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Key Credit Factors: Criteria For Rating The Global Oil Refining Industry

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Key Credit Factors: Criteria For Rating The Global Oil Refining Industry

1. Standard & Poor's Ratings Services is publishing its criteria for the global oil refining industry, in order to help market participants better understand the key credit factors in this industry. This article is related to "Principles Of Credit Ratings," published Feb. 16, 2011, on RatingsDirect on the Global Credit Portal. This report supersedes "Keys To Success For U.S. Oil And Gas Refiners And Marketers," published Oct. 5, 2004.

SCOPE OF THE CRITERIA UPDATE

2. These criteria apply to ratings on issuers that derive the majority of their earnings from the oil refining industry. These criteria are also applicable in assessing the business risk of refining (also known as "downstream") operations of integrated oil and gas companies that generally derive the majority of their earnings from oil and gas exploration and production ("upstream") businesses, and which also typically have "midstream" businesses, which include the transportation, storage, wholesale marketing, and trading of oil, natural gas, and refined products. Some integrated companies also participate in the petrochemicals industry.

SUMMARY OF CRITERIA UPDATE

3. These criteria specify the key business and financial risk factors that comprise our credit analysis of issuers in the oil refining industry.

IMPACT ON OUTSTANDING RATINGS

4. We do not expect implementation of these criteria to cause rating changes.

EFFECTIVE DATE AND TRANSITION

5. These criteria are effective immediately.

METHODOLOGY

Summary Of Key Credit Factors

6. The key credit factors used in analyzing a refining company are divided into three categories. Category one factors are, in our view, the most relevant factors; they ordinarily affect the rating outcome in a meaningful way, and in many instances are critical to our rating conclusions. We view category two factors as being of lesser relevance, but they may in some instances still prove critical. Category three factors may be individually meaningful in a few instances, but ordinarily just shape the company's overall profile in conjunction with the other factors.
7. Industry risk factors pertinent to the ratings process are discussed in the Industry Risk section of this report. The

refining industry involves higher than average credit risk compared with other industries and sectors, as explained in Industry Risk and Characteristics below (paragraphs 19 through 27, and table below.)

8. Category One Factor--cost position, including refinery complexity/feedstock flexibility and operating efficiency.
9. Category One Factor--financial condition, including:
 - Financial governance/policies and risk tolerance;
 - Liquidity management, including working capital management;
 - Cash flow adequacy, including capital investment requirements; and
 - Capital structure and leverage.
10. Category Two Factor--scale and market position, including:
 - Scale;
 - Product mix;
 - Geographic footprint; and
 - Diversity.
11. Category Three Factor--midstream/downstream integration, including:
 - Integration with marketing and transportation assets; and
 - Integration with petrochemical and specialty chemical operations.

Part I--Business Risk Analysis

12. Business risk is subdivided into four categories: country and macroeconomic risk, industry risk, company competitive position (including management), and profitability/peer comparisons. We evaluate each category, and then determine a score for overall business risks: "Excellent," "Strong," "Satisfactory," "Fair," "Weak," or "Vulnerable," as we define the terms.

Country risk and macroeconomic factors (economic, political, and social environments)

13. Country risk plays a critical role in ratings on companies in a given country, and this is particularly true in the case of refining companies. Country-related risk factors can have a substantial effect on company creditworthiness, both directly and indirectly. Country risk, the risk of doing business in a particular country, differs from sovereign credit risk--the risk of the sovereign defaulting on its commercial debt obligations. We therefore look beyond the sovereign rating to evaluate the country-specific risk that may affect the entity's creditworthiness, where such country risks include, among others: economic, political, legal, and regulatory risk, and infrastructure or labor market constraints.
14. While refined oil products are globally traded commodities, their importance to most countries leads the industry to be much more susceptible than most other industries to country level risk factors. These country factors include diverse infrastructure, regulatory, emission/pollution, taxation, substitution and tariff policies, which can lead to very different prospects for industry profitability and credit risk in one country versus another (see paragraphs 16 through 18 below for in-depth discussion).
15. Although demand has historically tended to track GDP growth over the long term, significant divergences from the business cycle can occur because of supply/geopolitical factors, and relative demand growth likely will slow over

time, given government-led efforts to spur conservation and encourage use of renewable fuels, and other regulations and subsidies intended to improve fuel efficiency; and, periods of high oil prices, and therefore high transportation fuel prices, encouraging a secular shift in demand toward more fuel-efficient vehicles.

16. Some of the main factors which can lead to major variations between refining industries in different countries, and in some cases, between regional markets within countries, can include:
- The extent to which the market is served by domestic refining capacity, and the nature of domestic refiners' access to various types/grades of crude oil;
 - The nature of the refined product transportation and wholesale and retail distribution system, including control of retail sales outlets;
 - Local environmental regulations, and the role of the government in sundry other forms, discussed below;
 - The nature of end-use demand, such as the size and growth rate of the passenger and commercial vehicle stock in operation, the intensity of vehicle usage, and the composition of the local industrial fuel oil user base; and
 - The extent to which the market is open to refined product imports, given the state of transportation infrastructure (e.g., import terminals, pipelines) and trade barriers.
17. For refining companies, the aspects of country risk that are most directly relevant from a credit perspective include:
- The maturity of the national/regional economy, prospects for GDP growth, prospects for growth in the key energy-consuming sectors of the economy, and extent to which the economy is subject to cycles and shocks;
 - The state of industry infrastructure, i.e., ports, terminals, pipelines, rail lines, and highways;
 - Constraints posed by government permitting of new refineries and of major upgrades to existing refineries. In some countries, the permitting process has come to be viewed by industry participants as so cumbersome that the construction of new greenfield facilities is highly unlikely;
 - Government regulations concerning refinery emissions (air, water) and environmental remediation of spills;
 - Government regulations regarding finished product specifications, for emission control purposes. As seen in various countries, mandated changes to product specifications have the potential to impose significant investment requirements on refining companies and roil end-use demand patterns, although they can also serve to insulate refining companies from competition, at least temporarily. An example was the 1997 introduction of CARB-II gasoline in California that temporarily protected California-based refineries from competition from refineries outside the state, thereby boosting their profitability until prices rose sufficiently to attract imports from distant sources. The implementation of CARB-III gasoline at the beginning of 2004 once again constrained that market;
 - Government mandates regarding the use of alternative fuels can cut into demand for refined products like gasoline and diesel. In the U.S., the Renewable Fuel Standard requires refiners to incorporate biofuel (such as ethanol or biodiesel) into their finished products, displacing a percentage of refined petroleum product in each gallon of fuel. In this way, government support mechanisms like tax credits or volumetric mandates (or emission regulations that benefit biofuel plants) can increase the competitive pressures on refineries;
 - Constraints posed by governments on companies' ability to close uneconomic facilities (e.g., in the form of extended notice requirements and costly severance requirements);
 - Taxation of fuel sales and regulation of prices. In most countries, transportation fuel sales are heavily taxed, significantly constraining demand. In some instances, however, transportation fuels have historically been subsidized (e.g., Saudi Arabia and Venezuela), and/or prices are regulated (e.g., Malaysia), in order to ease the financial burden for retail and industrial consumers of crude oil price spikes. Unless the effect of price caps is offset by subsidies to refining companies, they can severely impinge on refining companies' profit margins; and

