

**STANDARD
& POOR'S**

February 19, 2008

U.S. Securities and Exchange Commission
100 F Street N.E.
Washington, DC 20549-1090

Via Electronic Mail: rule-comments@sec.gov

Re: File No. S7-29-07

U.S. Securities and Exchange Commission

Concept Release on Possible Revisions to the Disclosure Requirements Relating to Oil and Gas Reserves

Standard & Poor's Ratings Services appreciates the opportunity to provide the Securities and Exchange Commission (the Commission) our comments on the *Concept Release on Possible Revisions to the Disclosure Requirements Relating to Oil and Gas Reserves* (Concept Release). The views expressed in this letter represent those of Standard & Poor's and do not address, nor are they intended to address, the views of any other division of The McGraw-Hill Companies. Further, we intend our comments to address the analytical needs and expectations of credit analysts and limit them according to our role as a credit rating agency in the financial markets.

Standard & Poor's rates the debt obligations of approximately 125 oil and gas exploration and production (E&P) companies globally. The oil and gas reserve data of E&P companies are at the core of information we use to measure E&P performance and are essential to our credit opinions. In our analyses of these companies, we evaluate the size, quality, and mix of oil and gas reserves; selling prices and production costs; production prospects; reserve replacement; and the costs to develop these reserves. We rely extensively on disclosures required by the Financial Accounting Standards Board Statement of Financial Accounting Standards No. 69, "Disclosures about Oil and Gas Producing Activities," to calculate key operating ratios such as reserve life, reserve replacement, and finding and development (F&D) and lifting costs.

Although we evaluate debt or financial leverage using several measures, our most important measure for E&P companies is debt leverage relative to reserves (amount of debt per proved

barrel of oil equivalent). Because reserves gauge a company's future production potential--and hence revenue and cash flow potential--it is important to compare them with debt levels to assess a company's overall leverage burden and ability to service debt payment obligations. The measure of debt--as adjusted to include certain analytical adjustments made by Standard & Poor's analysts, for example, the effect of operating leases--relative to total proved reserves and to proved developed reserves are the primary financial leverage ratios that we use.

Because information and technology in the oil and gas industry have advanced, it is appropriate to reevaluate how reserves are determined and reported; we therefore support the Commission's initiative to reconsider oil and gas reserve disclosure requirements. We believe that changes can and should improve disclosed reserve information.

Because of the importance of reserves in our credit rating process, we have identified certain characteristics as essential to accurate and relevant reserve reporting: consistency, conservativeness, completeness, and standardized pricing. We more fully expand on these below and support incorporating them into a principle-based disclosure framework for E&P activities. Also important to us are incremental or expanded disclosures such as reserve updates when amounts significantly change, thorough explanations of changes in reserves, sensitivity analyses, estimates of future production, aging of proved undeveloped reserves, and expanded geographic disclosures.

On November 29, 2007, we published an article summarizing our analytical views of and expectations from E&P disclosures. The article, "Oil And Gas Reserve Reporting: Recommendations For Change," which details our views on potential changes, is attached as an appendix to this letter; it is also available on Standard & Poor's RatingsDirect Web site (www.ratingsdirect.com).

The following are our responses to specific questions raised in the Commission's Concept Release. Our responses focus on the questions that we believe are important to credit analysts.

Questions and Responses

- 1. Should we replace our rules-based current oil and gas reserves disclosure requirements, which identify in specific terms which disclosures are required and which are prohibited, with a principles-based rule? If yes, what primary disclosure principles should the Commission consider? If the Commission were to adopt a principles-based reserves disclosure framework, how could it affect disclosure quality, consistency and comparability?*

We support the development of principles-based guidance for oil and gas reserve reporting. Articulating disclosures in a principle based fashion will accommodate future technological developments and better reflect the variety of activities E&P companies employ. The guidance should seek to achieve consistency, reliability, conservativeness, completeness, and standardized pricing.

- **Consistency.** Because comparing reserves from period to period and from company to company is important to our analysis of E&P businesses, reporting of reserves must be as comparable as possible.
- **Reliability.** Oil and gas reserve measures are estimates, and management should ensure that procedures and internal controls are adequate to report reliable reserves. Management should review and approve estimates, as should the audit committee or the board of directors or both. Companies should comprehensively disclose meaningful changes to their methodology and to past estimates.
- **Conservativeness.** Changes in proved reserve estimates related to reservoir performance should generally be upward revisions; downward performance-related revisions should be rare. Thorough explanations for volume changes (a management discussion and analysis [MD&A] of reserves) accompanying the reserve reconciliation tables would increase the understanding of them.
- **Completeness.** Oil and gas reserves should include all hydrocarbon resources.
- **Standardized pricing.** Reserves should be based on standardized selling prices and production costs. We also believe that it would be useful to disclose sensitivity analyses of reserves at differing selling prices and production costs.

Although a principle-based framework could introduce greater variability in reporting--which may seem to contradict the aforementioned "consistency" objective--we believe that, if appropriately applied and enforced, such a framework would ultimately promote much greater quality and consistency. This would result from the ability of investors, analysts, and issuers to contrast available information, methodologies, and quality of disclosures among companies.

2. *Should the Commission consider allowing companies to disclose reserves other than proved reserves in filings with the SEC? If we were to allow companies to include reserves other than proved reserves, what reserves disclosure should we consider? Should we specify categories of reserves? If so, how should we define those categories?*

Yes. We believe that disclosure of probable reserves (and even possible reserves in some circumstances) provides forward-looking information that is critical to the analysis of E&P companies. Having an inventory of prospective drilling locations is vital for reserve replacement and accordingly helps in understanding the extent of a company's probable and possible reserves.

Although the Commission does not currently allow disclosure of probable and possible reserves in filings, some companies disclose reserves other than proved reserves in press releases and other unfiled documents. Although useful, unfortunately, it is difficult if not impossible to objectively compare one company's probable or possible reserves with another's, because each company can define such reserves differently. Nomenclature also varies. For example, some talk of "risky" and "unrisky" unproved reserves, and others talk of "potential" or "low-risk upsides." We believe that permitting disclosure of unproved reserves in public filings will make them more consistent over time. With appropriate disclosure, analysts and others will understand the greater uncertainties of early-stage reserve development.

When allowing disclosures of unproved reserves, we believe that it is desirable to define the categories broadly, to achieve consistency and comparability among companies. Disclosures should also inform about the higher risks associated with the reserves being disclosed.

3. *Should the Commission adopt all or part of the Society of Petroleum Engineers – Petroleum Resources Management System? If so, what portions should we consider adopting? Are there other classification frameworks the Commission should consider? If the Commission were to adopt a different classification framework, how should the Commission respond if that framework is later changed?*

We support a principles-based system that will accommodate technological advances. Whatever classification system the Commission adopts should be consistent, reliable, conservative, complete, and standardized as to pricing, as given in our response to question No. 1. The system chosen should be consistent with industry standards. If companies do not use the same system internally, they could complement reserve disclosures with information about the methodology management uses in sensitivity analyses.

6. *Should we reconsider the concept of reasonable certainty? If we were to replace it, what should we replace it with? How could that affect disclosure quality? Should we consider requiring companies to make certain assumptions? Should we prohibit others?*

Oil and gas reserves estimates should be conservative and reliable. This means that changes in proved oil and gas reserve estimates based on reservoir performance should generally be upward revisions; downward performance-related revisions should be rare. The concept of “reasonable certainty” increases the quality of proved reserve disclosure and helps us evaluate the ability to repay debt. Lesser certainty would not be as useful in assigning credit ratings.

7. *Should we reconsider the concept of certainty with regard to proved undeveloped reserves? Should we allow companies to indefinitely classify undeveloped reserves as proved?*

Proved undeveloped reserves (PUDs) should meet the same high level of certainty as proved developed reserves.

In addition to the volumes of PUDs that companies currently report, we view additional information as useful to analysts and recommend that the Commission incorporate them in the new disclosure framework:

- An aging of PUDs that shows how long companies have classified them as proved undeveloped;
- A reconciliation of PUDs from beginning balance to ending balance, detailing the activity, with explanations for material changes in PUDs during the period; and
- Timing and plans for development.

8. *Should we reconsider the concept of economic producibility? If we were to replace it, what should we replace it with? How could that affect disclosure quality? Should we consider requiring companies to make certain assumptions? Should we prohibit others?*

In credit analysis, only economically producible reserves can generate future cash flows. Consequently, we support estimating reserves using economic producibility and existing economic and operating conditions. We believe the market would benefit if the Commission were to establish principles-based guidance for these terms that maintains comparability between companies. We believe that it is desirable for companies to estimate reserves at the end of their fiscal years, as rules currently require, not at an optional earlier date.

