Oil and Gas Review 2006 Report

Alberta
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A|S|C
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Table of Contents

1. Introduction and Overview

1.1 General

This Consolidated Oil and Gas Review 2006 Report (the "2006 Report") is the third Alberta Securities Commission ("ASC") review of the disclosure required by National Instrument 51-101 *Standards of Disclosure For Oil and Gas Activities* ("NI 51-101"). Reports for 2004 and 2005 can be found on the ASC website at www.albertasecurities.com.

This 2006 report was compiled by the Oil and Gas Branch of the ASC Corporate Finance Division. The Branch is comprised of three professional staff, one technologist, and administrative support. The 2006 Report is based on reviews of oil and gas disclosure of:

- annual NI 51-101 filings of 380 reporting issuers ("RIs");
- reserves information of 163 RIs including:
  - the reserves reports of 37 RIs as part of a Continuous Disclosure review program;
  - reserves information in prospectuses and associated reserves reports;
  - miscellaneous reviews of specific items of oil and gas reserves disclosure, including news releases and websites;
  - a review that compared the actual results of 17 reporting issuers to the forecasts in reserves reports in reserve reports prepared up to three years ago; and
- frequent informal questions from and discussions with third parties, including producing reporting issuers and evaluators.

1.2 Summarized Issues and Observations

i. Misuse of Classification and Terminology

Most of the surveyed annual disclosure used the correct classification and terminology for reserves and other resources. However, we frequently observed incorrect usage in news releases and webcasts, especially for the resource categories other than reserves.

The classification and terminology that RIs need to use in disclosure of oil and gas information is found in NI 51-101, which refers to the Canadian Oil and Gas Evaluation Handbook ("COGEH"), Chapter 5, Definitions of Reserves and Resources. There were a few instances of disclosure that used other systems, such as that of the Society of Petroleum Engineers, or that used by the US Securities and Exchange Commission ("SEC"). This is not acceptable unless a RI has obtained an exemption.

There is occasional confusion between the terms "Reserves" and "Resources". Although the latter is often used colloquially to indicate volumes that are not classified as Reserves, in the classification system used in NI 51-101, Reserves are a sub-class of Resources.

An increase in the frequency of disclosure of additional resource categories, beyond the mandatory requirements of Proved and Probable Reserves, led to the publication of Canadian Securities Administrators ("CSA") Staff Notice 51-321 *Questions and Answers Concerning Resources and Possible Reserves,* on November 17, 2006. This Notice provides guidance on the disclosure of the non-mandatory reporting categories and guidance on disclosure that uses or contains analog information.

The recommended practice should be to classify hydrocarbon volumes at the lowest level of the classification system. RIs should fully explain and justify the rare cases when this is not possible.

ii. Disclosure of Unconventional Resources

Our reviews indicate activity on unconventional resources, bitumen, and coal bed methane, continues to increase, and there are also signs of activity on shale gas. With this activity there has been an increase in the disclosure of the non-mandatory resource categories of these product types, such as Contingent and Prospective Resources. CSA Staff Notice 51-321, *Questions and Answers Concerning Resources and Possible Reserves* also addresses some of these emerging issues around unconventional resources.

iii. NI 51-101 Annual Disclosure

The ASC completed a compliance review of the NI 51-101 Annual Filings of 380 RIs. As a result, we asked a number of RIs to refile some of their annual 2006 disclosure. Sixteen RIs were required to refile all of their 2006 annual disclosure as we observed deficiencies including the following:

Reporting Errors

Part 1.1(v) of NI 51-101 defines product types (light & medium crude oil, heavy oil, natural gas, natural gas liquids, synthetic oil, bitumen, coal bed methane, hydrates) for which reserves must be reported separately. Examples of incorrect reporting included:

- combining light & medium crude oil with heavy oil;
- including coal bed methane with natural gas;
- reporting Proved Producing and Proved Non-Producing Reserves, but not Total Proved Reserves;
- reporting Total Proved Reserves without splitting into Producing and Non-Producing;
- reporting Gross Lease Reserves and reporting issuer Gross Reserves but not Net Reserves; and
- reporting only using Barrels of Oil Equivalent ("BOE"). The required mandatory disclosure should be in the appropriate units (e.g., Mbbls, MMcf) not in BOEs. BOEs may be used in supplementary disclosure, but must be accompanied by the cautionary statement specified in Part 5.14 (d) of NI 51-101.

Other Errors or Omissions

Examples of information that were occasionally missing or incorrect included:

- tables showing the reconciliation of reserves or net present value of future net revenue;
- omission of the Proved Reserves constant price case;
- failure to include information on Proved Undeveloped Reserves;
- failure to report both after-tax value and before tax value; and
- failure to use all of the required discount factors - 0, 5, 10, 15, 20%.

iv. Underlying Reserves Information

While there has been noticeable improvement from prior years, the key deficiencies noted in underlying technical reserves evaluation reports were similar to those identified in previous reports. These deficiencies included:

- inadequate explanation in reserves reports of the methods used to make reserves estimates

and production forecasts, which led to requests for additional information (refer to COGEH Section 11.2.2);

- unrealistic timetables, especially for production from Proved Undeveloped Reserves (PUDs);
- optimistic estimates of volumetric drainage areas, with consequent low production decline rates that were not supported by subsequent production;
- optimistic production decline extrapolations of historical production data that are not supported by subsequent production;
- poor selection and analysis of analog information; and
- incorrect unit abbreviations, arithmetic errors and careless editing.

v. Analysis of Technical Revisions

Technical revisions are an indicator of the quality of a RI's prior period reserves estimates. Technical revisions to a RI's reported reserves are a category in the reserves reconciliation required by Form 51-101 F1.