- Tariffs and other import trade barriers.

18. Refining companies that serve export markets are affected both by country risk in areas where their refineries are located and by aspects of country risk in the countries that are their end markets.

Industry risk and characteristics

19. In establishing a view of the degree of credit risk in a given industry, it is useful to consider how its profile compares with those of other industries. Risk categories are broadly similar across industries, but the effect of these factors can vary markedly among industries (see table). The key industry factors are scored: High risk (H, red), medium/high risk (M/H, red), medium risk (M, orange), low/medium risk (L/M, green), and low risk (L, green.)

Key Industry Characteristics & Drivers of Credit Risk	Oil Refining & Marketing	Oil & Gas Upstream	Oil & Gas Midstream	Metals	Mining	Building Materials	Capital Goods	Chemicals/Commodity	Forest Products
Industry Dynamics & Competitive Environment									
Industry Cyclicalty	H	H	H	H	H	H	H	H	H
Ease of Entry	L	M	M/H	M/H	M/H	H	M	M/H	M
Product Cycle/Obsolescence	L	L	L	L	L	L	M	M	M
Product Quality/Pressure	M	M	M	M	M	L	H	M	M
Disintermediation/Substitution	L	L	L	M/H	M	M	M	M	M
Competition/Commoditization	H	H	M	H	H	H	M	H	H
Pricing Inflexibility	H	M	M	H	H	H	M	H	H
Business Model Instability	L	L	L	L	L	L	L	M	L
Demographic trends	M	M	M	H	H	M	M	M	M
Growth & Profitability									
Growth Outlook	H	L	M	M/H	M	H	M	M	M/H
Profit Margin Pressure/Outlook	H	M	M	H	M/H	M	M/H	H	H
Earnings Volatility	H	H	M	H	H	M	M/H	M/H	M/H
Operating Considerations & Costs									
Technological Risk/Change	M	L/M	L	M/H	M	L	M	L	L
Cost Rigidity/Inflexibility	H	M	M	M	M/H	H	M/H	H	H
Operating Leverage	H	M	M	H	H	H	M/H	H	H
Research & Development Costs	L	L	L	L	L	L	M	L	L
Energy Cost Sensitivity	H	M	H	H	M	M/H	M	H	L
Raw Material Cost Sensitivity	H	M	L	H	M	M/H	H	H	M
Labor Costs	M	M	M	H	M	M	L/M	L	M
Labor Inflexibility/Unrest	M	M	M	H	H	M	M	L	M
Pension Costs/Contingents	M/H	L/M	L/M	M/H	L	L	M	M	M
Environmental Impact/Costs	H	H	M/H	H	H	M/H	L/M	M	H
Marketing Costs	L	L	L	L	L	L	L	L	L
Customer Concentration	M	L	H	M/H	L	M	M	L	L
Supplier Concentration	M	L	H	M	L	M/H	M	M	M
Risk Management	H	M	M	L	H	L	L/M	M	L/M
Asset Quality/Plant Upkeep & Age	H	M	M/H	M/H	M	L	M	H	M
Event Risk Sensitivity	H	M	H	H	H	L	L	M	M
Financial Market Volatility/Sensitivity	M	L	L	M	M	L	M	M	M/H
Fashion/Fad/Design Sensitivity	L	L	L	L	L	L	L	L	L
Capital & Financing Characteristics									
Capital Intensity	H	H	M/H	H	H	M/H	M	H	H
Borrowing Requirement	H	L/M	M	M	M	M	M	M/H	M
Interest Rate Sensitivity	M	L/M	M	M	M	M/H	M	M	M
Governmental, Regulatory & Legal Environment									
Regulation/Deregulation/Patents	H	M	H	H	M/H	L/M	L	M	M
Gov. Microeconomic & Social Policy	H	H	H	H	H	M	L	M/H	M
Litigiousness/Legal Risk	H	M	L	L	M	M	L/M	M	L

