is one of Canada's most diversified pipe and tubing manufacturers, supplying markets domestically and internationally in sectors such as the Oil and Gas, Automotive, Mineral Exploration, Fabrication and Distribution.

The Company has not experienced issues related to differences in technical or regulatory standards between Provinces. The company's products are steel pipes and tubing and the electrical code is not involved. For such products, internationally recognized standards from API are used. Therefore, there are no differences between the Provinces.

With respect to transportation, the company ships its products by rail and some times by truck. However no regulatory difficulties with respect to product shipments have occurred.

Tri-Lad produces flanges and fittings in Paris, Ontario. Products are produced in accordance to well-recognized standards including those from API, ASME, ANSI, CSA, and others. Due to the use of internationally recognized standards, the company experiences no differences between Provinces.

Wire Rope Industries is a manufacturer of high-performance wire rope located in Pointe-Claire, Québec. Products are mechanical cables, not electrical cables. Therefore electrical codes do not apply. Products are produced to standards of API which are internationally recognized. In addition, the Canadian standard G 4, which is issued by CSA, is used as a Canadian standard. As a result, there are no differences between Provinces.

Located in Granby and Montréal, Québec, Velan produces steel valves for the Oil and Gas industry, including off shore, pipelines, refining, petrochemicals and cryogenic applications. The company produces its products according to globally recognized standards such as those from the American Society for Testing of Materials (ASTM) and the API. Examples of standards are ASTM B1634 and API 598. These standards are recognized internationally and there are no differences between Provinces.

However some of the products related to pressure vessels need to be registered provincially by agencies such as the Technical Standards and Safety Authority (TSSA). However the company has in hand all the necessary registrations in Canada.

The Canadian Manufacturers and Exporters (CME) in conjunction with the Federal, Alberta and Ontario governments, operate the website Innovative Canadian Oil Sands Manufacturing Opportunities (www.icosmo.ca). Manufactured products such as structural steel, pressure vessels, tanks, heat exchangers, turbines, pumps and pre-fabricated modules are in high demand by oil sands companies. The website is a resource to facilitate procurement of these equipments in order to meet demand but also to share economic opportunities with other regions of Canada.

Members and participants in the icosmo program report that barriers to inter-provincial trade exist, particularly concerning to certification processes.

With respect to the movement of manufactured goods, the CME does not hear about many problems. This is not to say that there aren't any barriers. It is possible that while a large number of eastern Canada companies are interested in expanding their markets into western Canada, only a few are actually successful at doing it. These few companies have found ways to overcome some of the regulatory barriers and consider this experience as a competitive advantage. Companies who have been successful in gaining access to markets in western Canada are very reluctant to speak about the experience. In our view, it is because they do not wish to invite and provide assistance to competitors into these newly developed markets.

Saskatoon Boilers produces boilers that are tested, registered and labelled by Underwriters Laboratories. The UL label allows company boilers to be marketed and used across Canada. From time to time, a local inspector may inquire for compliance but generally, the UL label is sufficient. It is important that both the boiler and the gas burner be labelled as a package. Some other companies may register their boilers with UL and their gas burner with CSA. However this approach is not successful for obtaining Canada wide compliance.

Saskatoon Boilers also manufactures products that comply with CSA B. 149.3 Code for Fields Approved Equipment and with NFPA 85, which is a US code for pressure boilers.

Once products are properly tested, registered and labelled with UL there are no issues with marketing and installing across Canada. However, not all boiler companies follow this practice.

IPSCO produces steel pipes and tubing used by the Oil and Gas industry. Products are made to comply with relevant CSA and API standards that are valid Canada wide and indeed worldwide. There are no differences in the products sold in the Provinces of Saskatchewan, Alberta and British Columbia. Possible differences in technical standards between Provinces are not an issue for IPSCO.

The company produces manufactured tanks for the Oil and Gas industry for sale into Saskatchewan and Alberta. There are no issues with possible differences in technical standards between the two Provinces. The company's products can be sold in both Provinces without problems.

Ensign Drilling is able to use the same drilling and service equipment for Oil and Gas in the Provinces of Saskatchewan, Alberta and British Columbia. Equipment can cross the borders back and forth without problems. Provincial differences in electrical codes and pressure vessel codes are not very significant. Whenever issues have arisen in the past they have been dealt with through the help of the Canadian Association of Oilfields Drilling Contractors (CAODC).

With respect to equipment such as drill bits, steel pipe and tubing, there are no differences between British Columbia and Alberta. The same equipment and supplies can be used on both sides of the border.

The Saskatchewan Trade Export Partnership (STEP) does hear of issues encountered by companies operating on both sides of the Saskatchewan-Alberta border. There are reports of differences in the detailed designs of oil rigs. Another matter relates to different standards for weights allowed on roads. The industry segment that seems most affected is the service industry with trucks and oil rigs operating on both sides of the Saskatchewan-Alberta border.

