

***Additional Comments On  
Mineral Management Service's  
Notice of Proposed Rulemaking (NOPR)  
Establishing Oil Value for Royalty Due  
on Federal Leases***

***By Samuel A. Van Vactor  
A Report Prepared for Texaco Inc.***

## ***I. Introduction***

This supplemental report is submitted in response to comments made by the City of Long Beach and the California State Controller's Office on the proposed rules of the MMS for the valuation of crude oil. These comments are directed toward the use of ANS prices as an index with which to value California crude oils and the quality and location adjustments necessary to make such comparisons meaningful.

## ***II. Comparing Different Crude Oils***

Relative crude oil prices are determined by differences in location and quality, but the precise pattern cannot be captured by a simple formula. There are many reasons for this. Petroleum product prices are constantly in flux which change the relative refining values of the raw material. In addition, transport options constantly change; crude oil fields are depleted, pipelines rerouted, storage tanks modified, competing refineries closed and opened, etc. Refineries are not, of course, homogenous; each optimize output by running a different group of crude oils, the combination of which varies with market circumstances. As product prices and transportation options change each refinery responds to the new set of incentives in different ways.

Although a full accounting of all the market forces that impact relative crude oil prices can never be known, the petroleum industry has devised a series of measurements, standards and pricing conventions for most crude oils. The most important standard of measurement is API gravity.

API gravity measures the density of the crude oil. As a general rule, the denser (heavier) the crude oil the lower its value. This is because the less dense (lighter) ends of crude oil derived from simple distillation — naphtha, kerosene and middle distillates — are the most valuable. Also, sulfur tends to bind to heavier molecules, which means that heavy crude oils and products tend to have higher concentrations of sulfur and the resulting environmental penalties lower their value.

API gravity is often used to estimate crude oil values because it is an inexpensive proxy for crude oil quality. It is, however, only a proxy. To be precise about quality, far more detailed assays must be conducted. Such assays measure percentages of various product "cuts", sulfur and metals contents, and a variety of other chemical properties that are important to refiners. Often two crude oil fields have identical API gravities, but are different in many of their quality characteristics. Table 1 demonstrates such differences. [Table 1 to follow.]

The chemical properties of a pool within a crude oil field do not usually change over time. Thus, if a refiner knows the field from which the crude oil was produced and its API gravity, details on its quality can be inferred from previous assays. But, the refiner has to know the source of the crude oil in order to use API gravity to predict its precise quality.

Gravity and sulfur banks are often used on pipelines to calculate quality differences for shippers that deliver and receive slightly different crude oil

streams. If crude oils from adjacent fields are commingled there will likely be some variation in quality. Generally, shippers can expect random variations to wash out over time. Most commingled crude oil lines, such as Line 63 in California, serve a predictable set of crude oil fields and the qualities of the oils on the line are well known. (Commingled crude oil from Line 63 has, in fact, often been assayed so its properties are well understood by the industry.)

Gravity price differentials, such as those published with California crude oil postings or used in gravity banks on specific pipelines, are reasonably reliable estimates of value differences between two lots of crude oil within a field or on a commingled pipeline for which they are published. They should never be used to estimate value differences between wholly separate crude oils, particularly when they are from different petroleum provinces. This is the fundamental error in the analysis and comments provided by the City of Long Beach and State of California.

### ***III. ANS Crude Oil Is Of Higher Quality Than California Crude Oil Of Similar API Gravity***

Through most of the 1980s the API gravity of Alaska North Slope (ANS) crude oil was around 27°, with a sulfur content of slightly over 1%. On a world scale ANS is considered a medium quality sour crude oil. In many respects it has refinery qualities similar to Persian Gulf sour crude oils. ANS is favored by many refiners because it produces high quality motor diesel and heating oil. In any case, ANS is a high-volume crude oil readily available to U.S. refiners at tidewater, which frequently reduces handling and storage expenses.

In the last decade the API gravity of ANS has increased. The production of medium gravity Prudhoe Bay and Kuparuk crude oil has declined. New fields of lighter oils, such as Point McIntyre, have come on stream. Two natural gas liquids processing plants have been constructed. The average gravity of ANS is now about 30° and obviously commands a higher price for this reason.

California crude oils are delivered by pipeline, usually as part of commingled stream. Refinery properties are less predictable and delivered volumes much smaller than ANS which increase a refiner's transactions cost. California crude oils also have unique refining qualities; in particular they contain a number of heavy metals and other impurities which cause corrosion and other refinery difficulties.