10. *Should we reconsider requiring companies to use a sale price in estimating reserves? If so, how should we establish the price framework? Should we require or allow companies to use an average price instead of a fixed price or a futures price instead of a spot price? Should we allow companies to determine the price framework? How would allowing companies to use different prices affect disclosure quality and consistency? Regardless of the pricing method that is used, should we allow or require companies to present a sensitivity analysis that would quantify the effect of price changes on the level of proved reserves?*

We believe that selling prices and producing costs should be comparable from company to company. Allowing different pricing would make reserves less useful when we compare credit metrics such as debt per barrel of oil equivalent. Selling prices and production costs should either be averages for the year or year-end amounts. Prices and costs should be specific to the field and the quality of hydrocarbons produced. The use of average prices reduces the volatility that price swings and seasonality in natural gas prices at the end of the year cause; the use of year-end prices more closely represents year-end values. We do not believe that an optional choice of average or year-end amounts would be helpful, because it would impair comparability.

We encourage disclosures of sensitivity analyses that provide additional reserve information at different prices and costs--such as those that management uses in making investment decisions or that reflect other plausible changes in assumptions. All assumptions used in sensitivity analyses should be reasonable and disclosed.

11. *Should we consider eliminating any of the current exclusions from proved reserves? How could removing these exclusions affect disclosure quality?*

We recommend that the definition of oil and gas reserves embrace all oil and gas resources, including unconventional oil reserves--such as those requiring that crude oil be extracted from shale, tar sands, or coal--which companies confidently and economically expect to produce. We believe that it would be helpful to disclose such reserves by categories. The inclusion of all hydrocarbons in the reserve disclosures increases relevance and comparability. It also presents a complete view of hydrocarbon resources available. Said another way, the production and sale of

a barrel of oil, no matter what the source, generates cash flows that companies may use to repay debt. This information is critical to our analysis and important to other users.

Reserves should only include barrels of oil or cubic feet of natural gas that companies will ultimately recover and sell.

15. *Should we consider requiring companies to engage an independent third party to evaluate their reserves estimates in the filings they make with us? If yes, what should that party's role be? Should we specify who would qualify to perform this function? If so, who should be permitted to perform this function and what professional standards should they follow? Are there professional organizations that the Commission can look to set and enforce adherence to those standards?*

E&P companies vary as to whether they estimate oil and gas reserves internally, use independent petroleum engineers for outside estimates, or seek outside review of internal estimates. Standard & Poor's currently expects independent petroleum engineers to prepare or review the reported reserves of smaller companies that may lack sufficient in-house expertise, but we also believe that an independent audit or review enhances the credibility and reliability of reserve reporting for all companies.

We believe that management should ensure that procedures and internal controls are adequate to report reliable reserves. Management should review and approve estimates, as should the audit committee or the board of directors.

If outside engineers review or audit the reserves, the qualifications and requirements should follow the model established for public accountants, including independence, a common set of standards, and outside quality reviews.

Other Issues for Consideration

In our article included as an appendix, we identify several other issues that we recommend the Commission consider in developing a framework for reserve disclosure. Some of these issues are:

- **Reserve MD&A.** Companies should thoroughly explain changes in reserves from year to year, in what could be referred to as a reserve MD&A.
- **Disclosure of reserve changes.** Companies should disclose reserve changes separately for revisions due to changes in selling prices or costs, concession extensions, and reservoir performance. This would enable analysts to calculate and analyze F&D costs.
- **Future production.** Companies should disclose forward-looking estimates of oil and gas production related to proved reserves for the next three to five years and the capital costs necessary to produce these reserves.
- **Timing of disclosures.** Although quarterly reserve disclosures would be most helpful to us, we recognize that quarterly disclosure requirements would be burdensome. Consequently,

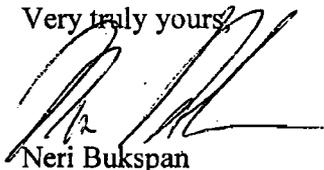
we understand why companies estimate and report reserves as of the end of each year. However, the Commission should require them to disclose in their quarterly reports significant changes, such as new fields, increases, or decreases in estimates, or changes in prices.

- **Geographic disclosure.** Our analysts would benefit from greater geographic detail in reserve disclosures. It would provide better insight into regional economics, legal and political risks, susceptibility to production cost inflation, and overall creditworthiness.
- **Production sharing contracts.** Disclosures should also address whether production sharing contracts exist and how they affect oil and gas reserves. These would provide additional information for understanding the differences between owned or leased resources and those subject to production sharing contracts.
- **Hedging.** Hedging fixes future selling prices of oil and gas production and could have the same economic consequences as contractual sales. Hedging can also meaningfully change the economic value of reserves. Accordingly, we believe that companies should include and disclose the effects of hedges in determining oil and gas reserves.

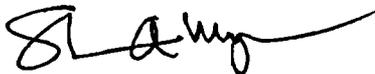
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We thank you for the opportunity to provide our comments. We would be pleased to discuss our views with any member of the Commission's staff. If you have any questions or require more information, please contact us at (212) 438-2000.

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APPENDIX

The McGraw-Hill Companies

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RESEARCH

Oil And Gas Reserve Reporting: Recommendations For Change

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The SEC recently announced that it will review and evaluate current disclosure requirements for oil and gas reserves held by exploration and production (E&P) companies, as a response to calls for change by interested parties. Because reserves are an essential part of credit evaluations, Standard & Poor's Rating Services has identified key information that is important to understanding reserve disclosures.

We believe that the following characteristics are crucial to accurate reserve reporting: consistency, conservative estimation, completeness, and standardized pricing.

We also recommend disclosure improvements:

- Thoroughly explaining all material reserve changes in text accompanying reconciliation tables, in what could be called a "reserve MD&A" (management discussion and analysis);
- Requiring sensitivity analyses for the effects of possible price changes;
- Reporting reserve tables as of each year-end and updating material changes in quarterly financial statements;
- Disclosing estimated future production for the next three to five years;
- Aging (by date of booking) and discussion of proved undeveloped reserves; and
- Providing expanded geographic disclosures for important countries or regions.

Finally, E&P companies vary as to whether they estimate oil and gas reserves internally, use independent petroleum engineers for outside estimates, or seek outside review of internal estimates. Standard & Poor's currently expects independent petroleum engineers to prepare or review the reserve reports of smaller companies, but also believes that an independent audit or review would enhance the reliability of all companies' reserve reporting.

Reserves Are The Core Measure Of E&P Performance

Oil and gas E&P companies are in the business of finding, developing, and producing oil and gas reserves. Consequently, an essential part of our default and recovery analyses of these companies is evaluating the size, quality, and mix of oil and gas reserves; future production; reserve replacement; and the costs to develop and produce these reserves.

The role of reserves in our credit assessment of E&P companies

Although our rating levels don't carry reserve size requirements, the amount that a company reports as reserves and the ratings it receives generally correlate strongly. Larger reserves allow for greater economies of scale, geographic diversity, and better access to equipment, people, and technology. In our analysis of companies reporting under U.S. GAAP, we rely extensively on disclosures required by the Financial Accounting Standards Board's (FASB) Statement of Financial Accounting

Standards (SFAS) No. 69, Disclosures about Oil and Gas Producing Activities, to calculate key operating ratios such as reserve life, reserve replacement, and finding and development (F&D) and lifting costs. Along with absolute reserve size, both total proved and proved developed, these metrics drive our business risk assessment. (For definitions of types of reserves for the purpose of this article, see "Sidebar: Key Definitions In Oil And Gas Reserves," at the end of this report.)

Reserves also play a strong role in our assessment of financial risk in the sector. Although we evaluate debt using several measurements, the most important of these is debt leverage relative to reserves (amount of debt per barrel of oil). Because reserves gauge a company's future production potential--and hence revenue and cash flow generation potential, given price and cost assumptions--it is logical to compare them with debt levels. Adjusted debt relative to total proved reserves and to proved developed reserves are the primary financial leverage ratios that we use. We also consider the future development costs associated with bringing a company's reserves into production, which are disclosed at year-end as part of SFAS 69 disclosures.

Disclosure requirements that vary internationally

Because of the importance of oil and gas reserves, E&P companies are required to disclose reserves in their annual financial statements. In the U.S., the FASB and the SEC define reserves and set disclosure standards. Canadian companies have the option of reporting reserves using Canadian or SEC rules. The International Accounting Standards Board (IASB) is currently working on an "Extractive Activities Research Project" that may result in an IFRS on accounting for oil and gas extraction.