The Saskatchewan Research Council (SRC) conducts research and development for Oil and Gas. However, the organization does not get involved with technical standards used by the industry. From second hand information and indirect reports, it appears to be a mixed bag when it comes to technical standards in Alberta and Saskatchewan. However, there have been no reports of significant issues that came to the attention of SRC.

The British Columbia Oil and Gas Policy Branch does not have the expertise to comment on technical standards. Indirectly, there have been reports of differences in truck weights allowed in British Columbia and Alberta. This appears to stymie companies that need to operate on both sides of the border. For example, there have been mentions of trucks having to rearrange their loads at the Alberta border before entering British Columbia. There is probably a long laundry list of issues that need to be addressed. However, the Oil and Gas Policy Branch does not have information on these details.

Governments and Standards Organizations

The Safety Codes Council is mandated by the Alberta government to review and amend all safety codes pertaining to the 10 technical councils. The technical councils are composed of approximately 15 individuals from stakeholder organizations. The technical councils review and amend on an ongoing basis the safety codes by making recommendations to the Alberta government who in turn makes changes to the regulations.

The 10 technical councils are:

- Amusement Rides
- Barrier Free
- Boilers & Pressure Vessels
- Building
- Electrical
- Elevators
- Fire
- Gas
- Passenger Ropeways
- Plumbing

Based on information found in its website, The Technical Standards and Safety Authority (TSSA) is the Ontario regulator for public safety. TSSA regulates and enforces safety codes on behalf of governments in Ontario. It is a self-funded, not-for-profit organization that performs safety inspections, engineering reviews, technical training and certification, public education and outreach.

The areas covered include:

- Amusement Devices
- Operating Engineers
- Boilers & Pressure Vessels
- Ski Lifts
- Elevating Devices
- Upholstered & Stuffed Articles
- Fuels
- Mechanic and Technician Certification

In the Oil and Gas sector, TSSA applies the following CSA standards:

- Oil and Gas Pipeline Systems Code (Z662);
- Natural Gas and Propane Installation Code (B149.1); and,
- Propane Storage and Handling Code (B149.2).

These standards have been adopted as codes at the national level and in each Province.

In Canada, Provinces have adopted the CSA Electrical Code as their own Electrical Code. Some Provinces have adopted it without any amendment while others have added supplements and amendments. Compliance with the Electrical Code is within Provincial jurisdiction.

Electrical installations need to be inspected and certified locally by Provincial authorities.

Electrical products are also governed by the Electrical Code. In Canada, certification and approval of electrical products is done by third-party organizations such as CSA International, Underwriters Laboratories and others. These organizations test and approve products according to the relevant specifications of the Electrical Code. Approved products then bear a mark as evidence of their approval. Provincial authorities recognize the approvals granted by these standards organizations and products bearing the marks are allowed to be used within their jurisdiction.

For example, in Ontario, the Electrical Safety Authority regulates electrical products and installations. Products approved by the following organizations are allowed to be used in Ontario:

- Canadian Standards Association (CSA)
- Curtis-Straus LLC
- Entela
- Intertek Testing Services
- Met Laboratories Inc. (MET)
- OMNI Environmental Services Inc.
- Quality Auditing Institute
- TUV America
- TUV Rheinland
- Underwriters Laboratories of Canada (ULC)
- Underwriters' Laboratories Inc.
- FM Approvals
- QPS
- Nemko
- NSF International

Standards that are used in the Oil and Gas industry are from ANSI and from API. For example, when purchasing fired heaters, seamless tubing is generally specified under standards from ANSI or API.

API is more active in the oil and gas industry than CSA or CGSB. Recently, two IRAP clients received API certification for their products and this was a major milestone in their business development plans.

Petroleum Technology Alliance Canada (PTAC) is not active in oil and gas industry standards. PTAC does not maintain information on standards but focuses on technology development.

There was a meeting between PTAC and the Canadian Standards Association regarding standards for CO₂ emissions but this effort is not currently active.

API is active in developing and publishing standards for the oil and gas industry. However, CSA is not much involved in oil and gas.

There is a specific industry effort known as the Canadian Crude Quality Technical Association (CCQTA). It developed a specification on the maximum amount of phosphorous content in crude oil. Phosphorous can be present in crude oil as a result of the use of certain gelling agents in well stimulation. Its presence results in severe fouling of refinery distillation towers. Imperial Oil and Petro-Canada are actively involved in the CCQTA.

