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August 26, 2013

Dr. Steve Cliff
Assistant Division Chief
Stationary Source Division
California Air Resources Board
1001 I Street, Sacramento CA 95814

Subject: Phillips 66 Comments regarding the August 13, 2013 CARB Workshop on Refineries and Related Industries

Dear Dr. Cliff:

Phillips 66 appreciates the opportunity to comment on issues relating to petroleum refinery benchmarking and proposed related potential modifications to California's Cap and Trade Program as outlined at the August 13, 2013 workshop in Sacramento. We are a regulated party through ownership of multiple refineries, hydrogen plants and a coke calciner in California. We support several of the proposals, but have specific concerns over others. Our concerns are outlined in this letter, but we are always open to coming in to discuss with CARB and explaining our positions in more detail as necessary to resolve these remaining issues.

1) Phillips 66 supports the adoption of the CWB methodology for refinery allocation. Using the CWB methodology has a variety of cost and accuracy benefits over the current regulation's use of CWT. CARB should adopt a CWB methodology moving forward.

2) Phillips 66 supports the inclusion of CWB factors for "Off-site and Non-Energy Utilities" and "Non-Crude Sensible Heat". These factors recognize real refinery energy use in areas outside of the core processing units and therefore cannot be excluded without reducing the accuracy of the methodology. The final CWB methodology should include these factors.

3) Phillips 66 generally opposes any further grouping of processes under the CWB. Grouping very different operations together may be inappropriate and lead to unintended consequences. Staff commented that further grouping would incent refiners to shift from a higher-carbon technology to a lower-carbon technology. Phillips 66 does not believe this to be realistic. CARB should not group additional CWB factors as suggested.

4) Phillips 66 supports the staff proposal of establishing a separate coke calcining benchmark. Calcining in California is done in locations separate from refinery operations; therefore it is more appropriate to address these facilities with a distinct product-based benchmark. CARB should retain the staff proposal.

5) Phillips 66 supports the staff proposal to reassign coke calciners into the list of industrial operations with greater than 50% process emissions in Table 9-2. We have supplied verified data which confirms our coke calcining process emissions are greater than 50%. CARB should retain the staff proposal.

6) Phillips 66 strongly opposes any proposed change to the First Compliance Period's (CP1) allocation methodology, including amendments to the true-up formula. For CP1, the allocation formula for refineries was adopted as a package set of complementary policies (allocation and true-up) in October 2011 after months of technical work and public process. Undoing that effort during the current compliance period is a significant and potentially catastrophic regulatory change. Such a change would negate the implementation of current business and market plans of our company through a retroactive change in regulatory policy. CARB should not amend sections 95981(d).

7) Phillips strongly opposes the application of "One Product – One Benchmark" for the petroleum refining sector. CARB staff has continually pushed this policy position without supplying stakeholders any supporting data that such a policy doesn't introduce permanent competitive disadvantages in the sector. CARB should establish multiple refinery benchmarks such that similar classes of facilities are compared for potential energy efficiency improvement purposes.

8) Phillips 66 is closely monitoring how regulations are developing to ensure equity for refineries as consumers of electricity. In the final CPUC Staff Proposal on GHG Allowance Revenue Allocation Methodologies for EITE Entities and Small Businesses dated July 10, 2013, CPUC Staff recognizes the potential windfall for refineries purchasing power from third-party CHP relative to CHP self-generation (Page 52 – 53 of the Proposal). Any "value", whether in the form of allowances or financial rebate, whether from CARB or CPUC, must be provided equitably to all consumers of electricity. Phillips 66 recommends that CARB ensure this equity, even if it requires supplemental regulation.

9) Phillips 66 recommends CARB recognize that assumed Fuel Gas Quality in CWB has a material effect on the establishment of CWB benchmark(s). CARB noted that CWB standard factors constructed for California's Cap-and-Trade program made the simplifying assumption that pipeline-quality natural gas is the consumed fuel in most combustion processes. In actual operations, this is not true. Most heaters use a mix of refinery-produced fuel gas with higher carbon content and natural gas. The result is that the CWB methodology under-predicts standard greenhouse gas emissions. This is an important distinction as CARB considers

assigning benchmark(s). We recommend that CARB recognize this inconsistency in comparing actual reported emissions with CWB-predicted emissions.