Companies subject to U.S. reporting requirements present tables that reconcile proved reserves of crude oil and natural gas. The tables start with beginning-of-year balances; reconciling items include revisions of previous estimates, improved recovery, purchases and sales of minerals in place, extensions and discoveries, and production. The sum is the end-of-year balance. These tables are included in the annual financial statements as unaudited disclosure. Table 1 is an excerpt from the 2006 crude oil reserve reconciliation of ConocoPhillips (A/Stable/A-1):

Table 1

ConocoPhillips--Reported Reserves

	Alaska	Lower 48	Total U.S.	Canada	Europe	Asia-Pacific	Middle East and Africa	Russia and Caspian	Other areas	Total	Equity affiliates
Proved developed and undeveloped crude oil (millions of barrels)											
End of 2005	1,505	170	1,675	44	808	274	328	190	17	3,336	2,430
Revisions	(118)	(11)	(129)	58	(65)	(12)	(18)	(74)	2	(238)	(35)
Improved recovery	13	1	14	--	5	63	--	--	--	82	--
Purchases	--	181	181	16	--	13	42	--	17	269	393
Extensions and discoveries	53	9	62	4	6	8	3	--	--	83	74
Production	(97)	(37)	(134)	(9)	(90)	(39)	(39)	--	(3)	(314)	(171)
Sales	--	(18)	(18)	--	--	--	--	--	--	(18)	(1)
End of 2006	1,356	295	1,651	113	664	307	316	116	33	3,200	2,690
Equity affiliates											
End of 2005	--	--	--	--	--	--	46	1,295	1,089	--	2,430
End of 2006	--	--	--	--	--	--	60	1,607	1,023	--	2,690

Estimating oil and gas reserves

Estimating oil and gas reserves is a complex and inexact process. In its 2006 annual report on Form 10-K, Petroleum Development Corp. (not rated) makes this statement about estimating oil and gas reserves:

"No one can measure underground accumulations of oil and natural gas in an exact way. Oil and natural gas reserve engineering requires subjective estimates of underground accumulations of oil and natural gas and assumptions concerning future oil and natural gas prices, production levels, and operating and development costs over the economic life of the properties."

Chesapeake Energy Corp. (BB/Positive/B-1) also describes the process of estimating oil and gas reserves in its 2006 Form 10-K:

"Reserve engineering is a subjective process of estimating underground accumulations of oil and natural gas that cannot be

measured in an exact way, and the accuracy of any reserve estimate is a function of the quality of available data and of engineering and geological interpretation and judgment. As a result, estimates made by different engineers often vary."

No matter how difficult oil and gas reserves are to estimate, they are critical to managing an E&P business and to determining other accounting measures, including:

- Whether exploration costs are capitalized for companies that use the successful-efforts accounting method;
- The unit-of-production depreciation, depletion, and amortization rates used; and
- The possibility of asset impairments.

ExxonMobil Corp. (AAA/Stable/A-1+) makes this statement in its 2006 Form 10-K:

"Evaluations of oil and gas reserves are important to the effective management of Upstream assets. They are integral to making investment decisions about oil and gas properties such as whether development should proceed or enhanced recovery methods should be undertaken. Oil and gas reserve quantities are also used as the basis for calculating unit-of-production depreciation rates and for evaluating impairment."

Change Is In The Air

We believe that the SEC should reevaluate its rules and that changes can and will improve disclosed reserve information.

Several competing standards make estimating oil and gas reserves even more confusing. Companies registered with the SEC must use the definitions and disclosure standards established by the SEC in 1978. Recently, the Society of Petroleum Engineers, the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers approved a common petroleum resource management system that some in the industry would like to replace the SEC definitions. Additionally, the U.N., Russia, and others have developed their own reserve definitions and standards.

Various interests have urged changes to the current SEC reporting system. Notable among these is a February 2005 special report published by Cambridge Energy Research Associates (CERA) titled "In Search of Reasonable Certainty, Oil and Gas Reserve Disclosure." In its report, CERA calls for the SEC to modernize its system "to create a workable, constructive framework for the oil and gas industry in the 21st century that responds to the needs of both investors and consumers." The CERA report was supported by major oil companies, independent reserve engineers, accounting and law firms, and others.

Perhaps in response to the calls for change, the SEC announced in October the appointment of an academic engineering fellow specializing in petroleum reservoir engineering. According to the SEC, the academic fellow, W. John Lee, will review and evaluate current disclosure requirements for oil and gas reserves and the new technologies companies use to determine reserves. He will also assist the SEC's staff in determining what, if any, recommendations it should make to the Commission about revisions to current reserve disclosure requirements.

What Do Analysts Want In Oil And Gas Reserve Disclosure?

We have identified several key characteristics and disclosures that we would like any new oil and gas reserve disclosure system to incorporate. For purposes of this discussion, we don't advocate any particular method for determining reserves, but rather the characteristics and disclosures that oil and gas reserve estimates should encompass.

Consistency

Because comparing reserves from period to period and from company to company is an important part of our analysis of E&P businesses, it's critical that reserves be as comparable as possible. We realize that reserve estimates on the same oil and gas fields may vary greatly from one estimator to the next. However, standardization would minimize the differences that exacerbate variability. For example, we believe that companies should estimate reserves at the end of their fiscal year as accounting rules currently require, not at an optional earlier date. We also urge consistency as to when reserves are initially recognized. For example, all E&P companies should use a common benchmark, such as final investment decision.

Reliability

Oil and gas reserves are management estimates, and management should ensure that procedures and internal controls are adequate to report reliable reserves. Management should review and approve estimates, as should the audit committee (not reporting to management) and the board of directors. A review or audit of reserves by an independent engineer could also

enhance reliability. Currently, there are no requirements for the audit committee and board to approve reserves or to have independent engineers audit the estimates. (See "Who Should Prepare Oil And Gas Reserve Estimates? Should The Results Be Audited?" below.)

Conservative estimation

Reserve estimates should be conservative, meaning that changes in reserve estimates related to reservoir performance should generally be upward revisions; downward performance-related revisions should be unusual. A consistent pattern of downward reserve revisions signals an aggressive operating culture. Also, we advocate that thorough explanations for volume changes (a reserve MD&A) accompany the reserve tables, increasing the understanding of the reserve reconciliation tables.

Completeness

Oil and gas reserves should include all oil and gas resources that companies own. Current SEC rules exclude some unconventional oil reserves, such as the extraction of crude oil from shale, tar sands, or coal. The SEC defines recovering oil from these sources as a mining activity. Chevron Corp. (AA/Stable/A-1+) makes this statement in its 2006 annual financial statement:

"In addition to conventional liquids and natural gas proved reserves, Chevron has significant interests in proved oil sands reserves in Canada associated with the Athabasca project. For internal management purposes, Chevron views these reserves and their development as an integral part of total upstream operations. However, SEC regulations define these reserves as mining-related and not a part of conventional oil and gas reserves. Net proved oil sands reserves were 443 million barrels as of December 31, 2006."

To be complete and to increase comparability, oil and gas reserves should include all forms of hydrocarbons that companies can confidently expect to recover and sell.

Reconciliations

The current reserve reconciliation tables provide valuable information; however, these tables should expand the reconciliations to show increases or decreases in reserves due solely to price movements, separately from changes in estimates. This will enable analysts to calculate F&D costs more meaningfully. We generally prefer to include performance-related, but exclude price-related, revisions in the calculation. Companies should separately report reserve additions resulting from concession extensions. They should also disclose changes from errors in estimation. Moreover, we believe that companies should thoroughly explain all material reserve changes in a reserve MD&A accompanying the reconciliation tables.

Standardized pricing

Current SEC rules require the use of year-end selling prices and costs in estimating reserves. In some cases, the volatility in selling prices may create unusual situations, such as when the selling price of heavy Canadian crude oil reached lows in late December 2004, causing reductions of crude oil reserves at year-end despite a recovery of selling prices in early 2005. In its annual report on Form 10-K, ExxonMobil discloses the following:

"Regulations preclude the Corporation from showing in this document the reserves that are calculated in a manner that is consistent with the basis that the Corporation uses to make its investment decisions. The use of year-end prices for reserves estimation introduces short-term price volatility into the process since annual adjustments are required based on prices occurring on a single day. The Corporation believes that this approach is inconsistent with the long-term nature of the upstream business where production from individual projects often spans multiple decades. The use of prices from a single date is not relevant to the investment decisions made by the Corporation and annual variations in reserves based on such year-end prices are not of consequence to how the business is actually managed."

Management should, of course, make long-term investment decisions based on its estimates of similarly long-term oil and gas prices. However, using anticipated future selling prices, rather than actual year-end amounts, would reduce comparability and consistency. Reserves will likely vary based on how bullish or bearish management is on prices. We therefore favor the use of standard prices, such as average or year-end, to make figures consistent and comparable among companies. Companies should disclose selling prices by geographic area. The use of average prices may reduce volatility caused by swings and seasonality in natural gas prices; year-end prices may be more representative of year-end values. The ultimate solution should require standardized selling prices and costs and allow additional reserve disclosures at different prices (sensitivity analyses).

