Outsourced Engineering in Alberta's Major Projects

An Inquiry by
APEGGA's
Practice Review Board

May, 2006

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Introduction

This report summarizes the results of an inquiry initiated by APEGGA's Practice Review Board in accordance with the provisions of the *Engineering, Geological and Geophysical Professions Act*. The Board is an arms-length regulatory body established under Section 15 of the Act.

One of the Board's mandates is to inquire into the practice of the professions by professional members, licensees or permit holders, generally. Although no one had raised specific complaints, general concerns had been expressed about the quality of engineering in major projects in Alberta. The Board determined that it would look into the matter on its own initiative and established a subcommittee to conduct the inquiry.

The fundamental question that the inquiry sought to address was: From the perspective of public safety and welfare, is there a concern with engineering designs that are used to construct facilities or operate processes in the province of Alberta? The target of the inquiry was loosely termed as "major projects" to differentiate it from engineering in smaller residential, commercial and industrial projects.

This report is based on the results of an initial questionnaire submitted by 261 respondents, as well as the findings from 30 interviews with engineering managers and practicing engineers who indicated they were involved with reviewing and/or stamping others' engineering work.

Scope

The inquiry was to address the control, supervision and quality of engineering, primarily in major projects in Alberta, but also, to some extent, in smaller projects. The focus, for the most part, related to engineers registered with APEGGA relying on, and taking responsibility for, engineering work that is not done under their direct supervision or control, work henceforth referred to as "outsourced engineering." The inquiry was to consider engineering practices in general, but not economic or social issues. It also considered existing regulations and guidelines governing professional practice in that regard.

Purpose

The purpose of the inquiry was to gain an understanding of the issues and to gather and make a preliminary evaluation of available information. The inquiry itself was not intended to reach any final conclusions about any individual member's or permit holder's competence or right to continue engaging in professional practice.

Background

Outsourced Engineering

For the purposes of this inquiry, outsourced engineering is defined as engineering obtained from sources that are external to the organizational unit requiring the engineering services. For many major projects in Alberta, clients or consultants outsource part or all of the engineering design, procurement, and/or manufacture. The engineering could be outsourced to a local (Alberta) organization, to a consultant's office in another province or in the United States, or to an overseas subcontractor.

In the context of this inquiry, outsourced engineering includes "offshore" engineering, here meaning engineering work obtained from another country, usually overseas.

Regulatory Context

From a regulatory perspective, in 1999, the *General Regulation* (Regulations) under the *Engineering, Geological and Geophysical Professions Act* (EGGP Act) was revised, allowing a professional engineer registered in Alberta to stamp and accept responsibility for engineering documents that were prepared by someone else, after the engineer thoroughly reviews the documents. The responsibility associated with stamping someone else's documents is regarded as being the same as if the engineer had prepared those documents himself or herself.

Within the context of this inquiry, the provisions of the EGGP Act and Regulations apply only to engineering being practiced in the province of Alberta. The provisions do not extend to engineering being practiced in jurisdictions outside Alberta. Separate Alberta legislation, such as the Safety Codes Act, may require the involvement of a professional engineer, but not necessarily the involvement of an engineer registered in Alberta. Unless there are such requirements, engineering designs may be brought into Alberta from outside the province without involvement of an Alberta-registered engineer.

Project Context

How much money is being spent on major projects in Alberta?

The *Inventory of Major Alberta Projects*[1] lists a total of $128 billion for projects that have been recently completed, are currently under construction, or are proposed to begin construction within two years. Assuming that the cost of engineering is between 6-12% of the total project cost, this inventory of major Alberta projects equates to $8-16 billion of engineering work.

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[1] *Inventory of Major Alberta Projects*, Alberta Economic Development. April 2006. Available online at: www.alberta-canada.com/statpub/albertaConstructionProjects/mpindex.cfm.

Inventory of Major Alberta Projects		
Sector	# Total Projects	Value of Projects($millions)
Agriculture & Related	22	$ 517.4
Chemicals & Petrochemicals	5	$ 530.0
Commercial/Retail	91	$ 3,486.1
Commercial/Retail and Residential	5	$ 1,127.0
Forestry & Related	7	$ 940.0
Infrastructure	298	$ 12,389.9
Institutional	202	$ 8,241.6
Manufacturing	3	$ 55.0
Mining	6	$ 444.8
Oil & Gas	15	$ 1,985.3
Oil Sands	48	$ 79,739.0
Other Industrial	30	$ 603.1
Pipelines	29	$ 4,624.4
Power	21	$ 4,909.3
Residential	76	$ 1,707.7
Tourism/Recreation	145	$ 6,730.9
Total	**1003**	**$128,031.5**

Footnotes:

1. This Inventory lists projects in Alberta, valued at $2 million or greater, that have recently been completed, are currently under construction, or are proposed to start construction within two years. Not all projects over this threshold are listed, due to reasons of confidentiality and/or due to information not being available at the time of printing.
2. Project data is obtained from public information sources. Although, where possible, this data has been verified with the project proponent/developer, users of the Inventory may wish to *confirm* project data with the proponent/developer.
3. The Inventory does not break down project expenditures by any given year. The cost of a project is the value of expenditures expected over *all* phases of project construction, which may span two or more years.
4. The cost of projects listed in the Inventory are *estimated* values only.