The CCQTA is a not-for-profit organization located in Alberta with members composed of companies commercially involved in the petroleum industry. Current projects attempt to solve technical issues related to crude oil and include the following:

- Phosphorous in Crude Oil
- NGL Contamination
- Heavy Oil Methods Manual
- TAN Project
- Iron Fouling Project
- Oil Sands Bitumen Processability

With the signing of the TILMA agreement between the Provinces of B.C. and Alberta, there is a framework and programs to harmonize safety protocols and certifications of skilled workers between the Provinces.

In the Oil and Gas sector, the B.C. Oil and Gas Commission works very closely with its Alberta counterpart, the Energy and Utilities Board (EUB). For example, there is currently an initiative on harmonizing regulations with respect to flaring. The B.C. Oil and Gas Commission is looking very closely at the EUB Directive 60 and will be publishing a policy paper this fall. Next year, B.C. will have its own flaring regulations that will be closely aligned to Directive 60 but will involve adjustments to take account of the particular geography and industry structure in British Columbia.

When harmonizing regulations between B.C. and Alberta, regulations are harmonized to

the highest safety level. There is no loss of safety or quality on account of harmonization. To the contrary, there are instances where there are enhancements to safety and environmental considerations.

With respect to standards that effect the procurement of equipment by the Oil and Gas industry in B.C. from other Provinces, the Commission is not aware of any issues. However, it is possible that these issues are not brought to the Commission because they would be somewhat outside of its jurisdiction.

The Alberta Energy and Utilities Board (EUB) regulates Oil and Gas industry activities in Alberta.

Alberta regulations would differ from regulations in neighbouring British Columbia and Saskatchewan. However, the EUB does not know to what extent these differences exist and may or may not create issues with the industry. Differences in regulations between neighbouring Provinces have generally not been raised as major issues to the EUB.

The TILMA agreement was recently signed between Alberta and British Columbia. However, the EUB is not aware of any specific initiative aiming at harmonizing the Oil and Gas regulations of the two Provinces. In the past, B.C. has adopted regulations that are aligned with Alberta regulations. However, there are no formal mechanisms currently in place to ensure harmonization. Representatives from B.C. and the Northwest Territories are present at one EUB committee concerning drilling and completions. However this appears to be more the exception than the rule.

There are probably opportunities for more harmonization. However the importance of this opportunity and its potential benefits are difficult to determine and there has not been a major industry push in that direction.

Equipment such as drilling rigs, pipes and pipelines that are used in the Oil and Gas sector in Alberta are also regulated by the EUB through Directives that reference standards from recognized standards organizations such as ASTM, CSA, API and others. Here again, the EUB is not aware of major issues concerning standards and regulations.

Authors' Note: As of January 1, 2008, the Alberta Energy and Utilities Board (EUB) was realigned into two separate regulatory bodies:

- The Energy Resources Conservation Board (ERCB), which regulates the oil and gas industry, and,
- The Alberta Utilities Commission (AUC), which regulates the utilities industry.

The Oil and Gas sector is covered under TILMA, including specific measures to reconcile standards and regulations but also to remove regulations when they are not compatible with the Agreement.

The process to harmonize Oil and Gas regulations between British Columbia and Alberta under TILMA is just starting. The first step is to draw up inventories of standards

and regulations in each Province. This is a large undertaking. In British Columbia there are 250,000 standards and regulations that may become subject to TILMA. Currently, British Columbia is ahead of Alberta because B.C. has recently gone through a deregulation exercise and therefore already has an inventory of its regulations. By contrast, Alberta will be starting from scratch.

The second step will be to compare equivalent regulations between the two Provinces. A contractor will be hired to do this task.

The third step will be to harmonize equivalent regulations. In some cases, regulations will need to be removed because they contradict the agreement. For example, Alberta has regulatory measures that require the management of Oil and Gas companies to be located in Alberta. These regulatory measures contradict TILMA and will need to be removed by November 2008. In most cases however, the harmonization of regulations will be done on a case-by-case basis. The harmonized regulation will not be prescriptive but will be expressed in a results-based manner. The first pass at harmonizing regulations will be done by governments and the Oil and Gas regulators in Alberta and British Columbia. When significant changes will be required, industry will be involved in designing the new harmonized regulations. The goal is to have harmonized regulations in Oil and Gas by April 2009.

The Saskatchewan government takes the position that not all regulations can be harmonized between Provinces because there are instances of different legislative authorities. For example, Workers Compensation will be different between Provinces. However, there are many instances, particularly with technical standards, where industry can choose to operate above the minimum set by regulations and therefore not be worried by differences between Provinces because their operations would be exceeding minimum regulatory requirements.