Sensitivity analysis

The SEC should require disclosure of sensitivity analyses. Sensitivity disclosures will allow analysts to understand the effects

of a plausible percentage increase or decrease in year-end selling prices on reserves, and on the standardized measure of discounted future net cash flows relating to proved oil and gas reserves. (This is commonly referred to as the PV10 calculation because cash flows are discounted using a required 10% discount rate.) Sensitivities could also include disclosure of reserves calculated using the price estimates that management uses to make investment decisions. Clearly, disclosures should be sufficient to indicate that the sensitivity analyses are supplementary to reserve estimates using standardized prices. Disclosures should also describe all of the assumption changes made in sensitivity analyses and the reasons for the changes. Finally, all assumptions should be reasonably likely to occur.

As part of Standard & Poor's ratings process, we request that E&P companies calculate the PV10 value of their proved reserves using our conservative long-term pricing assumptions--as of the time of this writing, \$45 per barrel of West Texas Intermediate crude oil and \$5.50 per million BTUs of Henry Hub natural gas. The PV10 value serves as a proxy for valuing a company's reserves when hydrocarbon prices drop significantly from today's levels. (For further details, see "S&P's Default And Recovery Analysis Of U.S. Oil And Gas E&P Sector Provides Implications For The Future," published March 27, 2006, on RatingsDirect.)

Chesapeake discloses the effects of changes in oil and gas selling prices in this way:

"... the estimated future net revenue from proved reserves and the associated present value are based upon certain assumptions, including prices, future production levels and costs that may not prove correct. Future prices and costs may be materially higher or lower than the prices and costs as of the date of any estimate. A change in price of \$0.10 per MCF [thousand cubic feet] for natural gas and \$1.00 per barrel for oil would result in a change in the December 31, 2006 present value of estimated future net revenue of our proved reserves of approximately \$350 million and \$50 million, respectively."

Timing of disclosure

We would prefer to see reserve disclosures quarterly. Nonetheless, we recognize that quarterly disclosure requirements could be burdensome. Consequently, we believe that companies should estimate and report reserves as of the end of each year. However, if significant changes occur during interim periods--such as new fields added, increases or decreases in estimates, or changes in prices--we believe that companies should update annual disclosures in their quarterly financial statements and describe significant changes so that users fully understand the changes.

Future production

Estimates of future production are useful in evaluating the need for further borrowing or ability to repay debt. A more complete understanding of the underlying decline curves of a company's reserves would be valuable, particularly as we consider the consequences of companies' paring back on capital expenditures when hydrocarbon prices are low. For these reasons, companies should disclose estimates of annual oil and gas production related to proved reserves for the next three to five years and related capital costs necessary to produce the reserves.

Proved undeveloped reserves

Proved undeveloped reserves (known as PUDs) generally require significant additional capital expenditures and successful drilling to recover. Producers need to have PUDs in a healthy reserve base as inventory for future production. Because proved undeveloped reserves don't provide current cash flows, but rather require capital expenditures and possibly significant time to bring into production, they have considerably less debt capacity relative to proved developed reserves in our analysis. In addition to PUD amounts, which companies currently report, we would like to see further information such as:

- An aging of PUDs that shows how long they have been classified as proved undeveloped;
- Timing and plans for development, indicating whether the company regularly turns over its PUDs or has a history of booking reserves that stagnate in the undeveloped category for years;
- Whether the PUDs result from the company's own drilling or came from acquisitions; and
- Explanation of material changes in PUDs during the period.

Brigham Exploration Co. (B-/Stable/--), in its 2006 Form 10-K, states:

"Finally, recovery of proved undeveloped reserves generally requires significant capital expenditures and successful drilling operations. At December 31, 2006, approximately 45% of our estimated proved reserves were classified as undeveloped. At December 31, 2006, we estimated that it would require additional capital expenditures of approximately \$135 million to develop our proved undeveloped reserves. Our reserve estimates assume that we can and will make these expenditures and conduct these operations successfully, which may not occur."

Geographic disclosure

Companies disclose oil and gas reserves located in their home countries separately from those in foreign countries or regions. Until recently, BG Energy Holdings Ltd. (A-/Stable/A-2), which prepares its financial statements in accordance with IFRS, only reported reserves split between the U.K. (then 19% of proved) and regions outside of the U.K. The company currently combines operations in Trinidad and Tobago and Egypt within its "Atlantic Basin" region. We believe that countries that represent some concentration--possibly defined arbitrarily as more than 15% of total proved reserves--should require a more detailed breakdown. Broad geographic areas, such as "Rest of World" and "Asia and Middle East," should be used only when not material to the total. We also believe that much more detail and clarity is needed concerning the tax regimes affecting future production from current reserves. Enhanced geographic detail will improve our understanding of reserves and associated geopolitical risks.

Other issues to consider

Any new disclosure system should also address other issues that are important to analysts, including the following.

Production-sharing contracts. Some countries use production-sharing contracts, rather than mineral leases with royalties and taxes, to provide for development of their hydrocarbon reserves. Production-sharing contracts allow E&P companies to recover their costs and to share in profits by receiving a portion of the hydrocarbons produced. They record as reserves the estimated portion of oil and gas volumes that they expect to receive over the life of the contract. As oil and gas selling prices change, reserves recognized from production-sharing contracts may behave in counterintuitive ways. For example, as the selling price per barrel increases, the number of barrels of oil needed to recover the company's costs in a production-sharing contract decreases, and reserves decrease. In its 2006 Form 10-K, Pioneer Natural Resources Co. (BB+/Stable/--) describes reserves in production sharing contracts:

"The Company reports all reserves held under production sharing arrangements and concessions utilizing the 'economic interest' method, which excludes the host country's share of proved reserves. Estimated quantities for production sharing arrangements reported under the 'economic interest' method are subject to fluctuations in the prices of oil and gas and recoverable operating expenses and capital costs. If costs remain stable, reserve quantities attributable to recovery of costs will change inversely to changes in commodity prices."

In regard to production-sharing contracts, the SEC should also consider:

- Whether production-sharing contracts should result in oil and gas reserves. Does the current accounting attempt to fit a "square peg" (a production-sharing contract) in a "round hole" (typical mineral lease accounting)?
- Additional disclosures that companies should make to allow financial statement readers to understand the difference between owned or leased resources and production-sharing contract reserves.

Probable and possible reserves. The continued health of an E&P company depends on probable and possible reserves and exploration acreage. However, current SEC rules prohibit the disclosure of probable and possible oil or gas reserves; the SEC allows disclosure only of proved reserves in documents filed with it. The reasoning has been that estimates of probable and possible reserves may be so inaccurate as to be misleading. However, some companies disclose these reserves in press releases and other documents that are not filed with the SEC.

As credit analysts, we generally do not consider probable reserves when calculating financial leverage ratios based on debt to reserves. That said, we recognize that having a large inventory of future drilling locations is vital for future reserve replacement and production growth. Everything else being equal, we prefer companies with larger quantities of probable and possible reserves. Unfortunately, it's difficult, if not impossible, to objectively compare one company's probable and possible reserves with another's, because each company can define such reserves differently. Nomenclature also varies. For example, some talk of "risky" and "unrisky" unproved reserves, and others talk of "potential" or "low risk upsides."

Table 2 gives examples of varied disclosures related to unproved reserves of four large, U.S.-based, independent E&P companies, taken from their most recent investor presentations.

Table 2

Reserves As Reported

Chesapeake Energy Corp. (BB/Positive/B-1)

10% of proved reserves

82 tcf of "unrisked" unproved reserves, or 21 tcf of "risky" unproved reserves
XTO Energy Inc. (BBB-/Stable/A-2)
8.5 tcf of proved reserves
7.3 tcf of "low risk upsides"
EOG Resources Inc. (A-/Stable/A-2)
6.8 tcf of proved reserves
4.5-6.7 tcf of "potential" in its Barnett Shale acreage alone
Anadarko Petroleum Corp. (BBB-/Stable/A-3)
14.4 tcf of proved reserves
10.2 tcf of "infill drilling," and 15 tcf of "extensions and unbooked discoveries"
Tcf--trillion cubic feet equivalent.

Issues that the SEC should consider include:

- Whether benefits for users of financial statements justify disclosure of probable and possible reserves;
- Whether reserve estimation has progressed to the point where probable and possible reserves can be disclosed without misleading financial statement users;
- If probable or possible reserves are disclosed, how they should be defined to achieve consistency among companies; and
- Whether financial statements can adequately capture the risks associated with probable and possible reserves.

Although our analysis will remain focused on proved reserves and we recognize the uncertainties associated with probable reserves, we believe that additional information on a company's probable reserves, including geographic location, would constitute important forward-looking guidance.