Comments number six and seven above are very significant to Phillips 66 and also to the credibility of the Cap and Trade Program. It is for that reason that we go into further detail about these issues below.

Comment #6 Details-First Compliance Period True-Up

Phillips 66 strongly opposes any proposed change to industrial assistance allocation, including true-up, for First Compliance Period (CP1). This methodology was adopted as a package set of complementary policies (allocation and true-up). Staff's proposal to undo all that work and agreement is against free market principles. This violates the good faith efforts of the stakeholders that worked on the original package of rules. ***Phillips 66 is opposed to such a change as it would negate the implementation of the current business and market plans of our company through a retroactive change in regulatory policy.*** Stated another way, Phillips 66's auction participation would have been different in the first set of auctions had this proposal been finalized. That is not how markets should operate.

This proposal surprised us when we reviewed the Discussion Draft. At no point prior to its release was there a discussion of amending this section. In fact it was clear when Resolution 11-32[1] was adopted that CARB staff was only directed to revisit the refinery allocation methodology moving forward, i.e. for CP2 and CP3.

The First Compliance Period Refinery Allocation Methodology located in Sections 95891(b) and (d), took a long time to work through and is very complex. Phillips 66 was a party to those long negotiations through the Western States Petroleum Association. In the end, the final allocation methodology did not reflect equitably on all EII refiners, but was agreed upon in principle partially due to the bounding conditions associated with the true up credit/debit provisions. These are the exact tempering provisions that are now proposed to be eliminated. These provisions are not severable from the allocation formula, and any attempt to disconnect them would be retroactive rulemaking.

In addition, from a technical perspective we have serious concerns as to how the revised true up would mathematically work. These concerns center on the revised calculation over "$DF_{y,t}$" and "F_t" which are connected to the allocations given to the under term "$A_{x,t}$". In essence, our allocation or "share" of the refinery sector pie (which may or may not be adjusted) would be impacted by factors that have nothing to do with our performance or product output. This type of calculation makes it virtually impossible to predict our allocations in advance and plan accordingly; likewise significant changes could negate *previous* auction strategy.

For the above reasons, Phillips 66 recommends that the First Compliance Period refinery allocation and true up provisions not be amended.

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[1] http://www.arb.ca.gov/regact/2010/capandtrade10/res11-32.pdf, pg. 11 second "be it further resolved"

Comment #7 Details-Establishment of Benchmark Values(s)

As was discovered during the almost two years of work that preceded the original Cap and Trade regulatory adoption, benchmarking all of California's refineries against each with a single benchmark proved too great a task. The compromise solution recognized that more than one benchmark was a workable solution.

Phillips 66 supports the use of a single benchmarking methodology, the CWB. But we do not support the use of a single benchmark value against which all refineries will be compared.

During CARB's August 13, 2013 workshop, it was clear that there was a disconnect on this topic. Staff was promoting a "one size fits all" approach, provided the data did not show a need for additional benchmark values, but concurrently both Solomon Associates and Ecofys were describing the limitations of the CWB/CWT methodology. This was clear even as Ecofys and Solomon diverged in their approach to benchmarking.

Solomon Associates has proprietary data from all major oil companies and can anticipate how the design of a program will impact individual companies on a competitive and energy efficiency basis. Alternatively, Ecofys was approaching this issue at a 50,000 foot macro-economic level when asked questions. This approach is flawed because benchmarking then becomes a financial competitive issue rather than an energy efficiency benchmark. This is a key difference as refineries aim to become the best that they can be compared to their peers of the same size and complexity. Without careful attention paid to refinery size, complexity and configuration, establishment of a single benchmark value will become an exercise in rewarding the large refineries for doing nothing and seeking most reductions out of the small refineries.

The consequence of adopting a single product benchmark on the refining sector could be devastating to the economy and result in one of the first real life examples of large-scale leakage in the Cap and Trade program. Some California refineries could be forced to shut down due to unequal regulation GHG compliance costs between large and smaller or otherwise uniquely-configured refineries.

This issue has been outstanding since 2011, when the Board directed staff on October 20, 2011 to review inequities between in-state refining in Resolution 11-32 to "continue to review information concerning.....in-State competition of industries in California.....including refineries..." in refinery allocation. CARB cannot simply ignore this issue as it has not been vetted, nor has adequate analysis been conducted to ignore the Solomon size categories utilized in data-supported industry benchmarking.