Why do companies outsource engineering?

The reasons for outsourcing include the following:[2]

- Compressed design and construction schedules. Outsourcing, especially to other countries, allows design to proceed 24 hours per day.
- Local workforce shortages or lack of specialized expertise in-house. Outsourcing leverages engineering workforces in other companies and locales. The number of engineering graduates in other countries (i.e., China, India, South Korea) is growing at a faster rate than in Canada.
- Salary differentials make it appealing for companies to use less expensive labour forces in other jurisdictions. For example, the salary of an offshore engineer may be as low as 10-20% of the salary of an engineer in Alberta.

[2] Lori Simpson, *Engineering Aspects of Offshore Outsourcing and Public Policy Investigation*. Washington Internship for Students of Engineering (WISE): August 6, 2006. Available online at: http://www.wise-intern.org/journal04/WISE2004-LoriSimpsonFinalPaper.pdf .

- Increasing technological capability and infrastructure. The internet allows instantaneous file sharing and teleconferencing allows increased communication.

How is worked outsourced?

There are many operational formats for outsourcing. However, the three main models for outsourcing are:[3]

- Captive processing centres which undertake business processing only for their own multinational businesses.
- Third-party contractors which supply outsourcing services to other companies.
- Joint ventures created by two companies to build, operate, then transfer the projects.

How much engineering is being outsourced?

There are no statistics specifically for the outsourcing of engineering services in Alberta. However, there are statistics for Canada for the import/export of combined architectural and engineering services. There are also revenue data for engineering services for Canada and for Alberta. These data may be used to estimate the importation of engineering into Alberta.

In 2004, on a national basis, architectural and engineering services had revenue of $14.0 billion and imports of $2.0 billion (or 14% of the total revenue). The revenue of engineering services in Alberta was $2.9 billion. If the importation of engineering into Alberta is similar to Canada as a whole, then imported services could have been worth approximately $400 million in 2004.

Geography	Summary Statistics	2004 ($ millions)
Canada	Architectural services operating revenue[4]	$1,920.3
	Engineering services operating revenue[5]	$12,147.8
	Total revenue Architectural & Engineering Services	**$14,068.1**
	Receipts (exports) for Architectural, Engineering and other technical services[6]	$3,577.0
	Payments (import) for Architectural, Engineering and other technical services[7]	-$1,965.0
Alberta	Engineering services operating revenue[8]	$2,936.0

Over the past twenty years, the export of architectural and engineering services has increased at an average annual rate of 10%. The import of architectural and engineering services has increased at an average annual rate of 14%. Refer to Figure 1.

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3 E-Business Strategies. *Offshoring – Frequently Asked Questions*. July 2004. Available online at: http://www.ebstrategy.com/Outsourcing/basics/faq.htm.