Effect of hedging on reserves. Currently, SEC rules consider future changes in oil and gas selling prices only to the extent they are included in contractual arrangements. It doesn't consider hedges of future prices, though these are contractual. Should hedges in place also be factored into the PV10 calculations and disclosures? We believe that fixing the future selling prices of oil and gas production with derivatives is no different than contractual sales and should be included in determining reserves and PV10 calculations.

Equity investments and minority interests. Oil and gas companies are not allowed to include oil and gas reserves of investments accounted for by the equity method in the enterprise's reserve quantities. However, the investor's share of the reserves is disclosed separately at the end of each year. This restriction makes sense because, to the extent that accounting standards appropriately reflect the investor's degree of control over its investees (including subsidiaries and affiliates), the cash flows related to equity investees' oil and gas operations are generally not directly available to the investor. However, even if not providing direct cash flow support, these investees may certainly have asset value to the investor. We believe the current practice should continue. Conversely, companies should systematically disclose minority interests in fully-consolidated but non-fully-owned investees in all tables.

For the five major international oil and gas companies, the share of reserves of equity affiliates has increased to a substantial 28% of total proved at year-end 2006, up from 18% in 2003. More detailed reserve breakdown for equity affiliates is needed. For example, for Exxon, whose equity affiliates account for about 35% of proved reserves, a breakdown between Qatari and Dutch affiliates seems warranted. Equally, additional information on profitability ("results of operations") is important.

Royalty oil (imaginary reserves). Reported oil and gas reserves shouldn't include reserves that don't provide economic benefits. For example, including in reserves designated quantities of oil and gas that will be sold to pay royalty costs or tax expenses only exaggerates total reserves without increasing value to the company. At Standard & Poor's, we recognize this issue when analyzing companies across different countries where reporting standards may differ.

Who Should Prepare Reserve Estimates? Should They Be Audited?

Companies prepare their reserve estimates in a variety of ways. The larger companies may estimate reserves internally using in-house engineers; smaller companies may rely on independent petroleum engineers. Some will prepare the reserve estimates and then have an independent engineer review or audit these estimates. Still others may have the independent engineer review only a portion of the reserves each year.

Unlike financial statements, reserve estimates do not require that independent experts evaluate or audit them. We believe that using independent engineers enhances credibility. Standard & Poor's currently expects independent petroleum engineers to prepare or review the reserve reports of smaller independent companies. We believe that independent audits of oil and gas reserves enhance reliability for all companies--although nontechnical issues, such as reserve booking ahead of

final investment decision, or how to factor in concession renewal, may remain outside the expertise of such reservoir engineers.

The SEC should consider several issues:

- Who should prepare initial reserve estimates?
- Should there be an independent evaluation of the reserve estimates?
- Should an independent engineer review or audit reserves estimates?
- Should there be standards for reviewing or auditing reserves, and who should set them?
- Should an independent engineer's review or audit report accompany the reserve tables presented in the annual financial statements?
- Should management issue a report on reserve estimates?
- Should companies that report reserves in jointly owned fields compare and reconcile estimates with other owners? Or should all ownership interests in the same field report reserves using the same estimates?

Example of reported quantities of oil and gas reserves

As an example, Devon Energy Corp. (BBB/Positive/A-2) provides good disclosure on the role that independent engineers play in calculating its proved reserves. Table 3 gives a summary of the reserves that were evaluated, either by preparation or audit, by independent petroleum consultants at year-end 2006, 2005, and 2004.

Table 3

Devon Energy Corp.--Prepared And Audited Reserves						
(%)	--2006--		--2005--		--2004--	
	Prepared	Audited	Prepared	Audited	Prepared	Audited
Domestic	7	81	9	79	16	61
Canada	46	39	46	26	22	--
International	99	--	98	--	98	--
Total	28	61	31	54	28	35

Devon advises:

"'Prepared' reserves are those quantities of reserves which were prepared by an independent petroleum consultant. 'Audited' reserves are those quantities of revenues which were estimated by Devon employees and audited by an independent petroleum consultant. An audit is an examination of a company's proved oil and gas reserves and net cash flow by an independent petroleum consultant that is conducted for the purpose of expressing an opinion as to whether such estimates, in aggregate, are reasonable and have been estimated and presented in conformity with generally accepted petroleum engineering and evaluation principles."

The company further informs that, in each of the three years, the independent petroleum consultants of LaRoche Petroleum Consultants Ltd. and Ryder Scott Co. L.P. evaluated the domestic reserves, the consultants of AJM Petroleum Consultants evaluated the Canadian reserves, and those of Ryder Scott evaluated international reserves.

If Changes Occur, Will Ratings In The E&P Sector Change?

Systematic changes to our ratings in the sector would be extremely unlikely. If reporting standards were to meaningfully change companies' reserves figures, we would instead recalibrate our expectations for certain key ratios, such as debt to proved reserves, at given rating categories. Our analysis focuses on companies' abilities to repay their financial obligations in a timely manner. Accordingly, we would not expect future cash flows to change from previous expectations.

However, to the extent that revised reserve information provides new information, ratings may change. With similarly rated companies, if new reporting requirements provide more insight into the characteristics that we have highlighted, we could become more confident about one company's prospects compared with another's. Depending on the circumstances, the insights could result in changes to our ranking list (see "Issuer Ranking: U.S. Oil And Gas Companies, Strongest to Weakest," published Sept. 24, 2007, on RatingsDirect) or even to outlooks or ratings in certain instances.

Standard & Poor's Will Monitor Progress

We're encouraged that the SEC will reevaluate reserve disclosure and believe that the improvements we've discussed will enhance analysis and understanding of this most important asset of E&P companies. We will continue to monitor developments regarding reserve disclosures at the SEC. We also encourage the IASB to consider similar issues and disclosures as it addresses accounting for the extractive industries.

Sidebar: Key Definitions In Oil And Gas Reserves

Oil and gas reserves

Reserves are all the quantities of crude oil and natural gas that are estimated to be recoverable in future years from known reservoirs. Petroleum reserves are classified by degree of proof as: proved (high probability of actual production and marketability), probable (moderate probability), and possible (low probability). All three types of reserves are also sometimes referred to as "resources."

Proved, proved developed, and proved undeveloped reserves are defined by the SEC in Regulation S-X, Article 4, Rule 10. A summary follows.

Proved reserves. The estimated quantities of crude oil, natural gas, and natural gas liquids which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Proved developed reserves. Reserves that can be expected to be recovered through existing wells with existing equipment and operating methods.

Proved undeveloped reserves. Reserves that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required.

Probable reserves. Reserves susceptible of being proved that are based on reasonable evidence of producible hydrocarbons within the limits of a structure or reservoir but defined to a lesser degree of certainty because of more limited well control and/or lack of definitive production tests.

Possible reserves. Reserves that may exist but are less well defined by well control than probable reserves.

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Oil And Gas Reserve Reporting: Recommendations For Change

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Sidebar: Key Definitions In Oil And Gas Reserves

Oil And Gas Reserve Reporting: Recommendations For Change

The SEC recently announced that it will review and evaluate current disclosure requirements for oil and gas reserves held by exploration and production (E&P) companies, as a response to calls for change by interested parties. Because reserves are an essential part of credit evaluations, Standard & Poor's Rating Services has identified key information that is important to understanding reserve disclosures.

We believe that the following characteristics are crucial to accurate reserve reporting: consistency, conservative estimation, completeness, and standardized pricing.

We also recommend disclosure improvements:

- Thoroughly explaining all material reserve changes in text accompanying reconciliation tables, in what could be called a "reserve MD&A" (management discussion and analysis);
- Requiring sensitivity analyses for the effects of possible price changes;
- Reporting reserve tables as of each year-end and updating material changes in quarterly financial statements;
- Disclosing estimated future production for the next three to five years;
- Aging (by date of booking) and discussion of proved undeveloped reserves; and
- Providing expanded geographic disclosures for important countries or regions.

Finally, E&P companies vary as to whether they estimate oil and gas reserves internally, use independent petroleum engineers for outside estimates, or seek outside review of internal estimates. Standard & Poor's currently expects independent petroleum engineers to prepare or review the reserve reports of smaller companies, but also believes that an independent audit or review would enhance the reliability of all companies' reserve reporting.

Reserves Are The Core Measure Of E&P Performance

Oil and gas E&P companies are in the business of finding, developing, and producing oil and gas reserves. Consequently, an essential part of our default and recovery analyses of these companies is evaluating the size, quality, and mix of oil and gas reserves; future production; reserve replacement; and the costs to develop and produce these reserves.