There are currently some issues, such as:

- The Petroleum Services Association of Canada (PSAC) is currently unhappy with regulations relating to Oil and Gas trucks, such as cementing and acidizing trucks, operating between Alberta and British Columbia. The trucks operate out of Alberta and meet Alberta standards. However, when some were stopped and inspected in British Columbia, it was found that the first aid kit on the truck did not meet B.C. standards. This particular issue is being worked on with authorities in British Columbia.
- Another matter relates to rules on provincial highways for certain high and wide loads, which in Saskatchewan can only be transported on certain days and times. The Canadian Association of Oilfield Drilling Contractors (CAODC) is in discussions with the department of transportation of Saskatchewan on an ongoing basis concerning this matter.
- Another issue concerns field trucks for heavy oil equipped with heated tanks and burners. The design can be quite complex with a fired tube going from the burner through the tank to heat the heavy oil. There were no real regulations covering the

design of these burners and heated tanks. However, this changed three or four years ago after a fatal refinery fire in Calgary where such a heated tank was involved in the fire. As a result, new rules were applied and specified in codes. The industry had to adapt quickly to be in compliance. Although the rules are quite similar, it appears that the industry, as represented by the Canadian Association of Petroleum Producers (CAPP) is happy with the way the rules have been interpreted and applied in Alberta but less pleased with how it is being done in Saskatchewan.

- There is also an issue arising from changes in federal regulations concerning the length of truck driver shifts. It used to be that truck drivers could drive from certain points in Alberta to destinations in Saskatchewan without regulations requiring them to stop and rest. However this has now changed and the industry is adapting but complaining.
- With respect to flaring and venting, Alberta has adopted its Guide 60. Saskatchewan is adopting a similar regulation but it will not be identical because Saskatchewan does not agree with certain emissions concepts arising from the Federal government. However, British Columbia, Alberta and Saskatchewan work together on an international committee for flaring and venting. Also present at this committee are representatives from the Atlantic Canada Oil and Gas sector and the Northwest Territories. Canadian flaring and venting regulations are sophisticated and advanced, and international jurisdictions want to highlight Canadian regulations at a future conference.

However, in general, technical standards for Oil and Gas in the western Provinces are very similar and all based on standards from organizations such as CSA, ANSI and others. Equipment spacings are now the same between Alberta and Saskatchewan and balance of plant requirements are similar. Governments in Saskatchewan and Alberta think that Oil and Gas rigs and equipment should be able to move easily between the two Provinces.

The Saskatchewan Pipeline Act is similar to its counterpart in Alberta and both make references to CSA, API and ANSI standards. However one difference in Saskatchewan concerns the CSA standard for polypipe when conveying gas with hydrogen sulphide contents.

The Saskatchewan government is collaborating with other Provincial governments in establishing Industry Recommended Practices (IRP) which enable an institution such as ENFORM to conduct safety training of workers for occupations in the Oil and Gas industry in a manner that is consistent with the regulations in all 4 western Provinces.

The government of Saskatchewan works closely with Alberta and the industry to address any issues relating to regulations. There is a regulatory review committee where government representatives meet with industry representatives and discuss problems and answer questions. Suggestions are made to make regulations safer and easier to administer, such as electronic submission of forms. When governments cannot change regulations, the committee offers the opportunity for explaining the reasons why changes are not possible. This committee meets regularly, approximately two or three times per year.

British Columbia is changing its regulatory administration for Oil and Gas. It has moved to a board approach which is similar to Alberta.

Saskatchewan, Alberta and British Columbia all have very similar standards with respect to Oil and Gas. Standards are based on CSA, API, UL and documents from other standards-setting organizations specializing in Oil and Gas.

Normally, Oil and Gas standards in the western Provinces do not differ. There used to be small differences which were vestiges from the 1970s. For example, equipment spacing in Alberta was set at 50 m as opposed to 45 m in Saskatchewan. The reason for the difference goes back to the time of metric conversion in the 1970s. Alberta decided to round up which resulted in a difference. However, this year the governments have harmonized this particular standard. Another example relates to drilling waste. Saskatchewan and Alberta both funded a research project regarding drilling waste and adopted similar regulations as a result.

Where differences exist, it is in the policy side, on issues such as taxes and royalties.

With respect to technical regulatory standards, all 4 western Provinces are trying to harmonize their regulations in Oil and Gas.

With respect to regulations concerning safety and the environment, the western Provinces have formed a committee that includes representation from Oil and Gas companies, as well as service providers, to develop and publish Industry Recommended Practices (IRP). The IRP described how to perform certain tasks or procedures in conformance with regulations. When there are small differences between Provincial regulations, these are noted in the IRP. In other words, IRP are guides to safe and environmentally respectful work practices that comply with Provincial regulations. There is excellent cooperation between the western Canada Provincial governments and virtually all regulations relating to Oil and Gas are harmonized.

The Provincial governments recognize the value of interprovincial trade and the benefits of training workers once (as opposed to four times) for tasks that fall under Provincial jurisdictions.

No issues of significance related to technical standards have been noted. In general, the department receives positive feedback from industry and Oil and Gas companies report that Saskatchewan is a good place to drill.