4 Derived from Statistics Canada, CANSIM, Table 360-0005

5 Derived from Statistics Canada, CANSIM, Table 360-0005

6 Derived from Statistics Canada, CANSIM, Table 376-0033

7 Derived from Statistics Canada, CANSIM, Table 376-0033

8 Derived from Statistics Canada, CANSIM, Table 360-0005

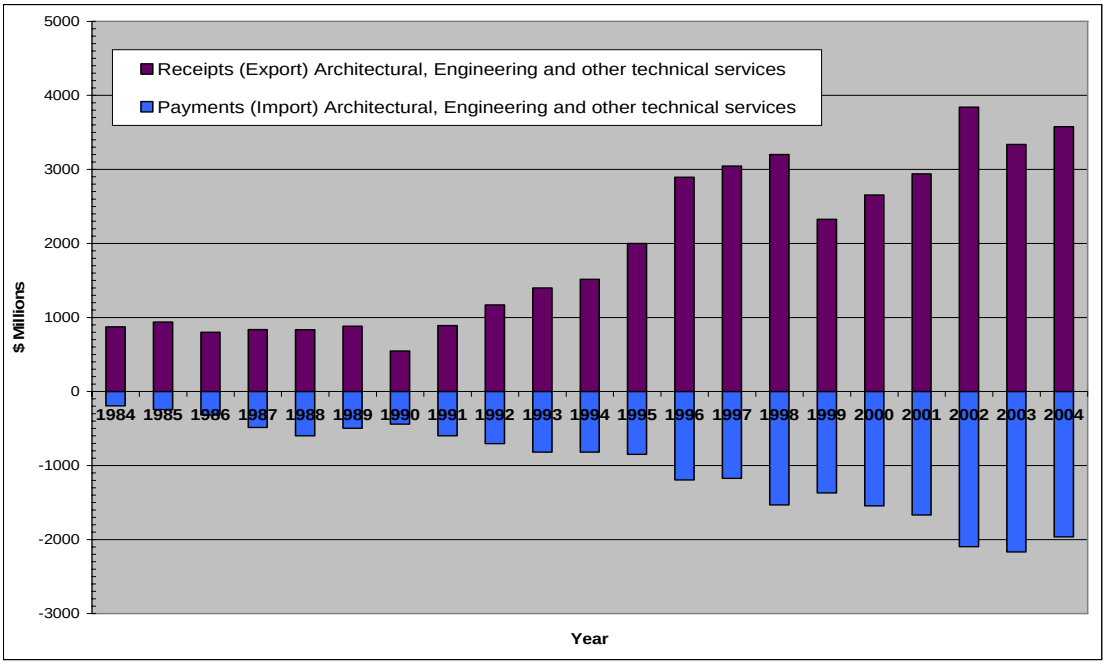

Figure 1 - Canadian Export (Receipts) and Import (Payments) of Architectural and Engineering Services, Derived from Statistics Canada, CANSIM, Table 376-0033.

The import/export of services has increased at a faster rate than the rate of growth for domestic engineering services as a whole. The total operating revenue for all Canadian engineering services has increased at an average annual rate of 5%, while the revenue for Albertan engineering services has increased at an average annual rate of 10%. Refer to Figure 2.

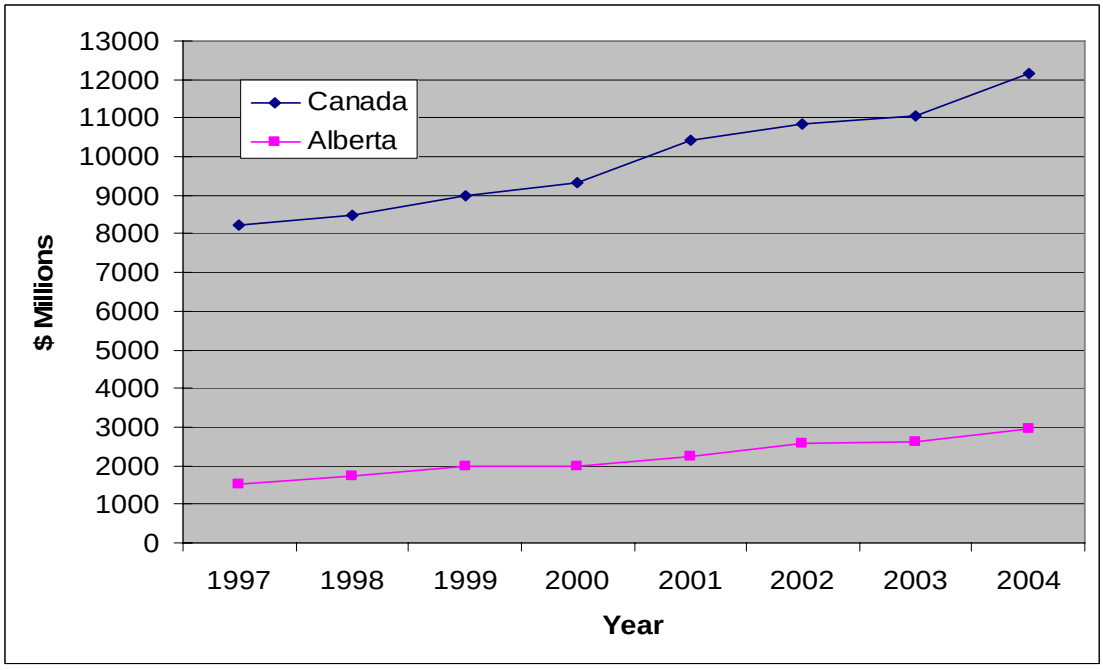

Figure 2 - Annual Operating Revenue for Engineering Services, Derived from Statistics Canada, CANSIM, Table 360-0005.