The role of reserves in our credit assessment of E&P companies

Although our rating levels don't carry reserve size requirements, the amount that a company reports as reserves and the ratings it receives generally correlate strongly. Larger reserves allow for greater economies of scale, geographic diversity, and better access to equipment, people, and technology. In our analysis of companies reporting under U.S. GAAP, we rely extensively on disclosures required by the Financial Accounting Standards Board's (FASB) Statement of Financial Accounting Standards (SFAS) No. 69, Disclosures about Oil and Gas Producing Activities, to calculate key operating ratios such as reserve life, reserve replacement, and finding and development (F&D) and lifting costs. Along with absolute reserve size, both total proved and proved developed, these metrics drive our business risk assessment. (For definitions of types of reserves for the purpose of this article, see "Sidebar: Key Definitions In Oil And Gas Reserves," at the end of this report.)

Reserves also play a strong role in our assessment of financial risk in the sector. Although we evaluate debt using

several measurements, the most important of these is debt leverage relative to reserves (amount of debt per barrel of oil). Because reserves gauge a company's future production potential--and hence revenue and cash flow generation potential, given price and cost assumptions--it is logical to compare them with debt levels. Adjusted debt relative to total proved reserves and to proved developed reserves are the primary financial leverage ratios that we use. We also consider the future development costs associated with bringing a company's reserves into production, which are disclosed at year-end as part of SFAS 69 disclosures.

Disclosure requirements that vary internationally

Because of the importance of oil and gas reserves, E&P companies are required to disclose reserves in their annual financial statements. In the U.S., the FASB and the SEC define reserves and set disclosure standards. Canadian companies have the option of reporting reserves using Canadian or SEC rules. The International Accounting Standards Board (IASB) is currently working on an "Extractive Activities Research Project" that may result in an IFRS on accounting for oil and gas extraction.

Companies subject to U.S. reporting requirements present tables that reconcile proved reserves of crude oil and natural gas. The tables start with beginning-of-year balances; reconciling items include revisions of previous estimates, improved recovery, purchases and sales of minerals in place, extensions and discoveries, and production. The sum is the end-of-year balance. These tables are included in the annual financial statements as unaudited disclosure. Table 1 is an excerpt from the 2006 crude oil reserve reconciliation of ConocoPhillips (A/Stable/A-1):

Table 1

ConocoPhillips--Reported Reserves											
	Alaska	Lower 48	Total U.S.	Canada	Europe	Asia-Pacific	Middle East and Africa	Russia and Caspian	Other areas	Total	Equity affiliates
Proved developed and undeveloped crude oil (millions of barrels)											
End of 2005	1,505	170	1,675	44	808	274	328	190	17	3,336	2,430
Revisions	(118)	(11)	(129)	58	(65)	(12)	(18)	(74)	2	(238)	(35)
Improved recovery	13	1	14	--	5	63	--	--	--	82	--
Purchases	--	181	181	16	--	13	42	--	17	269	393
Extensions and discoveries	53	9	62	4	6	8	3	--	--	83	74
Production	(97)	(37)	(134)	(9)	(90)	(39)	(39)	--	(3)	(314)	(171)
Sales	--	(18)	(18)	--	--	--	--	--	--	(18)	(1)
End of 2006	1,356	295	1,651	113	664	307	316	116	33	3,200	2,690
Equity affiliates											
End of 2005	--	--	--	--	--	--	46	1,295	1,089	--	2,430
End of 2006	--	--	--	--	--	--	60	1,607	1,023	--	2,690

Estimating oil and gas reserves

Estimating oil and gas reserves is a complex and inexact process. In its 2006 annual report on Form 10-K, Petroleum Development Corp. (not rated) makes this statement about estimating oil and gas reserves:

"No one can measure underground accumulations of oil and natural gas in an exact way. Oil and natural gas reserve engineering requires subjective estimates of underground accumulations of oil and natural gas and assumptions concerning future oil and natural gas prices, production levels, and operating and development costs

over the economic life of the properties."

Chesapeake Energy Corp. (BB/Positive/B-1) also describes the process of estimating oil and gas reserves in its 2006 Form 10-K:

"Reserve engineering is a subjective process of estimating underground accumulations of oil and natural gas that cannot be measured in an exact way, and the accuracy of any reserve estimate is a function of the quality of available data and of engineering and geological interpretation and judgment. As a result, estimates made by different engineers often vary."

No matter how difficult oil and gas reserves are to estimate, they are critical to managing an E&P business and to determining other accounting measures, including:

- Whether exploration costs are capitalized for companies that use the successful-efforts accounting method;
- The unit-of-production depreciation, depletion, and amortization rates used; and
- The possibility of asset impairments.

ExxonMobil Corp. (AAA/Stable/A-1+) makes this statement in its 2006 Form 10-K:

"Evaluations of oil and gas reserves are important to the effective management of Upstream assets. They are integral to making investment decisions about oil and gas properties such as whether development should proceed or enhanced recovery methods should be undertaken. Oil and gas reserve quantities are also used as the basis for calculating unit-of-production depreciation rates and for evaluating impairment."

Change Is In The Air

We believe that the SEC should reevaluate its rules and that changes can and will improve disclosed reserve information.

Several competing standards make estimating oil and gas reserves even more confusing. Companies registered with the SEC must use the definitions and disclosure standards established by the SEC in 1978. Recently, the Society of Petroleum Engineers, the World Petroleum Council, the American Association of Petroleum Geologists, and the Society of Petroleum Evaluation Engineers approved a common petroleum resource management system that some in the industry would like to replace the SEC definitions. Additionally, the U.N., Russia, and others have developed their own reserve definitions and standards.

Various interests have urged changes to the current SEC reporting system. Notable among these is a February 2005 special report published by Cambridge Energy Research Associates (CERA) titled "In Search of Reasonable Certainty, Oil and Gas Reserve Disclosure." In its report, CERA calls for the SEC to modernize its system "to create a workable, constructive framework for the oil and gas industry in the 21st century that responds to the needs of both investors and consumers." The CERA report was supported by major oil companies, independent reserve engineers, accounting and law firms, and others.

Perhaps in response to the calls for change, the SEC announced in October the appointment of an academic engineering fellow specializing in petroleum reservoir engineering. According to the SEC, the academic fellow, W. John Lee, will review and evaluate current disclosure requirements for oil and gas reserves and the new technologies companies use to determine reserves. He will also assist the SEC's staff in determining what, if any,

recommendations it should make to the Commission about revisions to current reserve disclosure requirements.

What Do Analysts Want In Oil And Gas Reserve Disclosure?

We have identified several key characteristics and disclosures that we would like any new oil and gas reserve disclosure system to incorporate. For purposes of this discussion, we don't advocate any particular method for determining reserves, but rather the characteristics and disclosures that oil and gas reserve estimates should encompass.

Consistency

Because comparing reserves from period to period and from company to company is an important part of our analysis of E&P businesses, it's critical that reserves be as comparable as possible. We realize that reserve estimates on the same oil and gas fields may vary greatly from one estimator to the next. However, standardization would minimize the differences that exacerbate variability. For example, we believe that companies should estimate reserves at the end of their fiscal year as accounting rules currently require, not at an optional earlier date. We also urge consistency as to when reserves are initially recognized. For example, all E&P companies should use a common benchmark, such as final investment decision.

Reliability

Oil and gas reserves are management estimates, and management should ensure that procedures and internal controls are adequate to report reliable reserves. Management should review and approve estimates, as should the audit committee (not reporting to management) and the board of directors. A review or audit of reserves by an independent engineer could also enhance reliability. Currently, there are no requirements for the audit committee and board to approve reserves or to have independent engineers audit the estimates. (See "Who Should Prepare Oil And Gas Reserve Estimates? Should The Results Be Audited?" below.)

Conservative estimation

Reserve estimates should be conservative, meaning that changes in reserve estimates related to reservoir performance should generally be upward revisions; downward performance-related revisions should be unusual. A consistent pattern of downward reserve revisions signals an aggressive operating culture. Also, we advocate that thorough explanations for volume changes (a reserve MD&A) accompany the reserve tables, increasing the understanding of the reserve reconciliation tables.

Completeness

Oil and gas reserves should include all oil and gas resources that companies own. Current SEC rules exclude some unconventional oil reserves, such as the extraction of crude oil from shale, tar sands, or coal. The SEC defines recovering oil from these sources as a mining activity. Chevron Corp. (AA/Stable/A-1+) makes this statement in its 2006 annual financial statement:

"In addition to conventional liquids and natural gas proved reserves, Chevron has significant interests in proved oil sands reserves in Canada associated with the Athabasca project. For internal management purposes, Chevron views these reserves and their development as an integral part of total upstream operations. However, SEC regulations define these reserves as mining-related and not a part of conventional oil and gas reserves. Net proved oil sands reserves were 443 million barrels as of December 31, 2006."

To be complete and to increase comparability, oil and gas reserves should include all forms of hydrocarbons that

companies can confidently expect to recover and sell.