The general expectation is that Proved Reserves are a high-confidence estimate. Therefore, technical revisions to Proved Reserves should be positive. Proved + Probable Reserves are an estimate of what is most likely, and consequently, technical revisions to Proved + Probable Reserves should be close to zero.

As was the case in 2005, technical revisions were close to the expected values.

Variance from these criteria should fall within reasonable limits that are a function of the number of properties that are aggregated to the reported reserves of a RI. Extreme variance beyond the typical limits for a RI of a particular size is one of the criteria used to select RIs for a review of their reserves.

Review of NI 51-101

In 2006, the ASC carried out an extensive review and assessment of the requirements for disclosure of oil and gas activities. This included formal consultation with industry and users of disclosure and consideration of the issues identified through our disclosure reviews. We have recommended a number of changes targeting evolving issues for the industry, clarifying the requirements and, in some cases, removing requirements for disclosure that are not being used by readers. The proposed version of NI 51-101, issued for public comment on January 19, 2006, can be found on the ASC website, www.albertasecurities.com.

Conclusions and Going Forward

The ASC's reviews of reserves evaluations carried out in 2006 continued to reflect the trend of general improvement noted in the 2005 report. Although less prevalent, omissions and errors identified in previous reports still occur, and a number of new issues were identified. The most significant new issue is the increasing disclosure of the non-mandatory categories of resources, especially outside the NI 51-101 annual filings. We will continue to review the NI 51-101 annual filings and the more detailed reviews of reserves and resource information and report the results in subsequent Oil and Gas Review reports.

We will review comments on the revised version of NI 51-101 and we plan to issue the revision in time for the evaluations carried out for the end of 2007.

2. Reviews of Oil and Gas Information

2.1 The Review Process and Types of Review

RIs disclose information on their oil and gas activities in a variety of ways, including regulatory filings, prospectuses, news releases, and web casts. The ASC may review this information in a number of programs that cover compliance and technical content. The ASC may also carry out studies on specific issues of a technical nature. Issues arising from these reviews are discussed in Section 3 of this report.

There are three levels of review: Statutory Filing Review, Compliance Review, and Technical Review.

i. Statutory Filing Review

This most basic type of review determines whether RIs have made the required filings. No detailed examination of the content is carried out.

ii. Compliance Review

NI 51-101 requires the disclosure of certain specified information (e.g., Proved and Proved + Probable Reserves). It also prescribes the manner in which RIs must make certain voluntary disclosure (e.g., Possible Reserves, Contingent, and Prospective Resources).

A Compliance Review ascertains whether the required disclosure is present and whether both the required and any voluntary disclosure is made in accordance with NI 51-101 standards.

iii. Technical Review

This is the most intensive level of review and involves assessing the quality of disclosure in detail. It usually involves a review of the reserves or resource evaluation report that underlies public disclosure.

Because evaluations of reserves and other resource categories are estimates, a technical review is primarily an assessment of whether the evaluation is consistent with basic underlying information (e.g., cores, logs and production history), and that RIs have prepared the evaluation in accordance with good geological and engineering practice and the evaluation standards set out in COGEH.

The ASC expects the RI will provide a solid and technically supportable explanation for the basis of an evaluation. As part of a technical review, the ASC considers the explanations the RI provided for the underlying evaluations and assesses its sufficiency. We may request further explanation or support for the RI's conclusions.

The ASC may also carry out special studies such as an analysis of Technical Revisions or a comparison of forecast and actual production.

If we identify material deficiencies in the review, we may request the RI to make additional disclosure to remedy the deficiencies. A RI will generally be informed of deficiencies that are of a lesser degree of materiality and be requested to avoid them in future disclosures.

2.2 The Context of the 2006 Review Program

The Technical Reviews were carried out in various programs, as described below, at different levels of detail.

i. NI 51-101 Annual Filing Compliance Reviews

Most of the 380 NI 51-101 annual filings that we reviewed had an effective date of December 31, 2005. The filing requirements consist of three disclosure documents:

- Form 51-101F1 *Statement of Reserves Data and Other Oil and Gas Information.* This form requires disclosure on Proved and Probable Reserves and it may also include voluntary disclosure of Possible Reserves and other Resources.
- Form 51-101F2 *Report on Reserves Data by Independent Qualified Reserves* Evaluator or Auditor. The reserves evaluator or auditor must sign this form.
- Form 51-101F3 *Report of Management and Directors on Oil and Gas Disclosure.* Two officers and two directors of the RI must sign this form.

RIs must also issue a news release to announce the filing, at the time of filing.

ii. Continuous Disclosure Technical Reviews

The Continuous Disclosure program of the Oil and Gas Branch for 2006 included technical reviews of reserve and resource information of a selected sample of oil and gas RIs. We selected review targets using the following criteria:

- significant technical revision of Proved or Proved + Probable Reserves in the previous year's filings;
- evaluations performed by a wide sample of independent evaluation firms;
- issues noted on a RI's disclosure during the previous year's review;
- technical issues of general interest; and
- a random selection of additional RIs.

iii. Prospectus Technical Reviews

Before the ASC issues a receipt for a prospectus, the ASC may review the oil and gas reserves and resource information disclosed in the prospectus.

Long form prospectuses must contain all relevant information, and the underlying reserves evaluation reports are almost invariably subject to a technical review.