20. Broadly speaking, the lower the industry risk, the higher the potential rating on companies in that sector. Industry risk identifies the range of business risk profile scores we generally expect to assign an industry. Those sectors with lower industry risk will tend to have higher business risk profile scores than those sectors with higher industry risk. However, a high industry risk profile does not automatically limit the rating on a company. Companies can differentiate themselves regarding business risk, and may be able to mitigate certain business risks with cautious financial strategies.
21. Industry risk analysis sets the stage for company-specific analysis. Once key country risk and industry risk considerations are identified, the credit analysis process proceeds to a second phase--company-specific, business risk analysis. If, for example, technology is a critical competitive factor, the analysis typically places greater weight on a company's research and development (R&D) capabilities. If the industry produces a commodity, production cost is of major importance. The goal is to develop a robust understanding of the company's external operating environment when evaluating its overall business position. Industry analysis focuses on industry prospects, and identifying the competitive factors, risks, and challenges affecting participants in that industry. The degree of business risk a company faces almost always depends on the dynamics of the industry in which it participates. Different industries pose different risks and opportunities for the companies that operate in their sectors.
22. In the refining industry, the dominant end products are transportation fuels (such as gasoline, diesel, and jet fuel) and fuel oils, used for various industrial, commercial, and consumer applications. Based on the refining process, products are usually grouped into three categories: light distillates (liquefied petroleum gas, gasoline, naphtha), middle distillates (kerosene, diesel), and heavy distillates and residual fuel oil (heavy fuel oil, lubricating oils, wax, asphalt).
23. Crude oil is the dominant cost component of refining companies, and product prices are typically closely related to crude oil prices over time--albeit with mismatches that can last for extended periods and that can make for extreme volatility in refining companies' earnings and cash flows. There is some degree of elasticity to demand, and refined product consumption tends to decline during periods of oil price spikes.
24. Under the criteria, the refining industry involves higher than average risk when compared to other industries and sectors. In our view, the following are the major industry risks:
 - The primary raw material for refiners, crude oil, is a globally traded commodity subject to volatile price fluctuations.
 - Refineries are designed to use specific grades or types of crude oil. Adverse changes in the price differentials between grades can undermine the competitiveness of a refinery compared to its peers.
 - The key refined products--gasoline, diesel, jet fuel, and residual fuel--also are globally traded commodities. While over time their prices tend to be closely tied to crude oil prices, extended timing lags can sometimes squeeze the profit margins of refining companies, although there have also been extended periods of highly favorable prices relative to feedstock costs.
 - The refining business is extremely capital intensive. A large investment is needed to construct a refinery and subsequently maintain its competitiveness through regular maintenance and upgrades. We believe the cost to build a new greenfield refinery with capacity of 100,000 barrels per day and a high degree of complexity in the U.S. would be well in excess of \$2 billion.
 - A material portion of global refining capacity is controlled by government-related entities, which are sometimes not as sensitive to market factors as other players, given the importance placed on such priorities as continuing to

generate hard currency and provide employment. This can cause significant distortions in the competitive global and regional environment for refined products. For example, refineries which produce under freer market regimes sometimes can be disadvantaged compared with those which benefit from subsidization. And subsidized producers may be less inclined to reduce production in a downturn, leading to over-supply. Moreover, in some countries protective government policies contribute to under-investment, leading the domestic industry to be disadvantaged in export markets.

- The refining business is also extremely working-capital intensive, given the extent of raw materials, in-process, and finished goods inventory that are generally necessary to ensure smooth processing and marketing operations. Also, seasonal fluctuations in demand can heighten working capital requirements.
 - Refineries are typically among the most significant sources of air and water pollution in areas where they operate, and their most important finished products--transportation fuels--ultimately account for a major share of all air pollution globally. As such, refining companies have been subject to successive rounds of new restrictions on direct refinery emissions, especially in OECD countries. Moreover, regulators have repeatedly tightened and otherwise modified formulation standards for such end products as gasoline and diesel fuel--significantly adding to investment requirements and operating costs, while sometimes disrupting end markets.
 - In some cases, governments have imposed blending mandates or placed incentives on the development and use of cleaner burning alternatives to fossil fuels, spurred by concerns regarding global warming. This helped slow secular growth in demand for petroleum products in the developed economies.
 - There is a high degree of operating risk associated with refining. Operating hazards include explosions, fires, spills, toxic emissions, maritime accidents, and weather disruptions (including hurricanes) and other natural disasters. For example, a fire and explosion at BP plc's large Texas City refinery in 2005 killed 15 workers, resulted in the facility being idled for one and one half years, and cost the company well in excess of \$2 billion of losses.
 - There is a very long lead time--at least several years--to plan and construct new refineries, and bring them into operation. It has been a pattern in the refining industry that periods of frothy market conditions have set in motion investments in new capacity, which then became operational in the midst of severe downturns, adding to industry woes.
 - Over the long term, refined products are subject to competing fuels, including renewable energy sources.
 - Exit barriers are high in certain countries, in the sense that they are disincentives to closing outmoded capacity. In some cases, costly environmental remediation obligations may become payable once operations are formally terminated, and there may also be severance costs triggered as employees are laid off.
25. Yet, when refining companies' operations are performing efficiently, the companies enjoy the advantage of low feedstock costs, and end market conditions are favorable, the upside earnings generating ability of the sector can be enormous, as has been demonstrated repeatedly in the past. At least at the better-positioned industry participants, surplus cash generated during cyclical peaks has more than offset cash outflow experienced during trough periods. Also, there is low risk of product obsolescence: We believe substitutes will make only modest inroads into demand for refined products over the next few years. Given ongoing industrialization in China, India, and other emerging markets, meaningful demand growth for refined products should continue for the foreseeable future, boosting market activity on a global basis.
26. Notwithstanding our view that the refining industry has higher-than-average risk, it is still possible for companies to achieve investment grade ratings where we view them as having well-above-average competitive positions within the sector and appropriately conservative financial profiles. In some instances, refining companies are

government-owned or –controlled, in which case they are analyzed using our criteria for government related entities. (See "Stand-Alone Credit Profiles: One Component Of A Rating," Oct. 1, 2010, and "Rating Government-Related Entities: Methodology And Assumptions," Dec. 9, 2010.) In some instances, refining companies are joint ventures where the owners are integrated energy companies, with the refining companies closely integrated into their operations: Such cases are analyzed using our parent/subsidiary criteria. (See "Corporate Criteria--Parent/Subsidiary Links; General Principles; Subsidiaries/Joint Ventures/Nonrecourse Projects; Finance Subsidiaries; Rating Link to Parent," Oct. 28, 2004.)

27. The market statistics we track that are of most direct relevance in monitoring industry conditions and the business risk profile of specific issuers include:
- Prices, inventory levels, and demand levels of key crude oil grades;
 - Price differentials between key crude oil grades such as WTI and Brent, and between each of these and lower-quality feedstocks that generally trade at a discount to WTI and Brent, such as Mars, Maya, and ANS.
 - Prices, inventory levels, and demand levels of key finished goods, as well as finished goods inventory/stocks (e.g., as measured in days' supply--such as in terms of stocks divided by trailing four-weeks average demand);
 - Crack spreads. A crack spread is the difference between the spot price of a barrel of oil and the spot price of a fixed, representative basket of the products derived from it. Thus, the so-called 3-2-1 crack spread is the difference between the cost of three barrels of crude oil feedstock and the selling price of two barrels of gasoline and one barrel of distillates. This serves as a rough approximation of the gross refining margin;
 - Natural gas prices, since natural gas is often a key cost component in the refining process;
 - Import/export levels in relevant markets;
 - Operable refining capacity serving the relevant market, as well as capacity utilization, and plans to expand or decommission capacity; and,
 - Pipeline capacity--including crude oil pipelines and refined product pipelines--serving the relevant markets.