Reconciliations

The current reserve reconciliation tables provide valuable information; however, these tables should expand the reconciliations to show increases or decreases in reserves due solely to price movements, separately from changes in estimates. This will enable analysts to calculate F&D costs more meaningfully. We generally prefer to include performance-related, but exclude price-related, revisions in the calculation. Companies should separately report reserve additions resulting from concession extensions. They should also disclose changes from errors in estimation. Moreover, we believe that companies should thoroughly explain all material reserve changes in a reserve MD&A accompanying the reconciliation tables.

Standardized pricing

Current SEC rules require the use of year-end selling prices and costs in estimating reserves. In some cases, the volatility in selling prices may create unusual situations, such as when the selling price of heavy Canadian crude oil reached lows in late December 2004, causing reductions of crude oil reserves at year-end despite a recovery of selling prices in early 2005. In its annual report on Form 10-K, ExxonMobil discloses the following:

"Regulations preclude the Corporation from showing in this document the reserves that are calculated in a manner that is consistent with the basis that the Corporation uses to make its investment decisions. The use of year-end prices for reserves estimation introduces short-term price volatility into the process since annual adjustments are required based on prices occurring on a single day. The Corporation believes that this approach is inconsistent with the long-term nature of the upstream business where production from individual projects often spans multiple decades. The use of prices from a single date is not relevant to the investment decisions made by the Corporation and annual variations in reserves based on such year-end prices are not of consequence to how the business is actually managed."

Management should, of course, make long-term investment decisions based on its estimates of similarly long-term oil and gas prices. However, using anticipated future selling prices, rather than actual year-end amounts, would reduce comparability and consistency. Reserves will likely vary based on how bullish or bearish management is on prices. We therefore favor the use of standard prices, such as average or year-end, to make figures consistent and comparable among companies. Companies should disclose selling prices by geographic area. The use of average prices may reduce volatility caused by swings and seasonality in natural gas prices; year-end prices may be more representative of year-end values. The ultimate solution should require standardized selling prices and costs and allow additional reserve disclosures at different prices (sensitivity analyses).

Sensitivity analysis

The SEC should require disclosure of sensitivity analyses. Sensitivity disclosures will allow analysts to understand the effects of a plausible percentage increase or decrease in year-end selling prices on reserves, and on the standardized measure of discounted future net cash flows relating to proved oil and gas reserves. (This is commonly referred to as the PV10 calculation because cash flows are discounted using a required 10% discount rate.) Sensitivities could also include disclosure of reserves calculated using the price estimates that management uses to make investment decisions. Clearly, disclosures should be sufficient to indicate that the sensitivity analyses are supplementary to reserve estimates using standardized prices. Disclosures should also describe all of the assumption changes made in sensitivity analyses and the reasons for the changes. Finally, all assumptions should be reasonably likely to occur.

As part of Standard & Poor's ratings process, we request that E&P companies calculate the PV10 value of their proved reserves using our conservative long-term pricing assumptions--as of the time of this writing, \$45 per barrel of West Texas Intermediate crude oil and \$5.50 per million BTUs of Henry Hub natural gas. The PV10 value serves as a proxy for valuing a company's reserves when hydrocarbon prices drop significantly from today's levels. (For further details, see "S&P's Default And Recovery Analysis Of U.S. Oil And Gas E&P Sector Provides Implications For The Future," published March 27, 2006, on RatingsDirect.)

Chesapeake discloses the effects of changes in oil and gas selling prices in this way:

". . . the estimated future net revenue from proved reserves and the associated present value are based upon certain assumptions, including prices, future production levels and costs that may not prove correct. Future prices and costs may be materially higher or lower than the prices and costs as of the date of any estimate. A change in price of \$0.10 per MCF [thousand cubic feet] for natural gas and \$1.00 per barrel for oil would result in a change in the December 31, 2006 present value of estimated future net revenue of our proved reserves of approximately \$350 million and \$50 million, respectively."

Timing of disclosure

We would prefer to see reserve disclosures quarterly. Nonetheless, we recognize that quarterly disclosure requirements could be burdensome. Consequently, we believe that companies should estimate and report reserves as of the end of each year. However, if significant changes occur during interim periods--such as new fields added, increases or decreases in estimates, or changes in prices--we believe that companies should update annual disclosures in their quarterly financial statements and describe significant changes so that users fully understand the changes.

Future production

Estimates of future production are useful in evaluating the need for further borrowing or ability to repay debt. A more complete understanding of the underlying decline curves of a company's reserves would be valuable, particularly as we consider the consequences of companies' paring back on capital expenditures when hydrocarbon prices are low. For these reasons, companies should disclose estimates of annual oil and gas production related to proved reserves for the next three to five years and related capital costs necessary to produce the reserves.

Proved undeveloped reserves

Proved undeveloped reserves (known as PUDs) generally require significant additional capital expenditures and successful drilling to recover. Producers need to have PUDs in a healthy reserve base as inventory for future production. Because proved undeveloped reserves don't provide current cash flows, but rather require capital expenditures and possibly significant time to bring into production, they have considerably less debt capacity relative to proved developed reserves in our analysis. In addition to PUD amounts, which companies currently report, we would like to see further information such as:

- An aging of PUDs that shows how long they have been classified as proved undeveloped;
- Timing and plans for development, indicating whether the company regularly turns over its PUDs or has a history of booking reserves that stagnate in the undeveloped category for years;
- Whether the PUDs result from the company's own drilling or came from acquisitions; and
- Explanation of material changes in PUDs during the period.

Brigham Exploration Co. (B-/Stable/--), in its 2006 Form 10-K, states:

"Finally, recovery of proved undeveloped reserves generally requires significant capital expenditures and successful drilling operations. At December 31, 2006, approximately 45% of our estimated proved reserves were classified as undeveloped. At December 31, 2006, we estimated that it would require additional capital expenditures of approximately \$135 million to develop our proved undeveloped reserves. Our reserve estimates assume that we can and will make these expenditures and conduct these operations successfully, which may not occur."

Geographic disclosure

Companies disclose oil and gas reserves located in their home countries separately from those in foreign countries or regions. Until recently, BG Energy Holdings Ltd. (A-/Stable/A-2), which prepares its financial statements in accordance with IFRS, only reported reserves split between the U.K. (then 19% of proved) and regions outside of the U.K. The company currently combines operations in Trinidad and Tobago and Egypt within its "Atlantic Basin" region. We believe that countries that represent some concentration—possibly defined arbitrarily as more than 15% of total proved reserves—should require a more detailed breakdown. Broad geographic areas, such as "Rest of World" and "Asia and Middle East," should be used only when not material to the total. We also believe that much more detail and clarity is needed concerning the tax regimes affecting future production from current reserves. Enhanced geographic detail will improve our understanding of reserves and associated geopolitical risks.

Other issues to consider

Any new disclosure system should also address other issues that are important to analysts, including the following.

Production-sharing contracts.

Some countries use production-sharing contracts, rather than mineral leases with royalties and taxes, to provide for development of their hydrocarbon reserves. Production-sharing contracts allow E&P companies to recover their costs and to share in profits by receiving a portion of the hydrocarbons produced. They record as reserves the estimated portion of oil and gas volumes that they expect to receive over the life of the contract. As oil and gas selling prices change, reserves recognized from production-sharing contracts may behave in counterintuitive ways. For example, as the selling price per barrel increases, the number of barrels of oil needed to recover the company's costs in a production-sharing contract decreases, and reserves decrease. In its 2006 Form 10-K, Pioneer Natural Resources Co. (BB+/Stable/--) describes reserves in production sharing contracts:

"The Company reports all reserves held under production sharing arrangements and concessions utilizing the 'economic interest' method, which excludes the host country's share of proved reserves. Estimated quantities for production sharing arrangements reported under the 'economic interest' method are subject to fluctuations in the prices of oil and gas and recoverable operating expenses and capital costs. If costs remain stable, reserve quantities attributable to recovery of costs will change inversely to changes in commodity prices."

In regard to production-sharing contracts, the SEC should also consider:

- Whether production-sharing contracts should result in oil and gas reserves. Does the current accounting attempt to fit a "square peg" (a production-sharing contract) in a "round hole" (typical mineral lease accounting)?
- Additional disclosures that companies should make to allow financial statement readers to understand the difference between owned or leased resources and production-sharing contract reserves.

Probable and possible reserves.

The continued health of an E&P company depends on probable and possible reserves and exploration acreage. However, current SEC rules prohibit the disclosure of probable and possible oil or gas reserves; the SEC allows

disclosure only of proved reserves in documents filed with it. The reasoning has been that estimates of probable and possible reserves may be so inaccurate as to be misleading. However, some companies disclose these reserves in press releases and other documents that are not filed with the SEC.