Inquiry Methodology

To obtain the information it required, the subcommittee prepared a questionnaire asking about various aspects of what it called “outsourced engineering”. For the purposes of the survey, outsourced engineering was defined as engineering that is not practiced under the direct supervision and control of a professional engineer registered in Alberta. In the second quarter of 2005, the questionnaire was published in the Association’s newspaper, *The PEGG*, and on APEGGA’s Web site, as well as having been mailed to APEGGA permit holders and other organizations connected with major projects. The questionnaire for the Phase I Opinion Survey is included in Appendix A of this report.

After receiving the responses to the initial questionnaire, the subcommittee decided that additional information would be helpful. A set of follow-up questions was prepared. These Phase II questions were posed to those individuals who, in the initial questionnaire, identified themselves and who indicated that they were required to stamp documents prepared by persons not under their direct supervision and control. The list of questions for the Phase II telephone interviews is included in Appendix B.

Phase I - Initial Opinion Survey

Responses

The Board was pleased with the response to its questionnaire; a total of 261 were returned. It should be noted that this was an opinion survey of self-selected respondents. It was not a random survey – response rates, significance, and confidence intervals cannot be calculated nor can the results be generalized to a larger population of engineers.

The responses came primarily from the petroleum industry:

- Upstream oil and gas 27%
- Oilsands/refinery 31%
- Infrastructure 8%
- Institutional/commercial 7%
- Government 4%
- Other 23%

The individuals responding classified the organizations in which they worked as follows:

- Engineering consultants 58%
- Project/facility owners 23%
- Constructors 2%
- Other 17%

The positions they occupied in those organizations were identified as follows:

- Management (engineer) 54%
- Management (non-engineer) 1%
- Engineer 39%
- Other 6%

Thirty-three percent of respondents are required to stamp documents prepared by persons NOT under their direct supervision and control (Q4). Those documents are prepared by persons who are:

- Within the company 36%
- Outside the company 23%
- Outside Alberta 13%
- Outside Canada 28%

Question 5 asked "Approximately what percentage of the documents that you/your engineers stamp are prepared by persons NOT under your/their direct supervision and control?" The results are shown in Figure 3, ranging from 0 to 100%.

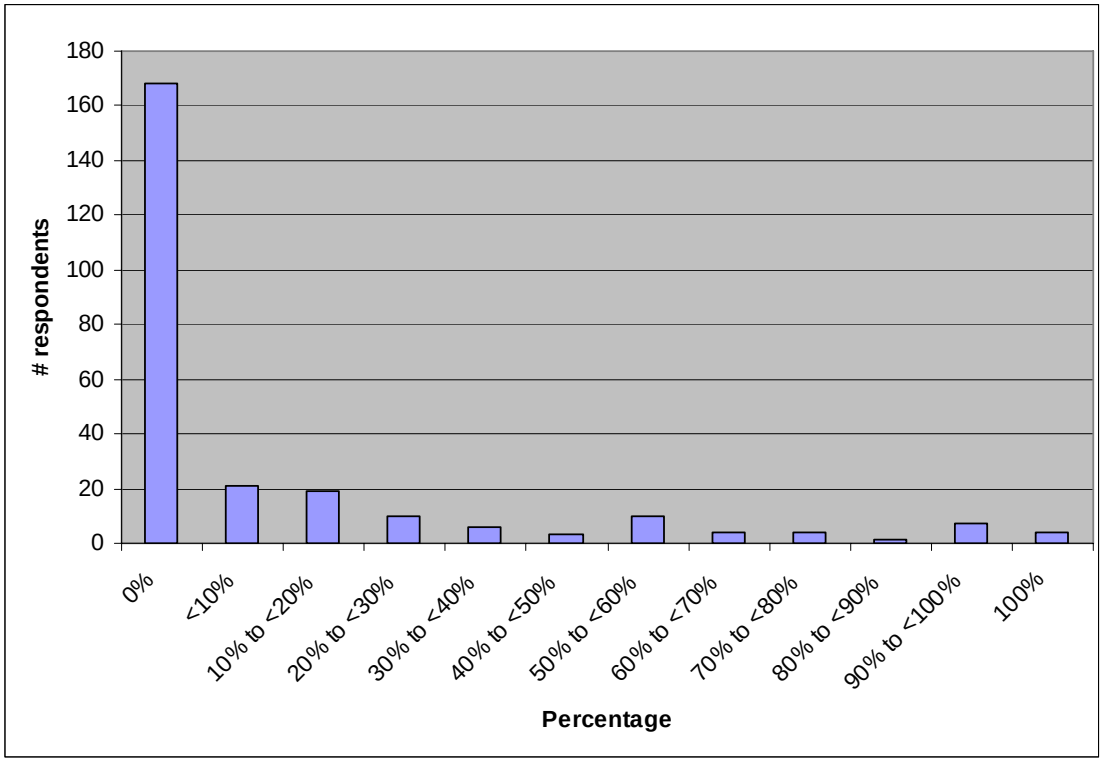

Figure 3 –Percentage of documents stamped that are NOT prepared under engineers' direct supervision and control

Observations

From an analysis of 261 returned survey responses the subcommittee made the following observations.