Company-specific analysis

28. Once key country and industry risk considerations have been identified, including industry-specific key credit factors, the credit analysis proceeds to company-specific analysis. The business risk part of this analysis is divided into three parts: company competitive position (including cost position, scale and market position, and midstream/downstream integration); management assessment; and profitability, (which incorporates industry peer group company comparisons).

Company Competitive Position

Category One Factor--Cost Position

29. A refining company that warrants a favorable assessment of cost position relative to peers typically is characterized by a combination of:
- An advantaged position with respect to feedstock sourcing, given the location of its refineries;
 - A high degree of complexity;
 - High capacity utilization;
 - Low processing/operating costs; and,
 - Inventory levels that are sufficient to meet operating requirements, without being excessive.

30. A refining company that warrants an unfavorable assessment of cost position relative to peers typically is characterized by a combination of:
- A lack of advantages in feedstock sourcing;
 - A low degree of complexity;
 - A poor track record with respect to unplanned capacity outages;
 - High processing/operating costs; and,
 - Inventory levels that are not kept well-balanced with operating requirements.
31. Cost position is a critical aspect of a refining company's competitive position. Given the commodity nature of refining products, matters pertaining to cost position are key differentiators among competitors, and play an important role in determining a company's long-range staying power.
32. Crude oil typically accounts for well over 80% of the cash costs of a refinery, and the mix of crude oil sourced by a refining company is a key aspect of its competitive profile. Related to this, the "complexity" of refineries is an important consideration: It is the refinery's ability to process less-expensive crude oil feedstocks (heavier and higher-sulfur-content crude oils) into value-added products. Light, sweet crudes are more expensive than heavy, sour crudes because the former require less treatment and produce a slate of products with a greater percentage of high-priced refined products (such as gasoline, kerosene, and jet fuel) than heavy, refined products (asphalt and residual fuel oil). Therefore, the more complex the refinery and more flexible the feedstock slate, the better positioned the refinery generally is to take advantage of the differential between heavy sour and light sweet crude prices. (Less complex refineries generally consist of simple distillation and desulfurization capacities.) As such, a higher complexity level generally provides a refiner with a competitive advantage over less sophisticated refiners. In making comparisons among facilities and companies, we use indices compiled by third-party sources, including the Nelson Complexity Index, without which we calculate general complexity measures where sufficient information is available. Complexity does not constitute absolute protection against adverse market conditions. Achieving a high degree of complexity requires significant incremental capital investment for refining companies. Also, ongoing unit processing costs of complex refineries are somewhat higher than those of less complex ones. The performance of more complex facilities depends on the price differential between low-quality and high-quality crude oil, which can change depending on global production. On balance, though, we consider complexity to be a competitive advantage, and expect that refining companies with highly complex refineries will generally have better and more stable profitability than others over time.
33. Operating flexibility: apart from its relevance to market position (see below), location can also be a key determinant of a refining company's cost competitiveness and operating flexibility. The closer a refinery is to its crude supply and end-users, the lower the all-in feedstock and transport costs. Landlocked refineries may benefit in their market position from their insulation from waterborne imports, but have the disadvantage of limited access to other end markets and limited options in sourcing crude oil feedstocks. On the other hand, coastal refineries may have much greater flexibility in sourcing relatively low-cost, waterborne feedstocks, and also in exploiting sales opportunities in export markets, but may be much more subject to competition from waterborne imports in their home territories.
34. In assessing operating efficiency, it is also important to consider the processing/operating costs (excluding raw materials costs) associated with refining, of which energy is the dominant component. Companies with access to low-cost natural gas (as in the U.S. presently) may enjoy a significant cost advantage compared to companies that must use fuel oil or liquefied natural gas (pricing of which is typically tied to crude oil). In considering processing

costs, we calculate cash operating expenses per barrel of throughput. Processing costs vary considerably depending on level of complexity, so it is most meaningful to compare peer companies that are similar in this regard.

35. The high-fixed-cost nature of the refining business means refining companies must maintain high utilization rates to keep unit fixed costs low and achieve satisfactory profitability. In assessing operating efficiency, we compare peer companies based on their disclosed operating rates, to understand both the definitions used and circumstances surrounding major unplanned outages.
36. In assessing cost position, we consider the age of a company's refineries, since newer refineries generally are more efficient and reliable than older ones. However, well-maintained older facilities sometimes have undergone such extensive retrofitting that they are not appreciably disadvantaged. Thus, ongoing operating results are a better gauge of cost-competitiveness than age, per se.
37. The refining business is also highly working capital intensive, and we assess refining companies' working capital management skills and efficiency. Ideally, from a credit perspective, companies must strike a balance between, on the one hand, having sufficient raw materials inventory on hand to avoid potential production disruptions and sufficient finished goods inventory to keep distribution channels filled, and, on the other hand, avoiding the price risk exposure that comes from excess inventory. (Hedging is discussed in the "Financial governance/policies and risk tolerance" section below.) The extent of a company's working capital requirements is highly influenced by regional/national infrastructure considerations. In assessing working capital efficiency and making peer comparisons, we view inventory turnover as an important metric.
38. Given the significance of operating hazards faced (see section 24 above), it is common for refining companies to maintain extensive property and casualty insurance coverage, including business interruption protection. We assess refining companies' insurance, including the risks covered, the related deductibles and premiums, and the company's track record in collecting on claims in a timely manner. We believe that, at most, insurance affords incomplete protection against operating hazards. Thus, at present, coverage for hurricane damage is very limited, and coverage for terrorism risks includes very broad exclusions. As a result of market conditions, premiums and deductibles for certain insurance products could escalate over time, becoming uneconomic. In some cases, once a company has filed an insurance claim and received a payment, its future premiums are almost automatically increased to cover the amount of the payment--undermining the value of the insurance protection except as a financing mechanism.
39. Foreign currency risk can be a significant exposure for some refining companies, affecting their cost performance. On a global basis, crude oil trading is generally denominated in U.S. dollars. To the extent companies have operating costs and/or sales that are denominated in other currencies, they may be affected by adverse fluctuations in relative currency values, absent hedging. In such cases, we assess refining companies' foreign currency risks and hedging strategies and techniques.