A new short form prospectus rule, National Instrument 44-101 *Short Form Prospectus Distributions*, came into force on December 30, 2005. Under this rule, a RI can incorporate previously disclosed information, including their NI 51-101 annual filings, in a prospectus by reference. RIs must also enclose subsequent material changes in a prospectus. The ASC will review this information and may request additional information, such as the detailed reserves reports. The ASC reviewed reserves information of 29 RIs that submitted a Notice Declaring Intention to be Qualified under NI 44-101 *Short Form Prospectus Distributions*. The fact that the ASC has not made comments on previously filed documents is no guarantee that the ASC will not raise questions when a short form prospectus is filed.

iv. Special Technical Review Projects

We may identify specific issues that warrant special studies. The ASC completed one such project, a monitoring review, during 2006 and others are in progress.

For the monitoring review project, the ASC carried out reviews of 17 previously filed reserves reports from the last three years, to determine how well they have stood the test of time. In particular:

- a comparison of the forecast and actual production;
- a comparison of the forecast and actual activity (e.g., drilling of PUDs); and
- a determination of whether the reserves estimates are supported by subsequent actual production.

The results of the monitoring reviews are reported in Section 3.6 ii

Other special projects undertaken during the year were:

- *Review of Steam Assisted Gravity Drainage* ("SAGD") Projects. There is limited information on the actual performance of SAGD and many forecasts rely heavily on reservoir simulation and analogy. We have initiated a review of the available information and a comparison with actual performance. This project will continue into 2007.
- *Comparison of Actual and Forecast Production for Conventional Oil and Gas.* This project was initiated over a year ago, and compares forecast to actual production for over 7000 wells. This project was still in progress at the end of the year.
- *Late Stage Production Performance of Gas Wells.* Production forecasts are generally carried out using mathematical relations (the Arps equations) that assume a regular, smooth, decline. A preliminary review of the production profiles of 203 depleted gas wells suggests that late stage performance is often considerably more erratic and subject to sudden termination, often due to sudden water breakthrough. More work is required on this project.

v. Miscellaneous Technical Reviews

The ASC reviews additional material, such as news releases, to assess and monitor compliance with NI 51-101. There was a slight increase in this activity in 2006, and we plan to significantly increase these reviews in 2007.

vi. Third Party Comments, Questions, and Discussions

During the year, the ASC Oil and Gas Branch received numerous inquiries and comments from, and held many discussions with RIs, their representatives and the public.

2.3 Looking Ahead to the 2007 Review Program

The 2007 Review Program will be similar to our program that we carried out in 2006 with the following anticipated changes:

i. In 2006, the ASC performed a Compliance Review of the disclosure in the NI 51-101 annual filings of substantially all RIs engaged in oil and gas activities. In future, we will review a sample each year so that a RI will be reviewed on a periodic basis. We will review RIs with major deficiencies in previous filings and those that have issued Initial Public Offerings in the previous

year. An application to qualify to issue, or to issue, a short form prospectus will automatically trigger an immediate review of information that is incorporated by reference.

ii. Increased emphasis on the review of disclosures of unconventional oil and gas activities.

iii. Increased emphasis on the review of non-regulatory filings such as news releases. When appropriate, the ASC will request expeditious clarification and correction of misleading disclosure.

The results of the various reviews are taken into account when considering potential revisions to disclosure legislation.

3. Issues Arising From Reviews

3.1 Requirement for Annual NI 51-101 Disclosure

RIs engaged in oil and gas activities are required to make specified disclosure, including annual filings, under NI 51-101. A number of RIs failed to make these annual filings because they wrongly believed that this was required only if they had positive cash flow. However, "Oil and Gas Activities" as defined in NI 51-101 1.1(s), are not limited to current production, but include exploration, land acquisition, and field level activities associated with production, for both conventional and unconventional hydrocarbons. Involvement in Oil and Gas Activities automatically triggers a requirement for regulatory filing under NI 51-101.

3.2 Requirement to Use the NI 51-101 Resource Definitions

RIs are required to use the definitions of reserves and other resources prescribed in NI 51-101. Occasional evaluations that used other definitions have been noted, mainly in reports prepared by non-Canadian evaluators. These definitions included:

- The definitions of the Society of Petroleum Engineers ("SPE"). These are long established, widely used outside the regulatory field, and may be evolving to become an international standard. There is considerable similarity between these definitions and those used in NI 51-101. In many, but not all, cases, reserves and resources estimates made using the SPE definitions will not be materially different from estimates made using the definitions of NI 51-101.
- The definition used by the SEC. This is limited to Proved Reserves at a constant price. These proved volumes may differ from proved volumes determined under NI 51-101. The SEC disclosure provides for none of the other categories of resources to be disclosed.
- Other definitions, peculiar to the evaluator concerned, and often presented as an "improvement" or "clarification" of the definitions in NI 51-101.

A RI that used other definitions than those required by NI 51-101 was usually requested to prepare an evaluation that conformed to NI 51-101 requirements. In one or two cases when there was no material difference from an estimate prepared under NI 51-101, the ASC allowed the RI to use the evaluation, providing disclosure to this effect was made. They were required and are expected to use the NI 51-101 definitions in future.

3.3 Non-Mandatory Reporting of Resource Categories

i. **Introduction: CSA Staff Notice 51-321** *Questions and Answers Concerning Resources and Possible Reserves*

NI 51-101 requires the disclosure of volumes and values for Proved and Probable Reserves, and allows other categories of resources to be disclosed if a RI chooses to do so. There has been a significant increase in the reporting of these non-mandatory reporting categories of resources in the last year.

Our reviews indicate activity on unconventional resources, bitumen, and coal bed methane, continued to increase, and there was also some activity on shale gas. With this activity, there has been an increase in the disclosure of the non-mandatory resource categories of these product types, such as Contingent and Prospective Resources. Some of this disclosure has been observed in annual filings, but most has been in news releases and web casts. Concerns about some of this disclosure led to the publication of CSA Staff Notice 51-321 *Questions and Answers Concerning Resources and Possible Reserves,* that provides guidelines for this type of disclosure. This notice can be found on the ASC website at: www.albertasecurities.com under "Securities Law & Policy – Regulatory Instruments."