Phillips 66 requests that CARB demonstrate how any proposed refining sector benchmark(s) comports with the industry standard of using peer size categories. CARB should demonstrate how it has considered the effects of a single benchmark and the extent to which it would discriminate against

smaller or otherwise atypical facilities that have no ability to reach the economies of scale that large facilities may reach.

CARB should pay particular attention to Solomon's response to Ecofys' questions dated August 7, 2013. Solomon demonstrated that the largest U.S. refineries (first quartile), as measured by Solomon's size and complexity metric (EDC), on average emit 11% less CO_2e per CWB than smaller refineries (fourth quartile). Solomon also directly commented at the workshop that smaller refineries have fewer opportunities for heat integration and that refineries with multiple sites due to legacy siting issues have energy disadvantages that cannot be overcome. Setting a single benchmark effectively sets an impossible standard for certain size refineries to meet.

Phillips 66 has also previously shared confidential information with CARB, prepared by Solomon that included a plot of U.S. refinery energy efficiency versus refinery size and complexity. This data shows an average energy efficiency difference of 20-30% between the largest and smallest refinery groups by size and complexity.

This situation is unique in that stakeholders cannot produce the data needed to prove our assertion; instead CARB has the only large grouping of data.

> **Benchmarking Recommendation #1**: Establish distinct benchmarks within the refinery sector based on similarity of size, configuration and complexity. As an example, data could show that implementation of three distinct benchmarks is appropriate. These conceptually would be for smaller, mid-size and larger refineries. CARB may see other efficiency breakpoints in data submitted by companies.
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> **Benchmarking Recommendation #2:** When establishing the individual CWB-based benchmark values for groups of refineries, CARB should use an appropriate statistical method of trimming the mean to ensure outliers do not artificially skew the benchmarks. Using a one-tailed mean test at 95% confidence level is an example of one such statistical method.

In conclusion, Phillips 66 supports a timely release of proposed benchmark(s) values, including back up data and documentation so that a thorough analysis can be done without unreasonable deadlines. It is necessary for covered entities to understand and digest how these potential changes will impact our business and industry before the Board votes.

The burden is on CARB to demonstrate that the industry practice of benchmarking like-against-like for energy efficiency is inferior to a single financially-based competitive benchmark. We do not believe there is data supporting the theory that "One Product – One Benchmark is appropriate for the refining sector.

Phillips 66 operates the following five facilities in California that are subject to this regulation:

- Los Angeles Refinery – Carson Plant
- Los Angeles Refinery – Wilmington Plant
- Santa Maria Refinery
- Rodeo Refinery
- Contra Costa Carbon Plant (coke calciner)

We look forward to further discussion with the Board on these very important issues as they are more formally proposed. But as was previously stated, CARB is again facing severe and short deadlines as we try and resolve these very complex issues. Phillips 66 is committed to getting this resolved, but not at the expense of getting it correct.

Sincerely,

Chris Chandler
Refinery Manager

ATTACHMENTS - APPENDIX A-Additional Background

cc: Mary Nichols
CARB Board Members
Virgil Welch
Richard Corey
Edie Chang
Elizabeth Scheele
Eileen Hlavka

APPENDIX A-Additional Background

1. Factors in Refinery Greenhouse Gas Efficiency

California's refineries were built decades ago and their relative size and configurations are now structurally static and can contain regulatory barriers or be unreasonably cost-prohibitive to modify. Legacy refineries are like small cities and must be considered as such when staff develops and then establishes revised refinery benchmarking values. The correct concept of a benchmark is to compare the operations of like facilities such that they are encouraged to invest in increased energy efficiency. We believe that size, configuration and complexity are important distinguishing characteristics that can be recognized when establishing such a critical component of this program. The benchmark(s) need to compare refineries as groups so that their ability to improve on-site energy efficiency is independent of their ability to economically compete against larger or smaller in-state refiners. We understand the reasons for wanting a single benchmark, but this desire for reporting and calculation simplicity does not override the previous concerns about the diversity of the refining industry. Therefore, one methodology (CWB) with multiple benchmarks is the only workable solution.