Category Two Factor--Scale And Market Position

40. A refining company that warrants a favorable assessment of scale and market position typically is characterized by a combination of:
 - Large scale, based on total refining capacity;
 - A number of different refineries, with the majority of these being large-scale individually, and with these being located in markets with attractive supply-demand characteristics; and,
 - A relatively high-value-added product mix compared to industry peers (see also section 32).

41. A refining company that warrants an unfavorable assessment of market position typically is characterized by a combination of:
- Small scale, based on total refining capacity;
 - Few refineries, with some of these having small scale individually;
 - Operates in one market or closely-correlated markets served by several competitors; and,
 - A relatively low-value-added product mix, compared with industry peers (see also section 32).
42. Scale and market position are important aspects of a refining company's competitive position. A large total capacity base can enable refining companies to achieve economies of scale or synergies by spreading their overhead costs over more production volume than otherwise would be possible. Also, larger refining companies are sometimes able to negotiate more competitive purchase contracts for crude oil and other raw materials. Ultimately, larger scale should contribute to lower unit production costs. Moreover, scale can enhance financial flexibility. And the relative attractiveness of the particular markets in which the refining company competes (for example, in terms of demand for high-value-added products and the level of competition with other producers), the diversity of those markets, and how the refining company is positioned in those markets with respect to product mix, are key determinants of its profit potential and exposure to downside risks.
43. **Footprint:** Not just the overall size of the capacity base, but the number of separate refineries operated, is significant. Having operations spread over a number of different facilities minimizes the potential downside of operating hazards. Over time, refining companies with greater production diversity should be able to benefit from higher operating rates than otherwise would be the case. Operating multiple refineries also implies a degree of geographic/market diversity. Market conditions vary considerably across regions and countries (see Country Risk). In analyzing a refining company's competitive position, we consider the specific geographic markets in which it competes, and its related market shares. Even a small-scale refinery may be highly profitable if it has an entrenched/niche position (as reflected in some degree of pricing power) in a market area that is somewhat insulated from competition. In addition, for some companies, having the ability to switch between serving domestic and export markets, as demand and pricing conditions fluctuate, can be a distinct advantage. Ultimately, greater geographic diversity should result in more stable cash flow over time. At the other extreme are single-refinery companies highly exposed to operating hazards and to adverse market developments, adding to potential cash flow volatility.
44. **Refinery size:** The size of a company's individual refineries is also important. Larger-scale refineries (which we view as ones with capacity of at least 150,000 barrels per day of capacity) are typically the most efficient. Also, costly investments for conversion equipment (such as hydrocrackers) may only make economic sense for large-scale refineries. Some refining companies have been able to gain large and defensible market shares in certain specialized, highly profitable market niches, such as lubricants and process oils.

Category Three Factor--Midstream/Downstream Integration

45. A refining company that warrants a favorable assessment of integration is characterized by operations that extend its basic refining operations in such a way as to enable demonstrably better profitability than otherwise would be the case and/or more stable financial performance over the course of the cycle.
46. A refining company that warrants an unfavorable assessment of integration is characterized by operations that are narrowly limited to refining, relying totally on third parties for crude oil sources and the transportation and marketing of its refined product output.
47. While some larger global integrated oil and gas companies operate full-cycle vertically integrated operations, it is

relatively common for larger refining companies to operate a cluster of ancillary, related businesses—including transportation, terminals, pipeline systems, wholesale distribution networks, retail sales outlets—although strategies regarding these have varied considerably over time, as have financial results.

48. Examples of such integration/diversification include:

- Participation in oil and gas common carrier pipelines with regulated tariffs;
- Ownership of a logistics networks, supported by a fuel marketing business--potentially encompassing transportation, distribution, and retail operations (such as a chain of branded gas stations); and
- Integration into petrochemicals.

49. In some cases, refining companies maintain extensive proprietary crude oil and refined product pipelines, giving them a significant and defensible advantage over regional peers in feedstock sourcing and marketing, for example, in the case of the latter, by allowing the refining company to direct products to the market that offer the greatest return.

50. In broad terms, participation in pipeline operations can sometimes afford refining companies a highly stable source of earnings not closely correlated to the refining company's base earnings.

51. In each case where the refining company's investment is material, we assess its competitive position applying the criteria appropriate to the industry in question, and then consider the overall affect on the company's business risk.

52. Refining companies that sell refined products directly to retail markets have sometimes achieved more stable earnings and cash flow than refining companies that sell predominantly to merchant markets: Refining and marketing margins tend not to be closely correlated. Through operating gas stations, refining companies have the potential to capture margins on nonfuel merchandise sold through related convenience stores, which have become all-pervasive. However, such retail operations face intense competition from a variety of other types of industry players (such as hypermarkets and food retailers).

53. In assessing the competitive position of a refining company's retail operations, we consider the same factors as when assessing any retailer (see "Key Credit Factors: Business And Financial Risks In The Retail Sector," Sept. 18, 2008). Of particular importance are:

- The extent of those operations in terms of breadth (wholesale/ retail) and depth (geographic coverage and density of outlets);
- How ownership of the retail outlets is structured--that is, whether the locations are company-owned or independently owned;
- The value of brand affiliations;
- The extent to which gas station fuel requirements are met by the refining operations, versus being sourced from other supplies;
- The distribution of earnings between the fuel business and convenience store and service operations;
- The relationship between retail fuel selling prices and crude oil prices; and,
- Potential environmental remediation liabilities related to gasoline stations and terminals.

54. We generally view integration of refining into petrochemicals activities somewhat less favorably, although we still view this as a meaningful form of diversification. In recent years, a number of refining companies globally have reduced or eliminated their exposure to petrochemicals. While such integration allows for arbitrage opportunities

between transportation fuels and petrochemicals, and can improve overall profitability somewhat, petrochemical prices are volatile—at times even more so than refining margins.

55. In another type of diversification, some refining companies have made investments in alternative energy sources and technologies (e.g., ethanol and biodiesel), attempting to hedge their bets on the future of conventional petroleum-based transportation fuels. For now, we view such investments as neutral for ratings. The premise for these particular transactions could take many years to be fully tested. To date, a majority of the investment by refining companies has been made in first generation corn ethanol. While the acquired units have generally been profitable with stable operating profiles, we believe poorly correlated corn and ethanol prices are likely to drive volatile margins and financial results.