The resource classification and terminology to be used for disclosure of resources (of which reserves are a sub-set) is that of Chapter 5 of COGEH, and is also available on the ASC website at: www.albertasecurities.com, under *Quick Links – Oil and Gas Disclosure Standards.*

CSA Staff Notice 51-321 should be consulted for details, but in summary, the provisions are:

- use the correct terminology as defined in NI 51-101. Other terms should not be used, even if used in other classification systems, such as that of the SPE.
- avoid the use of the term "in-place" in disclosure. Although it has a legitimate use in evaluation practice, it can be misleading to an individual without the appropriate technical knowledge. By definition, the categories of Discovered and of Undiscovered Resources are "in-place" volumes in the subsurface and Reserves, Contingent and Prospective Resources are volumes recoverable or potentially recoverable at surface.
- provide the definition. Although many are familiar with terms such as "Proved" and "Probable" for reserves, other terms such as "Contingent" and "Prospective" resources may be confused.
- provide appropriate cautionary language. For Contingent Resources, describe the contingencies and for Prospective Resources, explain that they have not yet been, and may never be, discovered.

ii. Level of Disclosure

The resource classification system is hierarchical, with the higher levels being an estimate of the volumes in the ground and the lowest level representing the volumes that may be recovered. Reference should be made to COGEH Volume 1, Section 5 for details of the classification system (also available on the ASC website at www.albertasecurities.com). Except in special cases, RI disclosure should include estimates at the lowest level of resource classification, that is: Reserves, Contingent Resources, and Prospective Resources. If this cannot be done, RIs should provide a full explanation. Although other categories may be disclosed, this should be done as described in CSA Staff Notice 51-321 *Questions and Answers Concerning Resources and Possible Reserves.* Additional comments on some resource categories are made below.

iii. Discovered Resources

A Discovered Resource is an estimate of a volume in the ground, where only a portion may be recovered. A Discovered Resource must meet the requirement of being in a "known accumulation" as defined in COGEH.

RIs should accompany disclosure as a Discovered Resource volume with disclosure of the associated reserves or contingent resources. In the infrequent cases for which no meaningful estimate of these can be made, RIs must provide substantial explanation. One of the rare instances when disclosure of only Discovered Resources may be warranted is for bitumen mining operations that require a feasibility study, typically costing many millions of dollars. In this case, the accumulation is often well delineated and there is a good estimate of the volume in the ground (discovered resource) but it is not known how much, or even if any, can be recovered until the feasibility study has been carried out.

iv. Recoverable Resources

The term "Recoverable Resources" is a defined term that is frequently misused. In the resource classification system used in NI 51-101, a Recoverable Resource is an estimate of Ultimate Reserves; that is, the sum of Cumulative Production and Reserves, and must fully meet the criteria for an estimate of reserves. There have been a number of instances of RIs disclosing volumes as Recoverable Resources, which do not meet this requirement. RIs should not use the term as a substitute for a more appropriate classification, such as a Contingent or Prospective Resource. Since Cumulative Production is always known, Recoverable Resources can always be accompanied by disclosure of the Cumulative Production and the appropriate categories of Reserves and Recoverable should always be accompanied by a disclosure of reserves.

RIs should avoid the use of the word "recoverable" as a modifier in other phrases, such as "recoverable bitumen", as the meaning is unclear.

v. The Term "In-Place"

RIs should avoid the term "in-place" in public disclosure of resource volumes. The term has a well-established and legitimate use in evaluation practice, to describe a volume in the ground, of which, at the best, only part may be recovered. However, this usage is not universally understood and it is sometimes thought that "in-place" refers to a volume recovered to the surface.

3.4 Use of Analog Information

Analog information is widely used for the evaluation of all types of resources, but some recent disclosures, particularly of unconventional resources have relied very heavily on the use of analog information, some of which may be prepared according to standards other than those required by NI 51-101. The quality and source of this information can vary, and may not even be known. Guidance on disclosures that use such analog information has recently been provided in CSA Staff Notice 51-321 *Questions and Answers Concerning Resources and Possible Reserves.* In summary RIs should:

- provide a statement if the analog information is not known to conform to the standards required by NI 51-101.
- describe the source of the analog information.
- describe the relevance of the analog information to the evaluation that is being disclosed.

3.5 Compliance With NI 51-101 Annual Disclosure

The ASC reviewed the NI 51-101 annual disclosures of 380 RIs, and we requested a number of them to refile one or more of the required forms and/or news release. The ASC required 16 RIs to re-issue all three forms. The ASC notified other RIs of minor deficiencies to attend to in future disclosure.

The ASC identified 31 RIs that had failed to file and requested them to make their annual filing.

We subjected a number of RIs with the most serious deficiencies in their disclosures to a more detailed continuous disclosure technical review. Issues we noted during the review:

i. General Issues:

- incorrect reporting categories (e.g., combining light and medium oil with heavy oil); reporting only using BOEs;
- omitting required information, (e.g., no reconciliation of reserves; no information on PUDs);
- confusion over the correct use of unit abbreviations and notations, although there was improvement since last year. As noted in the 2005 review, usage in the technical documents is usually correct and the errors generally occurred in the preparation of the disclosure documents;
- filing of summary or detailed reserves evaluation reports on SEDAR instead of the information prescribed in Forms 51-101 F1, F2, and F3.

ii. Form F1

The ASC found deficiencies throughout the Form F1, but the most common were in:

- Part 4. Reconciliations of Changes in Reserves and Future Net Revenue Deficiencies Deficiencies included:
  - omitting part or all of the required reconciliations;
  - failing to split the reconciliations by different product types (e.g., natural gas and coal bed methane);
  - preparing the reconciliation with BOEs;
  - combining categories such as technical revisions and improved recovery;
  - creating new categories of reconciliation;
  - making technical revisions to a zero opening balance;
  - stating that the numbers were net when they were gross; and
  - filing arithmetic errors.