- Outsourcing of engineering and design work is a fairly common practice in Alberta.

- It was generally believed that Alberta engineers have sufficient education, training and experience to adequately review and take responsibility for work done by others (94% agree with Q8). However, concerns were expressed that cases exist where the actual review(s) performed were not adequate (12% disagree with Q7).

- While 57% of respondents believe that there are deficiencies in the outsourced work (Q12), they also say that there are mechanisms to identify and address these deficiencies (79% agree with Q13), even though 41% feel there is insufficient time and resources to correct the deficiencies (Q14).

- Often, this review is left to the individual member doing the review rather than being addressed as part of a company/corporate procedure or policy. One third of the respondents felt that their own company's policies and procedures did not adequately address the review and stamping of documents prepared by outsourced entities (Q20). This last issue was seen by the subcommittee as a key to addressing the other concerns and the issue as a whole.

- Outsource companies' quality assurance/quality control programs are judged to be inadequate in a significant number of cases (30% disagree with Q10 and 20% disagree with Q16, Q17, Q18) and many outsource companies' quality assurance/quality control programs are not sufficiently audited to assure adequacy (45% disagree with Q18).

- The most concerning response was that 50% of respondents disagreed with the statement that "The public is adequately protected by the present practice of engineers reviewing and stamping the work of others not under their direct supervision" (Q31). For a greater understanding of opinions of those who stamp versus those who do not, cross-tabulations of the data were completed. For those who stamp others' work, 56% believe the public is protected. For those who do not stamp, 47% believe the public is protected. Apparently, those who review and stamp others' work have slightly more confidence in the practice.

Although the initial survey was not designed to determine what concerns respondents most about outsourced engineering, an analysis of the respondents' general comments indicates that there are concerns about the following:

- Quality control – ineffective approval/review process/policies by reviewing engineers/companies,
- Lack of qualified staff to do review,
- Time/budget constraints on reviewing engineer,
- Outsource companies are unfamiliar with local conditions (cold climate, design standards, field labour costs),
- Over-design by outsource companies to avoid rework,

- High turnover amongst the outsource companies resulting in novices doing complex designs,
- Job security of the reviewing engineers – fear of taking time necessary to do reviews.

Phase II – Follow-up Telephone Interviews

Based on the initial survey, the subcommittee noted that respondents perceive that outsourced engineering could be a cause for concern about public safety. Recognizing that the majority of Phase I respondents or their engineers (67%) do not actually review others' work, the subcommittee acknowledged that beliefs may not accurately reflect reality. The subcommittee decided that additional detailed questions needed to be asked of those who actually review and stamp the work of others to determine if these perceptions are well founded.

The telephone interviews were conducted with those individuals who had voluntarily identified themselves and provided a means of contact for follow-up. Repeated attempts were made to contact the 37 individuals, with 30 of those attempts finally being successful. The individuals identified their employers as being major Engineering-Procurement-Construction companies (e.g., Bantrel, Colt, Jacobs, Fluor, CoSyn, SNC Lavalin), smaller engineering consulting companies, operating companies, and suppliers.

Responses

Most respondents stated that less than 30% of the work they stamp is outsourced from outside Alberta (refer to Figure 4).