Management and strategy

56. The evaluation of issuer management in industries is discussed in "2008 Corporate Criteria: Analytical Methodology," April 15, 2008. Our criteria consider a refining company's senior management team and its strategic plans, and its investment allocation process. The depth, tenure, and caliber of the management team are evaluated, and management's views of the primary drivers of expected growth (internal or external) are considered. The entrepreneurial abilities of the top management group may be critical. This is even more the case for participants in less-developed markets, where management's ability to foster the necessary local relationships and ability to navigate through complex legal issues and red tape can be of key importance for success. Our criteria incorporate a review of the quality and composition of the board of directors. Its established corporate governance philosophies offer insight into financial transparency and quality of disclosure, and the potential for future conflicts of interest, material event risk, and strategic operating and/or financing shifts. Management compensation and how the structure of financial incentives influences management actions are also considered.
57. Over time, refining companies have pursued a range of different growth strategies. Thus, some have acted as consolidators, acquiring facilities in furtherance of a goal of greater geographic diversity. In other cases, companies have emphasized increased integration through growth of their distribution systems. We do not believe there is one particular approach that is clearly preferable from a credit perspective. We note, however, that the most successful companies over the long range have generally been those that consistently put a high degree of emphasis on optimizing the performance of existing operations.

Profitability and peer comparisons

58. A refining company that warrants a favorable assessment of profitability either has exceptionally stable profitability, generating consistently good return on capital, or a track record of significantly outperforming its peers during favorable market conditions and contain the extent of deterioration in profitability during more adverse periods.
59. A refining company that warrants an unfavorable assessment of profitability typically either has relatively stable but poor return on capital, or else has a track record of being prone to extreme volatility, typically incurring operating losses of sufficient magnitude during downturns to have a destabilizing effect.
60. In assessing the profitability of refining companies, our criteria employ the same methodology as with other corporate entities (again, see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008). In making peer comparisons among refining companies, two metrics we find particularly useful are the crack spread (as actually realized, not just on a market indicator basis) and the refining margin. There is little consistency in the use of these terms among analysts and industry participants. Below is an explanation of the particular definitions we employ for our analytical purposes in making peer comparisons. We consider these margins on a company-wide basis, but also

on a refinery-by-refinery basis, where disclosed. If a company operates a number of refineries but only a small number typically account for the dominant share of its earnings, that limits the extent to which we view its production as diversified.

Refining margin terminology.

- Refined product mix sales minus crude oil input costs equals the crack spread.
 - The crack spread minus variable cash operating costs (e.g., power, water, chemical costs) equals refining margin (as used by refining companies).
 - The refining margin (as defined above) minus fixed cash operating costs (e.g., labor, maintenance, taxes, overhead) equals the refining margin (as used by Standard & Poor's and the International Energy Agency; it corresponds to unit EBITDA).
 - The refining margin (as used by Standard & Poor's and International Energy Agency) minus depreciation and amortization equals operating income (after depreciation and amortization).
61. In brief, for a refining company to maintain competitive margins involves optimizing the quantity of feedstock refined (size and utilization rate), the quality of feedstock refined (light versus heavy or sweet versus sour), delivered costs of crude oil and other feedstocks, refinery processing efficiency, transportation costs to market, and the potential benefits gained through integration.
62. Profit potential is a critical determinant of credit protection. A company that generates higher returns on capital has a greater ability to generate equity capital internally and withstand business adversity. The key general profitability measure for refining companies is return on capital, which we utilize for comparison purposes within the sector and for comparisons with companies in other industries.
63. On the other hand, operating margins or EBITDA/revenues tends not to be useful as a general measure of profitability for refining companies, given the "pass-through" nature of the business, where crude oil input prices and finished goods/retail prices fluctuate with the price of crude oil, to a large degree, and where the absolute size of the refiner's margin is thus a better indication of profitability than as expressed in terms of a profit margin.
64. We analyze profitability measures in absolute and relative terms, taking account of the absolute range of profitability, as well as the volatility, trends, and prospects of these indicators. Our focus is on recurring earnings. Thus, where companies are pursuing restructuring efforts or cost reduction programs that render charges to the income statement, we emphasize ratios excluding these costs—while considering the company's track record with respect to such restructuring costs to determine whether they are truly nonrecurring in nature. We also eliminate asset impairment charges, LIFO liquidation effects, and fair value fluctuations relating to derivative instruments not accounted for as hedges. (In the case of companies reporting under U.S. GAAP, if derivative instruments are accounted for as cash flow hedges, fair value fluctuations are recorded in other comprehensive earnings, and do not affect reported earnings.) (See also Accounting characteristics, below, and "2008 Corporate Criteria: Ratios And Adjustments," April 15, 2008).
65. Given the extreme volatility of the refining industry, we believe there will be exceptionally wide fluctuations in a refining company's profitability over the course of time. In assessing profitability, sensitivity analysis is key. In preparing forecasts, we consider how a company is likely to fare with a recurrence of market conditions that are indicative of trough-level scenarios (for example, as reflected in crack spreads and throughput levels), based on historical experience. We also consider how a company will likely perform amid more normal/equilibrium market

conditions, as well as during periods highly favorable market conditions. In severe downturns, even the best-positioned refining companies are likely to underperform the profitability metrics generally associated with their ratings; however, in order for a refining company to achieve investment grade ratings, we must be satisfied that the extent of operating losses, if any, will be temporary, and also that in more favorable market conditions the company will substantially outperform the metrics generally associated with the rating.