- Part 6. Other Oil and Gas Information. RIs commonly ommited required information or the information consisted of uninformative boilerplate disclosure. In general, more attention is warranted to ensure that RIs provide all the information required in this section.
- Disclaimers related to Forward Looking Information. It is not acceptable for a RI to simply state that the RI is not required to provide any updates. Disclaimers of this type should include an additional phrase "except as required by sercurities legislation," in order to be acceptable.

iii. Form F2

The most common deficiencies in Form F2 were in Section 4, the table that shows the Net Present Value ("NPV") of the reserves examined by the Evaluator. Errors included using the Proved + Probable + Possible reserves instead of Proved + Probable Reserves and a discount rate other than 10%.

iv. Form F3

The most common deficiency in Form F3 was that the required number of officers and directors had not signed the form.

v. News Release

A number of RIs failed to file the required news release in the correct SEDAR category: News Release (Section 2.2 of NI 51-101).

3.6 Reserve and Resource Technical Reviews

i. Continuous Disclosure Information

We reviewed the reserves reports of 37 RIs, with a total 10% NPV before tax for Proved Reserves of $10.4 billion and for Proved + Probable Reserves of $13.8 billion for Toronto Stock Exchange (TSX) RIs, and an additional $210 million and $401 million, respectively for TSX Venture RIs. We may review the reserves reports of a number of these RIs again in 2007.

Although the number and extent of deficiencies has continued to decline, the key deficiencies noted were similar to those identified in previous annual reports. These deficiencies included:

- inadequate explanation in reserves reports, leading to requests for additional information;
- unrealistic timetables, especially for production from PUDs;
- optimistic estimates of volumetric drainage areas, with consequent low production decline rates that were not supported by subsequent production;
- optimistic production decline extrapolations of historical production data that are not supported by subsequent production; and
- poor selection and analysis of analog information.

Production decline reserves estimates on well groups are often significantly different from the sum of the individual well estimates. Successful group estimates require very careful control to ensure that the wells in the group have similar characteristics including initial rates, decline rates, and the important factor of time on production, or the results may be in significant error. It should be noted that grouping wells solely on the basis of similar on-production dates often results in groups that include wells with

significantly different characteristics, and a consequent erroneous result. RIs should avoid the grouping of wells with commingled production.

The ASC has seen a few evaluations with negative NPVs for Proved Undeveloped Reserves. This may be the result of careless procedures, or in one case, misallocation of costs.

ii. Special Projects: Monitoring Reviews

The ASC reviewed the reserves reports of 17 RIs from the previous three years to assess the quality of the production forecasts and whether they supported the reserves estimates with subsequent production. A number of the reserves reports displayed shortfalls in this respect. We are continuing to monitor and review the appropriateness of differences between forecasts and actual production. The ASC selected a number of them because we had concerns when the reserves report was originally issued, and, therefore, the selected RIs cannot be regarded as a representative sample. Although this precludes generalization of the results, the review usually confirmed the validity of these concerns. The major issues we are reviewing are the same as for other reviews: too large drainage areas resulting in production forecasts that declined too slowly; and over optimistic development scenarios especially for Proved Undeveloped Reserves.

3.7 Analysis of Technical Revisions

Technical revisions to reported reserves are a category in the reserves reconciliation required by Form 51-101 F1. They serve as an indicator of the quality of a RI's prior period reserves estimates, with, in the absence of bias, the following criteria:

- Proved Reserves are a high-confidence estimate, and technical revisions to Proved Reserves should be positive.
- Proved + Probable Reserves are an estimate of what will actually happen, and consequently, technical revisions to Proved + Probable Reserves should be close to zero. Significant deviation from zero is a measure of bias.

Table 1 shows the Technical revisions as a percentage of the total reserves for the three categories of Light & Medium Oil, Heavy Oil, and Natural Gas, for Proved and for Proved + Probable Reserves, for the years 2003 to 2005. The same information is shown graphically in Figure 1. There is insufficient information on other categories, such as bitumen or coal bed methane, to make any meaningful comment. In summary:

- 2003 (2004 Report, the first year of disclosure under NI 51-101). There were major negative technical revisions, especially for Heavy Oil.
- 2004 (2005 Report). Technical revisions were mostly increases to Proved Reserves and approximately equal numbers of positive and negative revisions for Proved + Probable Reserves, suggesting an improvement in the quality of reserves evaluation.
- 2005 (2006 Report). There were small positive revisions to Proved Reserves. Revisions to Proved + Probable Reserves were insignificant for Light & Medium Oil and natural gas, and, at minus 2.4%, slightly larger for Heavy Oil.

Figures 2 to 4 contain histograms of the Technical Revisions for the three product types. Some variance from the above criteria is to be expected, but should lie within reasonable limits. An acceptable level of variance depends on the number of properties that are aggregated to the reported reserves of a RI, since, in the absence of bias, as the number of properties increases, positive and negative revisions on individual properties are likely to cancel each other. The technical revisions to reported reserves should, therefore, be proportionately smaller for a RI with many properties than for a RI with few properties. This is clearly demonstrated in the scatter plots in Figures 2 to 4, which show Technical Revisions as a percentage of total reserves plotted against total reserves. Each point on these graphs represents the reported reserves of a RI. Extreme variance beyond the typical limits for a RI of a particular size is one of the criteria used to select RIs for a review of their reserves.