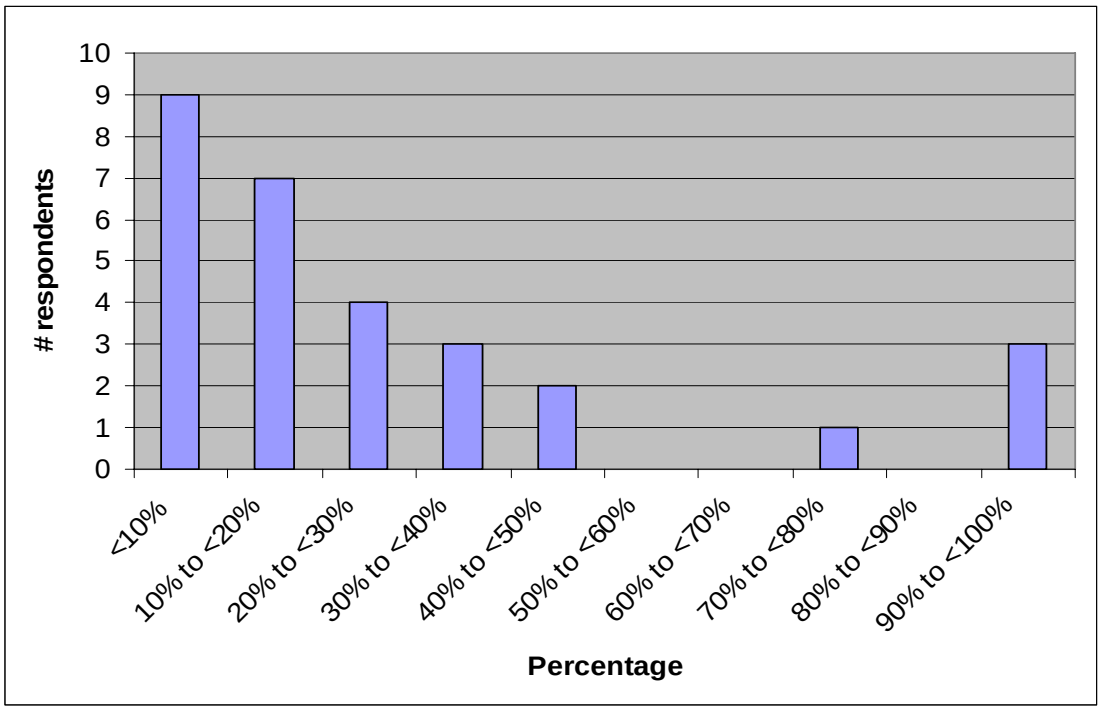

Figure 4 – "How much of the engineering that you review/stamp originates outside Alberta?"

The origins of outsourced engineering, based on responses provided by the interviewees, are shown below.

Source of Outsourced Engineering	**# Mentions (may mention more than one source)**
India	9
Local engineering firms, fabrication shops	7
Other provinces	6
United States	6
Philippines	4
Vendors, suppliers	2
Middle East	2
Anywhere, everywhere	2
E.U.	1
Indonesia	1
Australia	1
China	1
From others in office (E.I.T's, Technologists)	1

Project types included upstream oil and gas, pipelines, petrochemical / oil and gas refineries, and oil sands. The detailed engineering design is what tends to be outsourced.

Type of engineering being outsourced	**# Mentions (may mention more than one category)**
Civil – structural, foundations, pipe racks, brackets - detailed design	16
Mechanical – piping, pipeline - detailed design	15
Mechanical – equipment design & specs	11
Mechanical automation/process control	9
Electrical - detailed design	9
Chemical Process design/control	4
Petroleum/reservoir engineering	1
Software/Hardware	1

Interview respondents were asked "What does your review/checking involve?" Following is a sampling of their answers.

- Typically ask for copy of calculations, assumptions, design basis, to ensure calculations meet actual drawing. Review all calculations and assumptions. Calculate as necessary if something doesn't make sense.

- Review in detail first set of designs to establish level of confidence with spot checks afterwards –calculations, conformance of specifications and legislation/regulations, cross-reference with details.
- Typically distribute documents for a “squat check” by affected disciplines.

Interview respondents were asked “Is there any specific legislation, regulation, code, etc., that you know of, that requires the engineering to be performed or reviewed by an Alberta professional engineer?” Their responses are the following:

Specific reference mentioned by interviewees	**# Mentions (may mention more than one category)**
EGGP Act, Professional Practice Management Plan	13
Don’t Know / Unaware / Nothing specific to AB	9
ABSA	7
Alberta Building Code	7
Design standards (ISA, IEC, CSA, CUL, ASME, API)	7
OH&S Act, Alberta Safety Codes	5
Contractual requirements	2
EUB	1
NI 51-101	1

Interview respondents were asked “Is outsourced engineering is cause for concern?” The majority of respondents (25/30) replied with a “no” or a “qualified no”. Those who where not concerned stated that they:

- have proper review and checking procedures,
- have confidence in qualifications of outsource engineers,
- review outsourced company’s quality assurance/ quality control procedures,
- take the time necessary to do review the work.

Those expressing concern mentioned:

- over-design and conservative design,
- significant in-house checking requirements,
- calculations requiring rework,
- pressure to expedite reviews.

Observations

Based on the response results of the 30 interviews, the subcommittee made the following observations:

- A significant amount of outsourced engineering is being utilized in Alberta. The respondents expected outsourcing to be a growing trend given the expanding economy.

- Notwithstanding the presence or absence of any regulatory requirements to do so, proponents of major projects require outsourced engineering to be reviewed and approved by Alberta-registered engineers for their own reasons.

Respondents stated that all outsourced engineering that they are aware of is being reviewed and stamped by an Alberta engineer.