Part II--Financial Risk Analysis

66. Having evaluated a refining company's business risk, the next step is to look at several financial categories. The degree of a company's business risk determines the level of financial risk that the criteria consider consistent with any rating category. Financial risk largely is determined through quantitative means, particularly by using financial ratios. Since refining companies are highly cyclical, at comparable rating levels it is expected that they maintain more conservative financial policies and greater liquidity than companies in less cyclical businesses. (See "Financial governance/policies and risk tolerance" and "Liquidity/short-term factors," below.)
67. Financial risk analysis consists of five risk categories: accounting characteristics; financial governance/policies and risk tolerance; cash flow adequacy; capital structure and leverage; and liquidity/short-term factors. After this assessment, a score for overall financial risk is determined: "Minimal," "Modest," "Intermediate," "Significant," "Aggressive," or "Highly Leveraged," as we define the terms. The criteria employ a matrix approach to combining the business risk and the financial risk score into a rating outcome (see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008, and "Business Risk/Financial Risk Matrix Expanded," May 29, 2009). The discussion below on financial risk criteria is specific to the refining industry.
68. Since refining companies are highly volatile, at comparable rating levels we expect them to maintain more conservative financial policies, more moderate financial leverage, and greater liquidity than companies in less volatile businesses. Particularly in order to warrant investment grade ratings, refining companies need to be able to sustain extended periods of difficult market conditions and constrained capital markets access.

Accounting characteristics

69. In assessing the accounting characteristics of refining companies, our analysis uses the same methodology as with other corporate issuers (see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008). The objective is to determine the accounting approaches employed by an issuer, a prerequisite for understanding its reported financial performance and condition and identifying the appropriate analytical adjustments. As part of the assessment of accounting characteristics, our analysis determines what adjustments are required under the rating methodology.
70. **LIFO/FIFO.** A number of U.S. refining companies use the LIFO inventory accounting method, as permitted under U.S. GAAP. These include some "old-line" companies that have LIFO inventory layers (i.e., tiers of inventory accumulated over time on the balance sheet, but, from an accounting perspective, never sold) that are substantially under-valued relative to current market prices, reflecting the long-term trend of rising prices. Indeed, in some cases, the so-called LIFO reserve, which is the difference between the LIFO cost basis and the replacement or current cost basis (which is a required disclosure in the U.S.) exceeds the carrying value of inventory on the balance sheet. Under our rating methodology, we add back the LIFO reserve to inventory amounts on the balance sheet for companies that use the LIFO method. A corresponding adjustment, net of tax, is made to equity. These adjustments put the company's balance on a basis more comparable to a FIFO or average cost basis. On the other hand, we consider that, from an analytical perspective, the LIFO-basis income statement is preferable, in that costs are closest to

current values. One exception is that we adjust earnings for LIFO liquidations, which are gains that result when a company penetrates older layers of inventory, turning these into cost of good sold and thereby triggering gains that we view as artificial, in that they are not reflective of the sustainable profitability of the company. For companies reporting under FIFO, we ideally would adjust our key profitability and cash flow ratios to be on a LIFO basis, where the information necessary to do so is available: in our view, the LIFO perspective better depicts current operating performance.

71. **Turnarounds.** A turnaround is a planned, periodic shutdown (total or partial) of a refinery processing unit or plant to perform testing, maintenance, overhaul, and repair operations. Under accounting standards, these seemingly occupy a middle ground between normal periodic costs and capital expenditures: U.S. GAAP leaves companies much discretion in choosing whether to fully expense these costs in the period incurred or to capitalize them and expense them subsequently--optionality that complicates comparisons among issuers. We recognize qualitatively the distortions to reported earnings and operating cash flow that can result from the different approaches.
72. **Economic lives of assets and impairment charges.** Given the highly fixed capital intensive nature of the refining industry, choice of estimated economic lives for major fixed assets can have a significant influence on asset carrying values, equity, and reported after-depreciation earnings. We compare peer companies' economic life assumptions, although we generally lack sufficient information to recast financials to be on a common basis.
73. In light of the difficult fundamentals of the refining industry, there are cases where we are of the view that, from an analytical perspective, refineries are carried on the balance sheet at values significantly in excess of amounts on which satisfactory economic returns could ever be generated, either through ongoing operation or via divestiture. Yet, the company has not recorded impairment charges. In such cases, where we view the impact as material, we make our own analytical adjustments as if an impairment charge had been taken, haircutting assets, equity, and future depreciation accordingly.
74. **Hedges.** As discussed in the Financial governance/policies and risk tolerance section below, refining companies often try to contain their exposure to fluctuations in commodity prices and foreign currencies through hedges. In our analysis of profitability when hedge accounting is not used, we typically adjust for unrealized gains and losses relating to hedge positions, where such effects can be discerned--focusing for our analytical purposes on earnings that only include hedge effects that have been realized.
75. Other adjustments that are often material for refining companies include those for asset retirement obligations, environmental liabilities, postretirement benefits obligations, and debt of unconsolidated affiliates.

Category One Factor--Financial Governance/Policies And Risk Tolerance

76. In assessing the financial governance/policies and risk tolerance of a refining company, the analysis uses the same methodology as with other corporate issuers (see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008). Given the cyclical nature of the refining sector, we put particular emphasis on how refining companies tend to utilize the surplus cash flow generated during cyclical peaks, since this can be of critical importance in determining how they fare during trough periods.
77. Exposure to commodities prices--including crude oil prices, finished goods prices, and price differentials (such as crack spreads)--is among the key risks faced by refining companies. In theory, actions to mitigate such risks through hedging can be beneficial from a credit perspective, and we assess refiners' hedging strategies and techniques. In practice, though, refiners are seldom committed to consistently maintaining hedge positions over time, given that the economics of hedging may be more or less attractive in different pricing environments. In addition, there is generally a degree of inexactitude to hedging in the case of refiners, since liquid hedge markets may not exist for the specific

commodities to which they are exposed, thereby giving rise to basis risk. In most cases, then, we view refining companies' hedging as having little effect on their risk profiles.

78. In some cases, refiners engage in trading as an extension of their inventory management--trading that is speculative in the sense that it is not undertaken for the sake of hedging price risk; however, this is nonetheless typically low-risk in nature. For example, some refining companies at times deliberately accumulate excess inventory in anticipation of favorable price movements, "playing the contango"--i.e., seeking to take advantage of an upward-sloping forward curve by buying crude oil or accumulating excess stocks of finished products and then selling these forward, locking in an arbitrage profit. (This requires that the company either has excess storage capacity or that there is third-party storage capacity available.) In such cases, we assess the market and counterparty credit risks to which the company is thereby exposed. We also consider the controls that the company has in place to monitor and contain its trading risks.
79. As discussed in section 39, foreign currency risk can be another significant exposure for some refining companies. To the extent companies have operating costs and/or sales that are denominated in other currencies, they may be affected by adverse fluctuations in relative currency values, absent hedging. In such cases, we assess refining companies' foreign currency risks and hedging strategies and techniques.