		Light & Medium Oil	Heavy Oil	Natural Gas
No. of Companies*	2003	138	44	155
	2004	161	54	185
	2005	209	72	228
Proved % Technical Revisions	2003	(5.3)	(19.7)	(8.5)
	2004	5.0	5.8	9.6
	2005	3.9	1.2	2.6
Proved + Probable % Technical Revisions	2003	(0.4)	(4.3)	(4.3)
	2004	1.1	0.6	0.6
	2005	0.3	(2.4)	(0.8)

* No. of Companies with both Proved and Probable Reserves

4. Evaluation Standards

Unconventional resources currently on production or under investigation include coal bed methane, bitumen, synthetic crude, and shale gas. The reporting requirements under NI 51-101 are essentially the same, and must meet the same standards and use the same terminology, as conventional resources. At this time, there is limited detailed guidance in the COGEH on unconventional resources, although these are currently in preparation for coal bed methane and bitumen.

Although methods of estimating in-place volumes are fundamentally the same, thermal stimulation and mining extraction recovery processes are very different. The evaluation methods used for thermal stimulation are similar to those used for the evaluation of conventional resources; however the evaluation of mined bitumen uses the methods developed in the mining industry, in particular the requirement for a formal feasibility study before assigning reserves. Also, bitumen mining projects, because they are much larger than the typical West Canadian Basin conventional oil or gas projects, can be more appropriately compared to the evaluation of a large offshore oil or gas field development, which would be preceded by extensive geological and engineering studies, equivalent to a mining feasibility study, before a development decision is made.

Although thermal recovery projects tend to proceed more incrementally than mining, they are also often on a relatively large scale. Except for Cyclic Steam Stimulation ("CSS") at Cold Lake, there is, as yet, limited long-term performance information on thermal recovery projects, and evaluators should be cautious about assigning large reserves volumes on the basis of limited pilot project data or simulation.

5. Review of National Instrument 51-101

National Instrument 51-101 came into force in September 2003. This, and previous reports have described issues that have arisen from its use since that time. In response to an increase in the disclosure of resource categories that are not a mandatory requirement, CSA Notice 51-321 *Questions and Answers Concerning Resources and Possible Reserves,* was issued on November 17, 2006.

A review of the instrument, including consultation with industry initiated in mid-2006, identified a number of potential changes. An amended version of NI 51-101 was issued for public comment on January 19, 2007, and can be found on the ASC website at: www.albertasecurities.com, Quick Links.

The main proposals are:

- elimination of the mandatory requirement to report a Proved Reserves Constant price evaluation case (Form NI 51-101 F1 Item 2.1).
- elimination of the requirement to provide a Future Net Revenue Reconciliation (Form NI 51-101 F1 Item 4.2).
- revision of NI 51-101 Item 5.9, Disclosure Concerning Prospects and of Item 5.10, Estimates of Fair Value of an Unproved Property, Prospect, or Resource.

Comments are due by April 19, 2007. The CSA plans to publish a revised version of NI 51-101 in time for it to be implemented for evaluations carried out for the end of 2007.

6. Figures

1. Percentage Technical Revisions to Reported Reserves, 2003, 2004, 2005
2. Light and Medium Oil Technical Revisions, 2005 (2006 Report)
3. Heavy Oil Technical Revisions, 2005 (2006 Report)
4. Natural Gas Technical Revisions, 2005 (2006 Report)

Figure 1. Percentage Technical Revisions to Reported Reserves 2003 to 2005

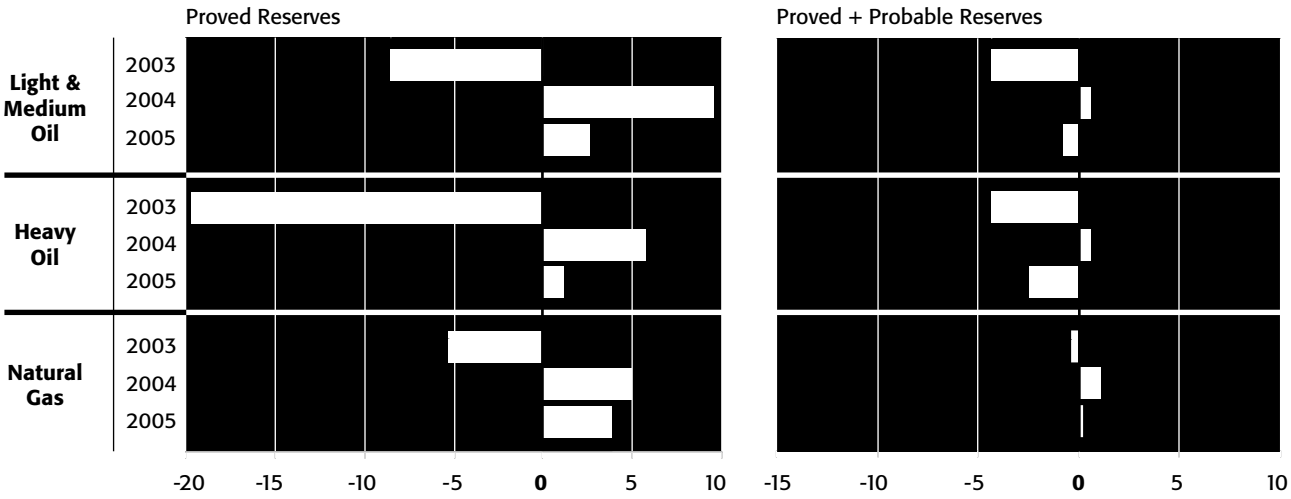
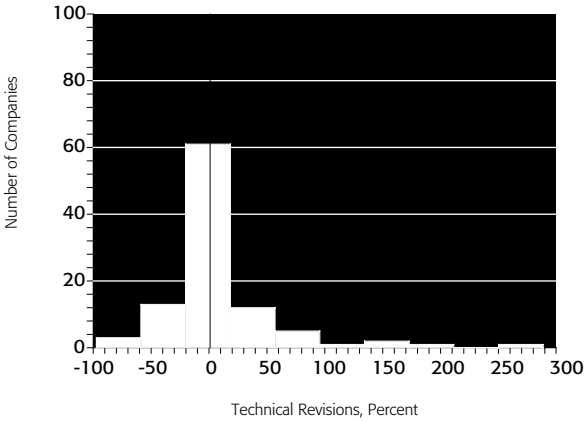
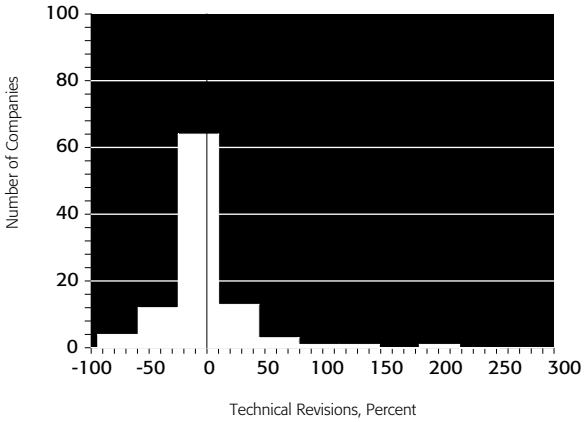