Mobility of Skilled Workers

However, the movement of skilled people is a very different subject. Most of the issues that affect our members are related to the mobility of certified trades people. Certification is a Provincial jurisdiction and trades people need to be certified and registered in each Province. While this may sound like a significant barrier, in practice it

does not appear to have a large impact. Presently, there is a large movement of trades people from Canadian Provinces into Alberta because of the significant economic growth in that Province. This flow of skilled workers is happening despite issues with Provincial certification.

There are some issues around labour mobility. This is in part addressed by the Red Seal and how different Provinces govern trades such as welders, pipefitters, etc. This can often be an impediment.

There is a need to continue to push for removing obstacles to the mobility of skilled workers.

The need for certification in different Provinces does create difficulties with the mobility of trades people. The situation may not be improving because there is information that Saskatchewan may be choosing to opt out of programs that enhance the mobility of skilled workers.

Based on a review of its website, “the Red Seal Program was established to provide greater mobility across Canada for skilled workers. Through the program, apprentices who have completed their training and certified journeypersons, are able to obtain a Red Seal endorsement on their Certificates of Qualification and Apprenticeship by successfully completing an Interprovincial Standards Examination.

The program encourages standardization of Provincial and Territorial apprenticeship training and certification programs. The Red Seal allows qualified tradespersons to practice the trade in any Province or Territory in Canada where the trade is designated without having to write further examinations. To date, there are 49 trades included in the Red Seal Program on a national basis.”

There is one significant issue however that affects business and interprovincial trade. It is the mobility of skilled workers for inspecting pipelines. In Ontario, pipeline inspections must be done by inspectors holding a Gas Pipeline Inspection (GPI) certificate issued by Ontario. However, most of the curriculum and skills associated with the GPI certificate are aimed at distribution pipelines which are generally made of plastic materials. By contrast, transmission pipelines are made of steel. The experts required to inspect transmission pipelines often fail the GPI certificate because they do not have the knowledge for plastic distribution pipelines. Currently, there are some major transmission pipelines being built in New Brunswick and in western Canada and there is a problem with finding qualified and certified inspectors. One possible solution would be to issue different certificates for distribution and transmission pipelines. However, the

TSSA already issues 47 certificates for skilled workers and is reluctant to add to this number. Another possibility is to utilize the HRDC Read Seal program for national certification of skilled workers. There is a need to find a solution that would increase the mobility of pipeline inspectors across Canada.

There is a Canadian Oil and Gas industry-specific organization involved in certification and standards. It is called ENFORM and it is based in Alberta. ENFORM is the result of the merger between the Petroleum Industry Training Services and the Canadian Petroleum Safety Council.

After reviewing the ENFORM web site, this organization provides training services for oil and gas operations including certification of individuals who successfully complete training programs.

With respect to skilled workers and technicians, there are inter-provincial certification processes that allow skilled workers to obtain a certification that will be recognized in other Provinces. However, the issue for workers is that it does take time to obtain this certification and workers have to invest this time while not knowing if they will actually be doing work in other Provinces. Therefore, they are usually hesitant about investing time and money for an uncertain benefit.

Alberta is ahead of British Columbia for training and certifying oil rig workers. It is necessary for workers to go to Nisku, Alberta for training and certification because the government of British Columbia has not invested in a training facility for oil rig workers.

International Aspects

Oil and gas equipment free flows across the U.S. – Canada border due to the standards used. ASME, API, ANSI standards are acceptable on both sides of the border and are used by companies to certify acceptable equipment. Electrical equipment manufactured in the US must receive a CSA sticker before being used in Canada. CSA harmonizes its standards with US and global standards where applicable.

At North American Oil Sands Corporation (NAOSC), CSA standards are used for structural steel but the company is looking very closely at Chinese standards which are excellent. The Chinese standards are referred to as GB standards and could be used in Alberta because steel standards are not mandatory by code.

NAOSC experiences some difficulties with American suppliers because they are not immediately knowledgeable about Canadian standards and regulations. The company has not yet tapped global markets because the suppliers in countries such as China,

India and Europe would even be less informed about Canadian standards.

When purchasing equipment from foreign vendors, there is always the risk for some delays and adjustments because the vendor may not be aware of the details of the codes applicable in Alberta.

Some difficulties are experienced when procuring equipment manufactured in the United States because US made equipment needs to be certified against Canadian standards.

Sector Specific Perspectives

Boilers and Pressure Vessels Codes

At the Alberta Safety Codes Council, there are 10 technical councils. The technical council concerned with elevators is very close to a national system. This is because in fact the technical standards for elevators are international with Canada adopting the international code and each Province generally replicating the Canadian code. However, in the boiler and pressure vessels area, there are dramatic differences between Provinces and this situation impacts the inspection and certification process.