Category One Factor--Cash Flow Adequacy

80. In assessing the cash flow adequacy of a refining company, our analysis uses the same methodology as with other corporate issuers (see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008). In preparing our forecasts of a refining company, we take account of various scenarios, just as in our assessment of profitability (see section 65).
81. Heightening credit risk for refining companies is the fact that the industry is inherently working capital intensive. An important aspect of our analysis concerns the assessment of refining companies' working capital needs, and how these can fluctuate. Refiners typically hold raw materials (predominantly crude oil) inventories sufficient to limit exposure to potential supply disruptions. Also, in-process inventory across the various stages of the refining process is considerable. Likewise, substantial finished goods inventories are necessary to keep the distribution system supplied.
82. In some cases, working capital requirements vary on a seasonal basis—for example, as refineries build gasoline inventory in advance of the summer driving season, or fuel oil inventory in advance of the winter heating season.
83. In some cases, refiners benefit from negative working capital cycles. That is, since the refining company collects payments from its customers on a faster cycle than it pays its own crude oil supplier payables, cash is generated as crude prices rise--although the converse is also true, and this can add to cash flow pressure in a downturn. As part of our assessment of cash flow adequacy, we assess a refining company's working capital structure and related potential calls on cash, given the nature of its raw materials sourcing system, in-process requirements, and nature of its distribution system.
84. Refining companies are also highly fixed-capital intensive. Therefore, as part of the assessment of their cash flow adequacy, it is especially important to understand ongoing investment requirements, including outlays related to planned turnarounds (as discussed in section 71 above) and investment related to compliance with government regulations. As part of our assessment, we also consider investment related to planned expansion projects: in the refining industry, such projects often have long lead times, and the refining company may have limited discretion to

halt such projects once initiated, if market conditions change.

Category One Factor--Capital Structure And Leverage

85. In assessing the capital structure and leverage of refining companies our analysis uses the same methodology as with other corporate issuers (see "2008 Corporate Criteria: Analytical Methodology," April 15, 2008).
86. Given the stresses that can stem from extreme cyclicity and seasonality, coupled with the fixed capital and working capital intensity of the refining industry, refining companies need to hold more capital than participants in most other industries, to warrant the same ratings.

Category One Factor--Liquidity/Short-Term Factors

87. In assessing the liquidity/short-term factors of a refining company, our analysis uses the same methodology as with other corporate issuers. (See "2008 Corporate Criteria: Analytical Methodology," April 15, 2008, and "Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers," Sept. 28, 2011.) In applying the standardized liquidity descriptors to refining companies, the industry's exceptional volatility is considered. Thus, to be viewed as having "adequate" (as we define the term) liquidity, refining companies must be able to sustain an EBITDA decline of more than 30% (rather than the standard 15%), with liquidity sources still exceeding liquidity uses. To be viewed as having "strong" (as we define the term) liquidity, refining companies must be able to sustain an EBITDA decline of more than 50% (rather than the standard 30%), with liquidity sources still exceeding liquidity uses. The application of these standards will vary depending on our view of where the sector is in the cycle.
88. Given refining companies' working capital intensity (as discussed under "Cash flow adequacy," above), matters of working capital management are particularly important in the analysis of liquidity. We consider the expected sources and uses of cash related to changes in net working capital levels over the course of the year and over the course of the business cycle. Some companies are subject to very wide swings in working capital even on an intra-month basis, adding to funding requirements.
89. In particular, for backup liquidity sources to be viewed as adequate and better, they must be sufficient to accommodate inventory requirements even during periods when crude oil prices are extremely challenging.
90. Distinctive uses of liquidity for refiners may include those relating to the need to provide letters of credit and/or surety bonds pursuant to commitments under crude oil purchasing agreements, workers compensation programs, and environment remediation. If the refiner cannot obtain letters of credit and surety bonds from third-party financial institutions, it typically must provide cash collateral, thereby reducing its unrestricted cash position.
91. Cash collateral requirements under hedging contracts are another potential use of liquidity. We assess refining companies' ability to meet such requirements. However, this matter is generally not problematic since refining companies often have committed credit facilities with borrowing bases that increase with rising crude oil prices, which is the scenario when cash collateral requirements typically arise.
92. In the case of refining companies, we are particularly skeptical about the extent to which the potential ability to sell facilities can be relied upon as a source of liquidity. Amid recent downturns, many refineries have been on the market, and actual transactions have taken place at mostly deeply distressed valuation levels. Also, sale transactions have generally taken extended periods to complete, in part due to the need for environmental inspections and regulatory approvals. (Note: We take a similarly cautious approach to the valuation of refining assets in our recovery analysis. See "Assumptions For Assigning Recovery Ratings To The Debt Of U.S. Oil Refining Companies," March 14, 2011.)

Related Criteria And Research

Industry reports:

- Natural Gas Price Assumptions For 2012 And 2013 Revised: 2014 Oil And Natural Gas Assumptions Added, Nov. 16, 2011
- Playing It Safe: The Importance Of Safety Measures To Corporate Credit Quality, Aug. 23, 2011
- Strong Margins For U.S. Refiners Are Unlikely To Last, March 24, 2011
- Assumptions For Assigning Recovery Ratings To The Debt of U.S. Oil Refining Companies, March 14, 2011
- California Set To Launch Ambitious Cap And Trade System As Federal Efforts On Pollution Control Falter, Jan. 13, 2011
- Standard & Poor's Updates U.S. And European Refining Margin Assumptions, Reflecting A Weaker Market Outlook, Feb. 4, 2008
- For U.S. Oil Refiner Ratings, 'Crack Spread' And Differential Assumptions Are Crucial, Feb. 13, 2007
- European Refining Business Risks: What Drives Cycles and Profits?, Oct. 16, 2006
- Keys To Success For U.S. Oil And Gas Refiners And Marketers, Oct. 5, 2004

General criteria:

- Methodology And Assumptions: Liquidity Descriptors For Global Corporate Issuers, Sept. 28, 2011
- Principles Of Credit Ratings, Feb.16, 2011
- Criteria Methodology: Business Risk/Financial Risk Matrix Expanded, May 27, 2009
- 2008 Corporate Ratings Criteria: Analytical Methodology, April 15, 2008

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