The presentation by Solomon Associates at the CARB's August 13, 2013 workshop provided important context in establishing a refinery efficiency benchmark. In the presentation and in the ensuing question and answer session, Solomon's Bill Trout and Celia He stated that indeed the CWB model is robust across a wide range of refinery sizes in energy demand of process units (e.g. atmospheric crude distillation). However Solomon elaborated further that size and configuration do matter in their summarized testimony below show:

- **Efficiency comparisons.** Solomon commented on their presentation slide #3 how they employ a "practical focus" and report on refinery performance to member companies in two ways: "competitive" and "efficiency" basis. The first is a straight competitive assessment. The second quantifies for that specific refinery how to "be the best they can be" and "how well they are operating the facility with what they have". This efficiency-based analysis recognizes that no two refineries are alike, nor can they all be expected to achieve comparable energy efficiency. For many comparisons, specific attributes such as refinery size, complexity, configurations, fuel gas quality, etc. are considered and normalized to allow for "better comparisons" and "apples versus apples".
- **Size can matter**. Solomon commented that smaller and simpler refineries have fewer process streams at the site so therefore have more limited opportunities for "heat integration", which is the sharing of excess heat from one unit or part of a refinery to another. An example would be the sharing of excess generated heat from an exothermic process reaction (e.g. hydrotreating) with an endothermic process reaction (naphtha reforming). Heat integration can be via shell-and-tube heat exchangers,

sharing of generated steam and produced electricity, air preheat to heaters, and other means.

- **Equipment/space can matter.** Solomon provided the example of how smaller refineries may have heaters with excellent combustion efficiency but don't have adequate space in the combustion convection (pre-stack) section to allow the installation of tubes for waste-heat steam generation.
- **Structural constraints matter**. Solomon provided the example of how refineries with multiple sites require additional infrastructure that requires energy. Examples include duplicate boilers, heated tankage, water treatment, truck and rail operations, warehouse and maintenance buildings, etc.

2. U.S. EPA Energy Star Recognizes Size Classes

U.S. EPA established an "Energy Star" award for refineries in 2006. EPA recognizes refinery size when it issues the award to refineries with strong energy efficiency performance for a given year. The criteria for the award is ranking in the top 25% of performers, as measured by Solomon EII, in its size class. Size classes are based on crude capacity (in thousand barrels per day):

<50
51-75
76-100
101-150
151-200
201-250
250+

3. Legacy Issues in Refinery Greenhouse Gas Efficiency

In addition to the factors mentioned above, there may be highly significant legacy configuration issues. Phillips 66 California refineries have unique configurations owing to the history of the industry that created them. These configurations cannot be changed, but are remnants of earlier actions to be as energy efficient as possible with the infrastructure that was in place:

- **Refinery purpose and location can impact efficiency.** The Phillips 66 Santa Maria refinery was built in the central coast area of California for the sole reason of pre-processing the local heavy onshore (and later offshore) crude oils that would otherwise require continuous heating in transfer pipelines to travel the 150-200 miles to other refineries for further processing. In essence, the two stage operation is itself an energy efficiency measure.

The Santa Maria refinery, with an approximate crude capacity of 40,000 barrels of crude per day, instead fractionates the crude with further bottoms processing in delayed cokers to produce two lighter intermediate products that can be moved without pipeline heating to the Phillips 66 Rodeo refinery in the San Francisco area. The refinery contains two parallel 20,000 barrels per day crude/coker trains to ensure that one train is always available to accept production from the offshore and onshore fields. These are legacy issues that cannot be economically changed.

- **Refinery acquisitions and sales can impact efficiency.** Shell Refining in the early 1990's was planning to close its Los Angeles Refinery. Instead, Unocal purchased the most efficient sections of Shell's refinery (Carson portion) and Shell proceeded to close the other inefficient sections of that refinery. Today, these two refineries located five miles apart (Phillips 66 Los Angeles-Carson refinery and Phillips 66 Los Angeles-Wilmington refinery) work in tandem. Both operations in tandem are more efficient than their historic operations, but there are still significant reprocessing requirements between the two refineries. Also, heat integration opportunities are significantly reduced and their utilities cannot be shared. This is a legacy configuration issue. Again, the operation of these facilities together is an efficiency measure, but it is theoretically impossible for a two-site operation to be as efficient as a single-site operation. These are legacy issues that cannot be economically changed.