- Nearly all interviewees do not have concerns that outsourced engineering adversely impacts public safety. However, there is a concern from a small number of respondents regarding pressure to review and stamp engineering documents without adequate time. Apparently the engineers are fulfilling their responsibilities, notwithstanding such constraints.

- About one quarter of interview respondents is uncertain about the current regulatory requirements for authentication of engineering documents and the responsibility of engineers in Alberta.

Conclusions

As stated at the outset, the fundamental question that the inquiry sought to address was: From the perspective of public safety and welfare, is there a concern with engineering designs that are used to construct facilities or operate processes in the province of Alberta?

Based on the opinions obtained from the initial questionnaire survey and the follow-up telephone interviews, and taking into account the personal experience of the members of the subcommittee and the Practice Review Board, the following conclusions were reached:

- There should be no cause for concern related to the adequacy of engineering designs for major projects because, as evidenced by the Phase 2 responses, companies engaged in outsourcing employ Alberta-registered professional engineers to adequately review and control outsourced engineering.

- No changes in the current EGGP Act and Regulations are required, nor is there any need for additional legislation.

- There is a need to inform individual APEGGA members and permit holders about their responsibilities connected with, and the requirements of, reviewing and stamping of outsourced engineering.

- Having examined the subject from two approaches, it is apparent that the inquiry data do not support the perception that outsourced engineering in Alberta is a serious concern from the perspective of engineering design.

Recommendations

As a result of these conclusions, the Practice Review Board makes the following recommendations:

- APEGGA should prepare a set of guidelines outlining the responsibilities of professionals with regard to reviewing, stamping and signing of outsourced engineering documents.

- APEGGA should actively communicate those responsibilities to its individual members and permit holders.

- Permit holders that rely on outsourced engineering should be required to include a section in their Professional Practice Management Plans (PPMPs) that addresses quality assurance and control of outsourced engineering and that includes an audit trail of deficiencies found and corrected.

- Issues and concerns regarding management of the quality of outsourced engineering are likely to vary over time and according to the intensity of design and construction within Alberta. APEGGA should revisit this situation in the future if circumstances warrant.

- APEGGA should communicate the findings of this inquiry to its members, in *The PEGG* and on its Web site.

Acknowledgements

The Practice Review Board expresses its appreciation to the members of the subcommittee (as noted in Appendix C) and to the inquiry respondents, especially those who took the time to provide written feedback and to be interviewed. Their collective opinions form the basis for dispelling the perception of outsourced engineering affecting public safety.

Most importantly of all, the Board and the subcommittee recognize and appreciate the contributions of APEGGA staff, namely, Ray Chopiuk, P. Eng., Director Professional Practice, Lianne Lefsrud, P.Eng., Assistant Director Professional Practice and Cathy Ladouceur, Administrative Assistant Professional Practice.

Appendix A – Phase I Opinion Survey

(*For the purposes of this questionnaire, "outsourced engineering/work" means engineering that is not done under the direct supervision and control of a professional engineer registered in Alberta*.)

Please circle your responses.

1. Type of organization you work for:
a. Engineering consultant **b.** Project/facility owner **c.** Constructor **d.** Other _____

2. Your position in the organization:
a. Management (engineer) **b.** Management (non-engineer) **c.** Engineer **d.** Other_____

3. Your organization's industry sector:
a. Upstream Oil and Gas **b.** Oilsands/Refinery **c.** Infrastructure
d. Institutional/Commercial **e.** Government **f.** Other _____

4. Are you/your engineers required to stamp documents prepared by persons NOT under your/their direct supervision and control?
a. Yes **b.** No

5. Approximately what percentage of the documents that you/your engineers stamp are prepared by persons NOT under your/their direct supervision and control? _____ %

6. Where are such documents prepared? *Please circle all that apply*.
a. Within your company **b.** Outside your company **c.** Outside Alberta **d.** Outside Canada

Please circle your agreement or disagreement with each of the following statements.

7. You/your engineers adequately review those documents before stamping them.	Strongly Disagree	Disagree	Agree	Strongly Agree
8. You/your engineers have sufficient education, training, and experience to review work done by others.	Strongly Disagree	Disagree	Agree	Strongly Agree
9. You/your engineers have control over others' work being outsourced by your company.	Strongly Disagree	Disagree	Agree	Strongly Agree
10. Others, whose work you/your engineers review, exercise adequate quality control over their work.	Strongly Disagree	Disagree	Agree	Strongly Agree
11. There is undue influence or pressure from your company management on you/your engineers to approve others' work even when you/they are not comfortable in approving such work.	Strongly Disagree	Disagree	Agree	Strongly Agree
12. The designs/work that you/your engineers review is free of deficiencies.	Strongly Disagree	Disagree	Agree	Strongly Agree
↳*If you 'strongly disagree' or 'disagree' with statement 12* **13.** There are mechanisms to identify and address deficiencies.	Strongly Disagree	Disagree	Agree	Strongly Agree
↳ *If you 'strongly disagree' or 'disagree' with statement 12* **14.** There is sufficient time and resources to correct the deficiencies.	Strongly Disagree	Disagree	Agree	Strongly Agree
15. You/your engineers have influence on your company's quality control system.	Strongly Disagree	Disagree	Agree	Strongly Agree