One possible barrier to interprovincial trade is the requirement for inspection and certification for equipment such as pressure vessels and elevators. Currently, inspection and certifications are done at the Provincial levels by a journeyman electrician or someone from the Red Seal program. Inspectors are certified at the provincial level. When moving such goods across Provinces, there is a need to repeat the inspection and certification process. There is an initiative being developed for national certification of inspectors.

There are generally no issues with technical standards. However, with respect to inspection and conformance, each Province has its own regulations and certification process. If a pressure vessel is manufactured in Ontario it is generally registered and certified in Ontario. However if it is to be installed in Alberta there may be a need for recertification by the Alberta authority. However, the differences in codes between Provinces are minor and generally do not affect the design of the equipment. It has more of an impact on the certification process. Certainly, if all provincial codes could be harmonized it would make business processes simpler.

The standards that apply to boilers and pressure vessels are based on safety and the same standards apply whether the application is in an apartment building or in the oil sands. The Alberta Boilers Safety Association (ABSA) enforces the same standards

irrespective of where the equipment is manufactured. In the past, there were requests to give special treatment to Canadian manufacturers. However the safety standards are not related to trade and should be designed with public safety as the primary goal.

In the past, oil sands companies wanted some special rules for equipment for steam injection in Alberta. However the ABSA refused and insisted that the CSA standard be amended to meet the needs of oil sands companies. This approach insured uniformity between Provinces and now Saskatchewan is able to use the CSA standard for heavy oil steam injection applications.

On the equipment regulatory side, pressure vessels, which are produced to conform to ASME code, are regulated in Alberta by the Alberta Boiler Safety Association (ABSA). In Ontario, they are regulated by TSSA. Other Provinces likely have their own governing body. This situation may not be an impediment but it may be a burden to fill out more paperwork.

The codes for boilers and pressure vessels are uniform between Canadian Provinces. They are all based on the CSA standard 351 which itself is directly based on the ASME code. CSA 351 has been adopted by all Provinces and the Federal government as law in their jurisdiction. However it is not yet recognized as the national standard.

Some years ago, there was a chlorine spill in Mississauga, Ontario. As a result, the Ontario government classified chlorine as a lethal substance, which had implication for standards applicable to tanks storing chlorine. By contrast, Alberta does not classify chlorine as a lethal substance. Therefore, there will always be differences between Provinces because of their different circumstance.

Electrical Codes

The electrical code is quite harmonized between Provinces.

One example cited a Conference Board report is as follows:

“For example, due to different electrical codes between Alberta and British Columbia, oil and gas companies must rewire their exploration rigs before taking them from one Province to the next. The different standards and regulations thus add to the cost of oil and gas companies doing business between the Provinces.”

In general, exploration rigs are not required to be rewired for compliance with electrical codes when moving between Alberta and British Colombia. Any electrical installation that meets the requirements of the Canadian Electrical Code is acceptable across

Canada.

However, there have been some specific issues regarding the electrical installation on drilling rigs. For example, in BC, lock out procedures and the requirements for explosion proof heaters are different. The Alberta Electrical Safety Codes Council has established a close working relationship with BC and Saskatchewan to develop the Code for Electrical Installations at Oil and Gas Facilities. Any issues regarding this code could be addressed without red tape.

Recent issues encountered with other Provincial regulatory agencies regarding rigs, camps and transportation have been dealt with fairly efficiently.

It is correct to say that there are increased costs and administrative burden associated with moving a rig into BC. Traditionally, it has always been more expensive to do business in BC, although strides taken over the last several years have made things better.

There are important regulatory and standards differences, particularly between Alberta and B.C. In particular, it is more difficult to obtain approvals in B.C. and typically, oil rig operators will charge a surcharge for projects in B.C. as compared to Alberta because of the increased amount of regulatory filings and paperwork.

According to Derek Hibbard of the Canadian Association of Oilwell Drilling Contractors, there are no cases where an exploration rig had to be rewired in crossing the border between Alberta and BC.

According to Milton Sorensen of Municipal Affairs who sits on the code committee, BC and AB work together to be on the same code committee to harmonize codes. There are a few small differences but overall equipment can cross the border unchanged.

The only difficulties apparent to us are caused by the failure of companies to properly fill out a manifest of the equipment when crossing the U.S. – Canada border. For example, one rig was turned back because its certificate of worthiness had expired.

Building Codes

There are differences between building codes here in Alberta and in Ontario. When trades people from Ontario are hired to work here, the differences are apparent because Ontario trades people build to different standards than what is required here in Alberta. Therefore, some training is required.

Highway Codes

The government of Ontario hired an external group to study the supply of large pressure

vessels manufactured by Ontario companies to the Alberta oil and gas industry. The issue identified was transportation. Highway regulations vary from Province to Province and make the movement of such goods difficult.