Figure 2. Light And Medium Oil Technical Revisions, 2005 (2006 Report)

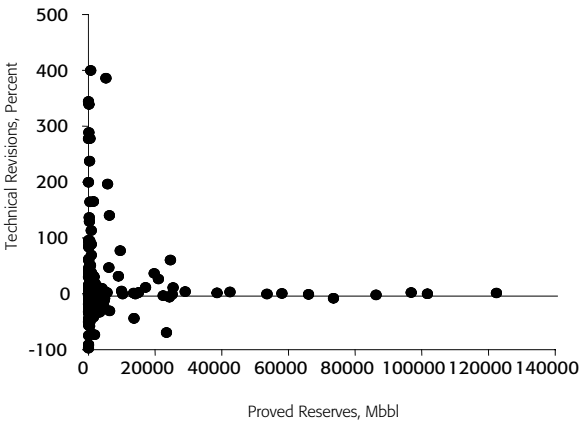
Light & Medium Oil, Proved Reserves
209 Companies



Light & Medium Oil, Proved + Probable Reserves
209 Companies



Light and Medium Oil Proved Reserves
Technical Revisions



Light and Medium Oil Proved + Probable Reserves
Technical Revisions

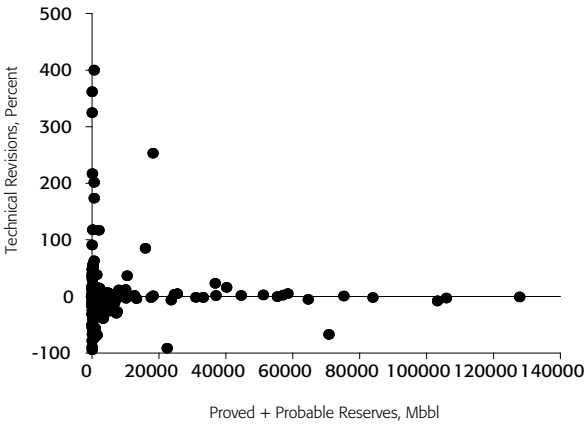
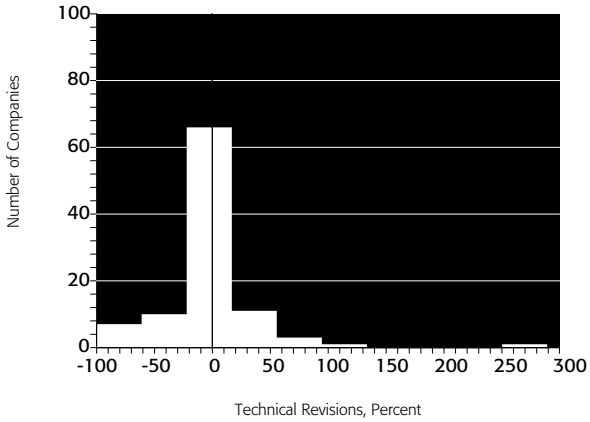
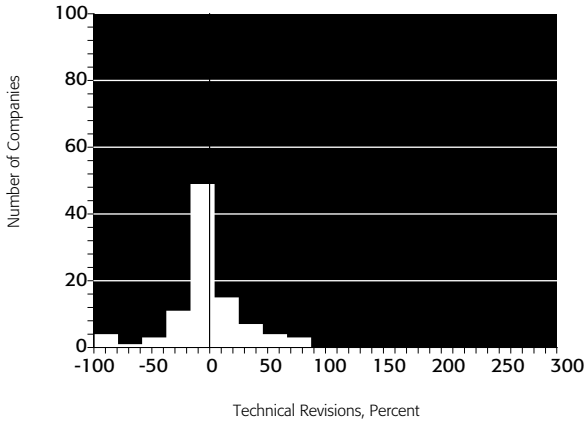


Figure 3. Heavy Oil Technical Revisions, 2005 (2006 Report)