As credit analysts, we generally do not consider probable reserves when calculating financial leverage ratios based on debt to reserves. That said, we recognize that having a large inventory of future drilling locations is vital for future reserve replacement and production growth. Everything else being equal, we prefer companies with larger quantities of probable and possible reserves. Unfortunately, it's difficult, if not impossible, to objectively compare one company's probable and possible reserves with another's, because each company can define such reserves differently. Nomenclature also varies. For example, some talk of "risky" and "unrisky" unproved reserves, and others talk of "potential" or "low risk upsides."

Table 2 gives examples of varied disclosures related to unproved reserves of four large, U.S.-based, independent E&P companies, taken from their most recent investor presentations.

Table 2

Reserves As Reported	
Chesapeake Energy Corp. (BB/Positive/B-1)	
10 tcf of proved reserves	
82 tcf of "unrisky" unproved reserves, or 21 tcf of "risky" unproved reserves	
XTO Energy Inc. (BBB /Stable/A-2)	
8.5 tcf of proved reserves	
7.3 tcf of "low risk upsides"	
EOG Resources Inc.(A-/Stable/A-2)	
6.8 tcf of proved reserves	
4.5-6.7 tcf of "potential" in its Barnett Shale acreage alone	
Anadarko Petroleum Corp. (BBB-/Stable/A-3)	
14.4 tcf of proved reserves	
10.2 tcf of "infill drilling," and 15 tcf of "extensions and unbooked discoveries"	

Tcfe--trillion cubic feet equivalent.

Issues that the SEC should consider include:

- Whether benefits for users of financial statements justify disclosure of probable and possible reserves;
- Whether reserve estimation has progressed to the point where probable and possible reserves can be disclosed without misleading financial statement users;
- If probable or possible reserves are disclosed, how they should be defined to achieve consistency among companies; and
- Whether financial statements can adequately capture the risks associated with probable and possible reserves.

Although our analysis will remain focused on proved reserves and we recognize the uncertainties associated with probable reserves, we believe that additional information on a company's probable reserves, including geographic location, would constitute important forward-looking guidance.

Effect of hedging on reserves.

Currently, SEC rules consider future changes in oil and gas selling prices only to the extent they are included in contractual arrangements. It doesn't consider hedges of future prices, though these are contractual. Should hedges in place also be factored into the PV10 calculations and disclosures? We believe that fixing the future selling prices of oil and gas production with derivatives is no different than contractual sales and should be included in determining reserves and PV10 calculations.

Equity investments and minority interests.

Oil and gas companies are not allowed to include oil and gas reserves of investments accounted for by the equity method in the enterprise's reserve quantities. However, the investor's share of the reserves is disclosed separately at the end of each year. This restriction makes sense because, to the extent that accounting standards appropriately reflect the investor's degree of control over its investees (including subsidiaries and affiliates), the cash flows related to equity investees' oil and gas operations are generally not directly available to the investor. However, even if not providing direct cash flow support, these investees may certainly have asset value to the investor. We believe the current practice should continue. Conversely, companies should systematically disclose minority interests in fully-consolidated but non-fully-owned investees in all tables.

For the five major international oil and gas companies, the share of reserves of equity affiliates has increased to a substantial 28% of total proved at year-end 2006, up from 18% in 2003. More detailed reserve breakdown for equity affiliates is needed. For example, for Exxon, whose equity affiliates account for about 35% of proved reserves, a breakdown between Qatari and Dutch affiliates seems warranted. Equally, additional information on profitability ("results of operations") is important.

Royalty oil (imaginary reserves).

Reported oil and gas reserves shouldn't include reserves that don't provide economic benefits. For example, including in reserves designated quantities of oil and gas that will be sold to pay royalty costs or tax expenses only exaggerates total reserves without increasing value to the company. At Standard & Poor's, we recognize this issue when analyzing companies across different countries where reporting standards may differ.

Who Should Prepare Reserve Estimates? Should They Be Audited?

Companies prepare their reserve estimates in a variety of ways. The larger companies may estimate reserves internally using in-house engineers; smaller companies may rely on independent petroleum engineers. Some will prepare the reserve estimates and then have an independent engineer review or audit these estimates. Still others may have the independent engineer review only a portion of the reserves each year.

Unlike financial statements, reserve estimates do not require that independent experts evaluate or audit them. We believe that using independent engineers enhances credibility. Standard & Poor's currently expects independent petroleum engineers to prepare or review the reserve reports of smaller independent companies. We believe that independent audits of oil and gas reserves enhance reliability for all companies--although nontechnical issues, such as reserve booking ahead of final investment decision, or how to factor in concession renewal, may remain outside the expertise of such reservoir engineers.

The SEC should consider several issues:

- Who should prepare initial reserve estimates?

- Should there be an independent evaluation of the reserve estimates?
- Should an independent engineer review or audit reserves estimates?
- Should there be standards for reviewing or auditing reserves, and who should set them?
- Should an independent engineer's review or audit report accompany the reserve tables presented in the annual financial statements?
- Should management issue a report on reserve estimates?
- Should companies that report reserves in jointly owned fields compare and reconcile estimates with other owners? Or should all ownership interests in the same field report reserves using the same estimates?

Example of reported quantities of oil and gas reserves

As an example, Devon Energy Corp. (BBB/Positive/A-2) provides good disclosure on the role that independent engineers play in calculating its proved reserves. Table 3 gives a summary of the reserves that were evaluated, either by preparation or audit, by independent petroleum consultants at year-end 2006, 2005, and 2004.

Table 3

Devon Energy Corp.--Prepared And Audited Reserves						
	--2006--		--2005--		--2004--	
(%)	Prepared	Audited	Prepared	Audited	Prepared	Audited
Domestic	7	81	9	79	16	61
Canada	46	39	46	26	22	--
International	99	--	98	--	98	--
Total	28	61	31	54	28	35

Devon advises:

"'Prepared' reserves are those quantities of reserves which were prepared by an independent petroleum consultant. 'Audited' reserves are those quantities of revenues which were estimated by Devon employees and audited by an independent petroleum consultant. An audit is an examination of a company's proved oil and gas reserves and net cash flow by an independent petroleum consultant that is conducted for the purpose of expressing an opinion as to whether such estimates, in aggregate, are reasonable and have been estimated and presented in conformity with generally accepted petroleum engineering and evaluation principles."

The company further informs that, in each of the three years, the independent petroleum consultants of LaRoche Petroleum Consultants Ltd. and Ryder Scott Co. L.P. evaluated the domestic reserves, the consultants of AJM Petroleum Consultants evaluated the Canadian reserves, and those of Ryder Scott evaluated international reserves.

If Changes Occur, Will Ratings In The E&P Sector Change?

Systematic changes to our ratings in the sector would be extremely unlikely. If reporting standards were to meaningfully change companies' reserves figures, we would instead recalibrate our expectations for certain key ratios, such as debt to proved reserves, at given rating categories. Our analysis focuses on companies' abilities to repay their financial obligations in a timely manner. Accordingly, we would not expect future cash flows to change from previous expectations.

However, to the extent that revised reserve information provides new information, ratings may change. With similarly rated companies, if new reporting requirements provide more insight into the characteristics that we have highlighted, we could become more confident about one company's prospects compared with another's. Depending on the circumstances, the insights could result in changes to our ranking list (see "Issuer Ranking: U.S. Oil And Gas Companies, Strongest to Weakest," published Sept. 24, 2007, on RatingsDirect) or even to outlooks or ratings in certain instances.

Standard & Poor's Will Monitor Progress

We're encouraged that the SEC will reevaluate reserve disclosure and believe that the improvements we've discussed will enhance analysis and understanding of this most important asset of E&P companies. We will continue to monitor developments regarding reserve disclosures at the SEC. We also encourage the IASB to consider similar issues and disclosures as it addresses accounting for the extractive industries.

Sidebar: Key Definitions In Oil And Gas Reserves

Oil and gas reserves

Reserves are all the quantities of crude oil and natural gas that are estimated to be recoverable in future years from known reservoirs. Petroleum reserves are classified by degree of proof as: proved (high probability of actual production and marketability), probable (moderate probability), and possible (low probability). All three types of reserves are also sometimes referred to as "resources."

Proved, proved developed, and proved undeveloped reserves are defined by the SEC in Regulation S-X, Article 4, Rule 10. A summary follows.

Proved reserves.

The estimated quantities of crude oil, natural gas, and natural gas liquids which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.

Proved developed reserves.

Reserves that can be expected to be recovered through existing wells with existing equipment and operating methods.

Proved undeveloped reserves.

Reserves that are expected to be recovered from new wells on undrilled acreage, or from existing wells where a relatively major expenditure is required.

Probable reserves.

Reserves susceptible of being proved that are based on reasonable evidence of producible hydrocarbons within the limits of a structure or reservoir but defined to a lesser degree of certainty because of more limited well control and/or lack of definitive production tests.

Possible reserves.

Reserves that may exist but are less well defined by well control than probable reserves.

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Oil And Gas Reserve Reporting: Recommendations For Change

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