A study was recently completed by a consultant to the Ontario Department of Economic Development and Trade. The study was concerned with the transportation of large pieces of equipment from Ontario to Alberta, particularly to the oil sands region. However, the study has not been released. It is currently being reviewed by management and may be released in October after the Provincial election.

In summary, the study did not contain earth shattering results. The consultant studied the question of how best to move large equipment from Ontario to Alberta. The most costly option would be to utilize a large cargo aircraft such as the Russian Antonov 124 which is the world's largest cargo airplane. Rail and road options were also found to be possible.

Moving large equipment by road causes disruption to highway traffic and communities along the way. However the Ontario Ministry of Transportation does make the necessary arrangements given the valuable economic impact of moving large equipment. For example, large wind turbines had to be moved to locations within Ontario. The slow moving trucks cause traffic inconvenience and also may require some low lying electricity and telephone wires to be removed temporarily.

No regulatory issues impacting the movement of large equipment was found by the study in Ontario, Manitoba, Saskatchewan and Alberta. The issue with moving large equipment by road is the inconvenience caused to highway traffic and communities.

The following is based on information obtained from Alberta Transportation and BC Transportation. While truck dimensions and weights are fairly well standardized between the two Provinces, BC is far more restrictive with respect to permit policies. The reason for the restrictions in BC is primarily because of the difference in road and bridge infrastructure:

- 2 lane vs. 4 lane highways - Alberta has a much greater proportion of 4 lane highways than BC;
- For the most part BC has 1 meter of shoulder, while Alberta is wider with width sometimes up to 2 meters;
- Better sight lines in Alberta;
- Alberta has a 2:1 ratio on its slopes; BC has a 4:1 ratio. In other words, BC's gravel slopes are more severe; and
- BC has more bridges to deal with.

Doug Elliott, Manager Commercial Transportation for BC indicated that he is aware of equipment moving in Alberta to Fort McMurray weighing up to 1,000 metric tonnes. BC

would not consider a load in excess of 300 metric tonnes. Alberta will permit to 24' wide, while in BC most borders crossings are restricted to 15'. The Peace River Region is the only area in BC that goes to 24'.

There are logistics issues with procuring large equipment, skids and prefabricated modules from Provinces such as Québec and Ontario. These issues relate to width, height and weight restrictions on highways. Alberta has the most liberal transportation regulations in Canada. In Alberta, the high and wide corridors allow loads up to 24 ft. wide. In British Columbia, loads are restricted to widths of 14 ft. when crossing the Rocky Mountains. In Saskatchewan and Manitoba, the maximum width is 20 ft. However, in Ontario the maximum width is 18 ft. and special permits are required. A similar situation exists for height and weight restrictions.

The situation is unlikely to improve due to the recent bridge collapses in Minneapolis and Québec.

The outcome is that Alberta-based oil and gas construction companies will be hesitant when purchasing prefabricated modules from companies located in Ontario and Québec because the larger modules are preferred.

However, there are some construction companies in Alberta that are tapping overseas manufacturers by ordering 10 ft. wide packages that are manufactured in such a way that they can be bolted together on-site. If a manufacturer from Ontario or Québec wishes to supply 24 ft. wide packages to the Alberta oil and gas sector, they may wish to consider producing to 12 ft. wide modules that could be bolted together at destination.

There are also unconfirmed reports of issues when constructing access roads into drilling sites where the road start in Alberta but the well site is in British Columbia. The issues are with the deforestation/debarking of the trees. Some of the equipment or transport of cut wood to mill sites can't cross the border. Oil & Gas operators end up burning wood at the side of road because it can't be hauled out.

Pipelines Regulations

The transportation of natural gas is done by transmission utilities and distribution utilities. The membership of the Canadian Gas Association is primarily composed of distribution utilities that operate within Provincial boundaries.

There are no or few issues with the flow of natural gas molecules.

Obtaining regulatory approval for pipeline projects remains a complicated and difficult task. Each Province has its own approval process and pipeline projects that involve more than one Province must be independently approved in each host Province. However, this is not an issue related to technical standards or regulations. It is related to the fact that the approvals required to build pipelines are often related to provincial

jurisdictions and sometimes to overlapping Provincial and Federal jurisdictions. There are also instances where different Provinces or different Federal departments interpret or apply differently the same standards or regulation. This means that the regulatory process to obtain approval is often a long and complicated one. However, these issues mostly affect natural gas transmission utilities that operate across multiple Provinces. Members of the Canadian Gas Association are distribution utilities that operate within Provincial boundaries and are generally not affected by multiple or overlapping Provincial and Federal approval processes.

In summary, there are no major issues with current standards and regulations that affect the flow of natural gas and the flow of equipment. There are issues that restrict the flow of skilled trades people across Provinces. However, it appears that the industry has found ways to cope with the situation and the need to provincially certify trades people is not a showstopper.