For these and other possible reasons, ANS has consistently sold for higher prices than California crude oils of similar or identical gravity. This observation holds whether comparing either spot or term prices<sup>1</sup>

Crude oil from Line 63, which is a blend of California crude oils from the San Joaquin Valley, is often sold on the spot market in Los Angeles. These oils have an average gravity of 28° and the point of sale is within a few miles of the Los Angeles Basin's largest refineries or the ports when ANS is off loaded. There are a variety of crude-oil pipelines to move either crude oil and many of them are

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<sup>1</sup>The California State Comptroller's Office argues that spot price assessments for California crude oils are as unreliable as postings. Why ANS spot prices, collected by the same news organizations, are reliable is not adequately explained.

common carriers.

Telerate (Dow Jones), Reuters, and Platts all report daily spot prices for Line 63 (although the number of spot sales in recent years has dropped.) Price data are available from November, 1984 through the present. Despite the fact that Line 63 averaged approximately one degree higher than ANS from 1984 through 1987 its spot prices were almost always lower.<sup>2</sup> Table 2 provides annual averages of Line 63 and ANS spot prices during this period.

The City of Long Beach and the State of California recommend that the MMS determine the royalty obligation for California crude oils using ANS spot prices as an index, without making any adjustment for the obvious quality differences. (Indeed, they seem unaware of the increase in the API gravity of ANS and this leads to a further set of false conclusions. ) Such a methodology is bound to overstate the netback value of California crude oils in the field and would be an unreasonable burden on lease holders.

***IV. Assertions Made by the City of Long Beach and State of California Cannot Be Demonstrated***

Comments filed by James N. McCabe, Deputy City Attorney for the City of Long Beach on May 27, 1993 noted:

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<sup>2</sup>Since 1988 ANS spot prices have increased relative to Line 63 spot prices. This increase is due mainly to the increase in ANS API gravity.

"Yet from the early 1980's through the present, the market price of ANS on the West Coast has been significantly higher than posted prices of similar California crudes (adjusted for location) such as Ventura, Signal Hill and Buena Vista [see Graph B, attached]."

Table 3 compares annual average ANS prices to posted prices of Buena Vista plus the pipeline tariff to move it to Hynes station in central Los Angeles. (Line 63 is a common carrier and rates are set by the California PUC.) Buena Vista prices are adjusted by adding 47¢ as a location and quality correction (from Table 2) and an additional gravity adjustment is made for periods in which ANS exceeds 27°. This price series is then compared to ANS West Coast spot prices. On average through the period ANS received an 6¢ per barrel premium. This very small difference is easily explained by gathering and other handling costs and the likely risk aversion by lessors. The results are also compared in Figure 1 (which can be contrasted to Graph B of the City of Long Beach's comments).

#### ***V. Kern Rivers Spot Prices***

As we have seen when market-based location and quality adjustments are made, similar crude oils in the same market sell for similar prices. Most California crude oil is, however, heavy and quite different from ANS. On shore it must be transported by tanker truck, heated pipeline, train, blending or some combination. Transportation is costly and complex. This makes reliable comparison between heavy crude-oil field prices and delivered ANS prices difficult if not impossible to calculate. Since most federal royalty oil is heavy and remote from refinery centers such valuations are bound to be vexing for all

parties.

In this regard, the comments by the California State Comptroller's Office are quite illuminating. Their analysis "...revealed that from January 1985 to August 1996, the average monthly difference between Kern River spot prices, based on information from both Platts and Telerate, and the comparable posted price was 4 cents." The California State Comptroller's Office rejected the use of either posted prices or spot prices for valuing California crude oils. They rejected this price information despite the fact that either are precise measures of fair market value of comparable crude oils at the lease<sup>3</sup>; despite the fact that such prices can be confirmed (or denied) by audit; and despite the fact that spot prices are gathered by the same third parties, who they would rely on for discovering ANS prices.

## ***VI. Conclusion***

The comments filed by the City of Long Beach and the California State Comptroller's Office are revealing and misleading at the same time. They rejected direct measures of market value and instead proposed a formula based on an ANS index price. They recommended that the formula not be grounded on market-based location and quality differences. Instead, they argue that it should

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<sup>3</sup>Spot and term prices usually have similar averages, but may be quite different at any particular point in time. This reflects the fact that they often represent separate markets. When gross proceeds are unknown (due to internal transfers or other reasons), royalties could be tied to either spot or term prices, but the two should not be mixed.

be determined by a regulatory process.

Contrary to the claim made by the City of Long Beach and State of California, when actual market data are collected and correctly interpreted they reveal that posted prices and spot prices of California crude oils are closely linked and entirely consistent. California crude-oil royalties have not been undervalued. There are three main reasons why the City of Long Beach and the California State Comptroller's Office reach a contrary conclusion:

1. They failed to recognize that ANS is superior in quality to California crude oils of comparable API gravity and thus commands a price premium in the market place.
2. They failed to make adequate or market-based adjustments for transportation. ANS is a delivered price and cannot be directly compared to California crude oil field prices.
3. They failed to acknowledge that ANS has been increasing in gravity; instead they did a price comparison on the basis of 27°, when the crude oil is now 3° lighter.