16. Others, whose work you/your engineers review, have adequate policies, procedures, and standards.	Strongly Disagree	Disagree	Agree	Strongly Agree
17. Others, whose work you/your engineers review, follow their company's policies and procedures to meet acceptable standards.	Strongly Disagree	Disagree	Agree	Strongly Agree
18. Other companies, whose work you/your engineers review, are adequately audited.	Strongly Disagree	Disagree	Agree	Strongly Agree
19. Others, whose work you/your engineers review, are checking their work.	Strongly Disagree	Disagree	Agree	Strongly Agree
20. Your company's policies, procedures and standards regarding quality control adequately address the review and stamping of engineering documents prepared by outsourced entities.	Strongly Disagree	Disagree	Agree	Strongly Agree
21. Your company's policies, procedures and standards are adequately audited.	Strongly Disagree	Disagree	Agree	Strongly Agree
22. You/your engineers thoroughly review and approve work according to your company's policies, procedures and standards.	Strongly Disagree	Disagree	Agree	Strongly Agree
23. You/your engineers have adequate time and budget to review others' work.	Strongly Disagree	Disagree	Agree	Strongly Agree
24. You/your engineers are adequately trained, supervised, or mentored to do the work.	Strongly Disagree	Disagree	Agree	Strongly Agree
25. Others, whose work you/your engineers review, have the proper education, training, and experience to do the work.	Strongly Disagree	Disagree	Agree	Strongly Agree
26. You/your engineers have the adequate technical and administrative support in doing the work.	Strongly Disagree	Disagree	Agree	Strongly Agree
27. Others, whose work you/your engineers review, have adequate technical and administrative support in doing the work.	Strongly Disagree	Disagree	Agree	Strongly Agree
28. Your company does not compromise engineering quality to satisfy schedules and budgets.	Strongly Disagree	Disagree	Agree	Strongly Agree
29. Other companies, whose work you/your engineers review, do not compromise engineering quality to satisfy schedules and budgets.	Strongly Disagree	Disagree	Agree	Strongly Agree
30. The quality of engineering work in Alberta is improving.	Strongly Disagree	Disagree	Agree	Strongly Agree
31. The public is adequately protected by Alberta engineers reviewing and stamping documents prepared by persons not under their direct supervision and control.	Strongly Disagree	Disagree	Agree	Strongly Agree

Comments. Attach additional sheets, if necessary. _____

_____

Optional:
Name/Organization: _____
Address: _____
Phone/Fax: _____
Email: _____

Please mail or fax your completed questionnaire to:

APEGGA Practice Review Board
c/o R.G. Chopiuk, P.Eng., Director Professional Practice
1500 Scotia One, 10060 Jasper Avenue, Edmonton AB T5J 4A2, fax: (780) 426-1877

Appendix B – Phase II - Telephone Interview

You've indicated that some of the work that you or your engineers do involves reviewing and/or stamping engineering that originates outside your organization.

1. Where does that engineering originate, geographically?

2. How much of the engineering originates outside Alberta?

3. Are you aware of any outsourced engineering that is not reviewed and stamped by an Alberta engineer?

4. What kinds of projects are we talking about here?

5. Could you describe the engineering that is being outsourced, first by its discipline, e.g., civil, electrical, mechanical, chemical, etc.?

6. Within that/those disciplines, more specifically, what equipment, structure or process does the engineering relate to, e.g., piping design, systems monitoring, process design, etc.?

7. Is there any specific legislation, regulation, code, etc., that you know of, that requires the engineering to be performed or reviewed by an Alberta professional engineer?

8. What does your review/checking involve?

9. Is the outsourced engineering cause for any concerns?

10. (*If "no", above*): Why is that?

11. (*If " yes", above*):
    a. What kinds of specific concerns/problems are you seeing with that engineering?

    b. How are the concerns/problems addressed/corrected?

12. Anything else to add?

Appendix C –Subcommittee Members

Howard Leung, P.Eng., Chair
Richard Enns, P.Eng.
Robert Gartshore, P.Eng.
Barry Kopperud, P.Eng.
Larry Krushelnitzky, P.Eng.
Gregory Schneider, P.Eng.
Stephen Yewchuk, P.Eng.
David Woodall, P.Eng.