There are minimal differences in technical standards across Canada with respect to natural gas pipelines. The CSA standards that are used are viewed as robust standards. Technical standards are currently in good shape.

However, there are significant differences between jurisdictions with respect to information requirements, approval processes and rules governing access. This may explain the difficulties experienced by Alberta-based natural gas shippers when trying to obtain access on pipelines located in B.C. The rules governing access to natural gas transmission pipelines are not related to the technical engineering standards used to build and operate pipelines but are related to government policies and regulations in each jurisdiction. Different entities will set access rules depending on the scope of the pipeline. In some cases, Provincial agencies determine access rules while in other cases Federal agencies such as the National Energy Board are involved.

The TSSA regulates pipelines in Ontario, except interprovincial pipelines which are regulated by the National Energy Board (NEB). However, TSSA performs work on behalf of the NEB in Ontario. The code for pipelines is CSA Z662 which has been adopted by every single Province in Canada and the North West Territories. In general, when Provinces adopt national codes, they add supplements to cover Provincial issues. However, with respect to the code CSA Z662, there have been no supplements added to our knowledge. Therefore, it is very uniform across Canada. In addition, most companies exceed the requirements of the code. For example, if the code requires a pipeline to be buried 18 inches deep, most companies would bury it 24 inches deep.

Opportunities for Standards Development

There will always be needs for improvements and increased standardization. However the boilers and pressure vessels code is probably the most uniform code across

Provinces in Canada. One suggestion for improvement is that codes such as CSA 351 which are widely applied for regulatory purposes should also include administrative details and specify such things as forms that need to be use. This would avoid each Province developing its own forms and process when enforcing the standard.

The idea that technical standards could be extended to include the specification of forms and approval process may be a good one. However, distribution utilities that operate provincially would not really see a benefit because their business is specific to a single Province. Therefore, the effort would be greater than the benefit. In other words, the pain of updating the standards would be greater than the gain. The CSA standards do an excellent job in their present form.

It would be helpful if standards organizations such as CSA, ASME and API would provide an easy cross-reference between their standards and equivalent standards in other countries such as China, Japan and Germany. A correspondence table would be very useful.

If a manufacturer from Ontario or Québec wishes to supply 24 ft. wide packages to the Alberta oil and gas sector, they cannot ship them by road due to highway restrictions. However, they may wish to consider producing to 12 ft. wide modules that could be bolted together at destination.

The only improvement would be stronger standards in regards to the environment, such as handling of waste from drill sites and flare stack operations.

For example, regulations should be put in place to eliminate all flare stacks. There is technology to use flare gas and burn it in a microturbine such as a Capstone microturbine, and convert it into electricity. In this way, harmful air emissions are converted into useful power.

It is important that all Provinces be on the same page across the country with respect to environmental regulations.

There are still some other existing issues and differences between BC and AB with respect to oil exploration rigs. They are as follows:

- Boiler regulations and requirements;
- Blowout Preventer (BOP) requirements are different; and
- Numerous transportation related differences pertaining to weights and dimensions

There is a lack of consistent standards for estimating oil sands reserves because extraction processes exhibit variability of processability and expected recovery. This is particularly true for recent innovation such as lower energy extraction methods which rely more on ore blending and identification of problematic ore types based on depositional environment and lithofacies to achieve target recovery (e.g. 90%) rather than improvements in the actual recovery method.

Estimates of "fines" varies a lot - both in method (Coulter, Microtrak, sieve hydrometer) and what threshold to use (<44um, <6um, etc.) as there is a legacy of sieving that probably doesn't represent the reality of whether coarser fines negatively affect recovery.

There appears to be a lack of a standard for fungible bitumen (e.g. water fraction, fines fraction, ions in water, etc.).

Assay methods for bitumen percentage are mature.

Shell Canada wishes to source electrical equipment from the North American market rather than only from the Canadian market. For example, UL rated electrical cable may not bear a CSA mark but is equivalent in all other aspects. In Alberta, it is possible for companies to obtain variances from the Canadian Electrical Code to use such equivalent products. However it is not possible to do so in some other Provinces, for example Ontario.

As a result, Shell Canada is supporting the Objective Based Industrial Electrical Code (OBIEC) which is being developed through a CSA committee with the intent to establish it as a national standard. When implemented, the OBIEC would be a code parallel to the Canadian Electrical Code. Under OBIEC and with a safety management system such as ISO 9000, the onus would be on OBIEC participating manufacturers for determining compliance with the Electrical Code on the basis of a recognized management system, engineering procedures and declaration of product details in the design documents.

The principles behind the OBIEC could be applied to other regulatory codes and allow the manufacturing economy to become more effective and to apply global best practices more quickly where needed.