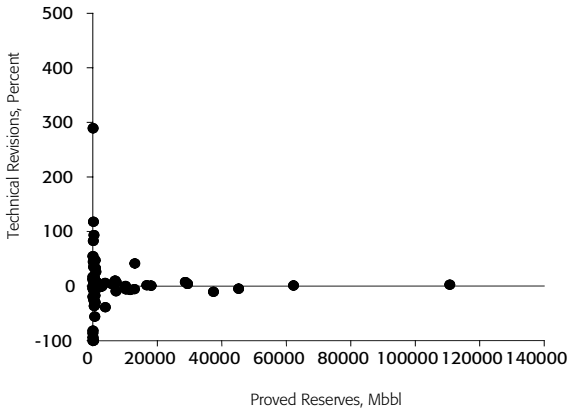
Heavy Oil, Proved Reserves
72 Companies



Heavy Oil, Proved + Probable Reserves
72 Companies



Heavy Oil Proved Reserves
Technical Revisions



Heavy Oil Proved + Probable Reserves
Technical Revisions

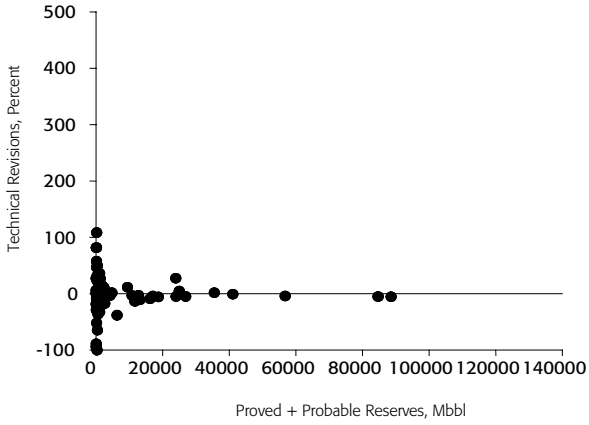
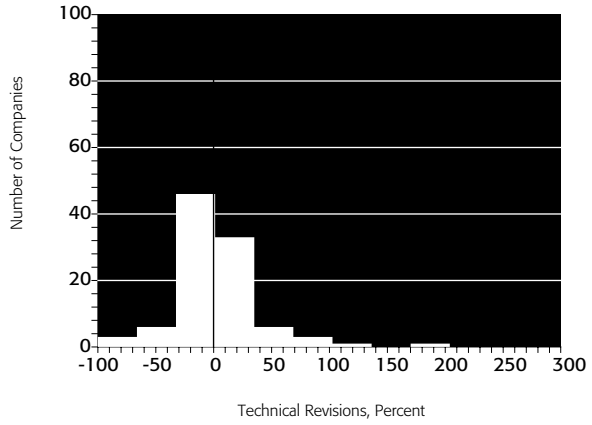
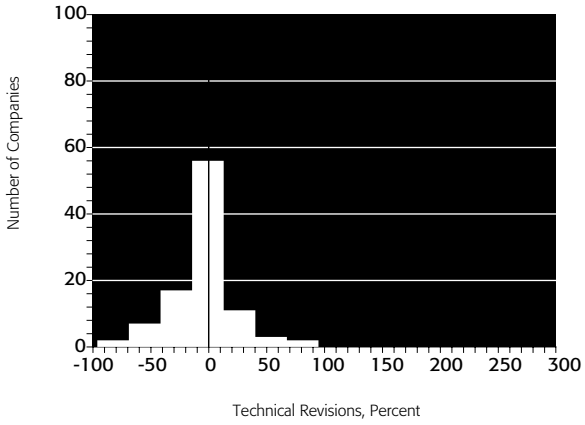


Figure 4. Natural Gas Technical Revisions, 2005 (2005 Report)
(Includes solution gas)

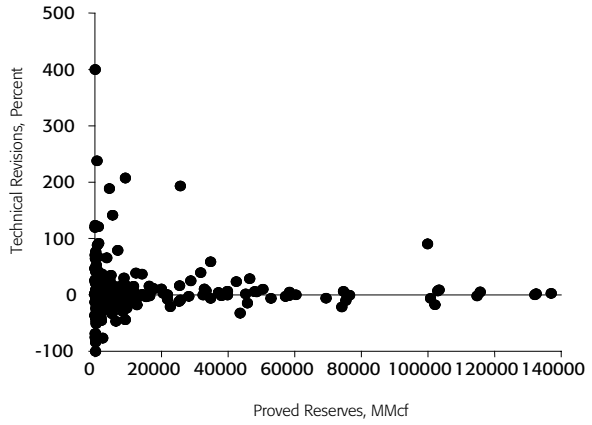
Natural Gas, Proved Reserves
228 Companies



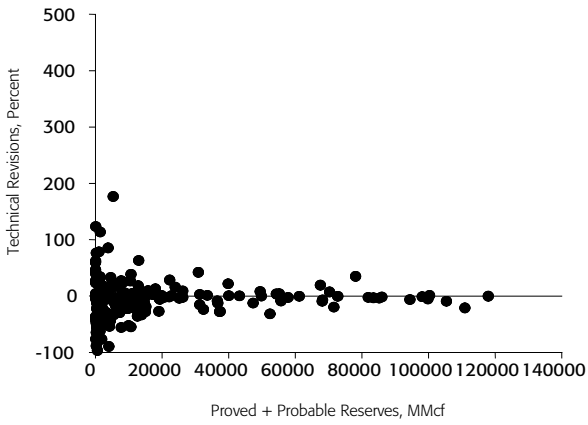
Natural Gas, Proved + Probable Reserves
228 Companies



Natural Gas Proved Reserves
Technical Revisions



Natural Gas Proved + Probable Reserves
Technical Revisions



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