Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Telephone (610) 481-4911

March 7, 2014

Ms. Mary Nichols – Chair, California Air Resources Board
1001 I Street
PO Box 2815
Sacramento, CA 95812

RE: Comments Regarding *Proposed Amendments fro Refineries and Related Industries* (Released 26 February 2014) - Submitted electronically to the "REFINERYBENCHMARK-WS" docket via http://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=refinerybenchmark-ws&comm_period=1).

Dear Ms. Nichols:

Air Products is a global, Fortune 250 company that supplies atmospheric, process, medical and specialty gases, specialty chemicals and process equipment serving a diverse range of industries, including primary metals, refining, electronics, food and glass sectors, as well as healthcare and many other general manufacturing industries. Air Products has over 400 employees and 30 locations in California, including numerous atmospheric gases (oxygen/nitrogen/argon) and hydrogen production facilities, electronic specialty gases and materials production and electricity generating facilities. In addition, Air Products serves a fleet of hydrogen fueling stations across the state, facilitating the transition to carbon-free transportation.

Air Products welcomes the opportunity to submit comments regarding the proposed amendments to the cap & trade program's benchmarks for refineries and related industries, particularly hydrogen production, since we are the largest merchant hydrogen producer in California. Over the course of the last several years, Air Products has worked very constructively with ARB staff and are pleased that most of our concerns with earlier approaches have now been addressed in this latest proposal. I hope the remaining, relatively small, adjustment we seek can also be accommodated. We look forward to a continued working partnership with ARB staff to ensure an effective implementation of these aspects of the cap & trade program.

SUMMARY COMMENTS:

1. ***Proposed refinery and hydrogen benchmarks are highly consistent with ARB cap & trade principles***
    a. ***One Product – One Benchmark***
    b. ***Consistent stringency with other product-based benchmarks***

2. ***Data exclusion, necessitated by problematic voluntary data, results in an understatement of the hydrogen benchmark – which can be corrected with reasonable assumptions and available data.***

3. ***Corrected hydrogen benchmark should also be retroactively applied to Compliance Years 2013 and 2014***

<u>DETAILED DISCUSSION of COMMENTS:</u>

1. ***Proposed refinery and hydrogen benchmarks are highly consistent with ARB cap & trade principles*** – Air Products strongly endorses the underlying principles of "One Product – One Benchmark," consistent benchmark stringency, and deriving benchmarks from data representative of the entire population of affected facilities. In this regard, Air Products supports ARB's commitment demonstrated in this latest proposal to the singular product benchmark and consistent stringency; and reserves minor concerns regarding the representativeness of the data set used to derive the hydrogen benchmark, as discussed.

   The proposal maintains the principle of defining a single benchmark value for each distinct product – regardless of the many variations in practice (process, feedstock, facility ownership, etc.). Further, the proposal restores consistency of applying consistent stringency in setting the benchmarks for all sectors/products eligible for industrial assistance. The proposed benchmark value is based upon "90% of sector average or best in class, whichever is greater," for both the refineries and the related industries, specifically hydrogen. This principle, when combined with the "One Product – One Benchmark" principle discussed above, ensures equitable treatment of all covered sectors in the state.

   Air Products also acknowledges ARBs attempt to significantly expand the emission and production data set for deriving the hydrogen benchmark to include both refinery-produced hydrogen and industrial gas company, or "merchant"-produced hydrogen. Air Products minor remaining concern is in addressing the exclusion of a small portion of the refinery hydrogen data, described by ARB as "problematic," and, as discussed below, offers a minor adjustment to the benchmark value as a proposed remedy.

2. ***Data exclusions, necessitated by problematic voluntary data, results in an understatement of the hydrogen benchmark – which can be corrected with reasonable assumptions and available data*** – Air Products recognizes that MRR data for hydrogen production by refineries is insufficient to provide the complete dataset needed to derive a benchmark representative of all hydrogen production and commends ARB efforts to obtain the necessary refinery data through a voluntary survey conducted in 2013 with ARB follow-up clarifications in early 2014. The current proposal acknowledges that "A small number of facilities [*refineries*] had problems with hydrogen production emissions data reported in the voluntary survey, and both production and emissions data from these facilities were excluded from the calculation. While Air Products recognizes the exclusion of what ARB has termed "problematic" data is a practical and expedient

approach, we believe this data exclusion introduces a negative bias in the benchmark derivation.

ARB states in the proposal that refinery hydrogen production is “less emission efficient than the merchant hydrogen producers,” a conclusion clearly illustrated by the aggregated data shown in the benchmark calculation. Therefore, exclusion of a portion of the production from the least efficient subset of all producers creates a bias which depresses the true benchmark value.

Air Products proposes that the effect of this data exclusion can be corrected by using available refinery hydrogen production data to estimate the GHG emissions properly attributed to its production. Such an adjustment is straightforward and only assumes the emission efficiency of the “excluded” refinery hydrogen production is consistent with that portion of “included” refinery hydrogen production, where both hydrogen production and emission data is available – a reasonable assumption which eliminates the bias in the current proposed benchmark value derivation.

The approach Air Products recommends for correcting for the bias introduced by excluding the “problematic” refinery hydrogen data follows:

The hydrogen benchmark derivation was represented in the ARB proposal as:

$$b_{hydrogen} = 0.9 \text{ X } \frac{\sum_{\text{merchant \& refinery}} (GHG_{2008}) + \sum_{\text{merchant \& refinery}} (GHG_{2010})}{\sum_{\text{merchant \& refinery}} (Hydrogen_{2008}) + \sum_{\text{merchant \& refinery}} (Hydrogen_{2010})}$$

Which can also be represented as:

$$b_{hydrogen} = 0.9 \text{ X } \frac{\sum_{\text{refinery}} (GHG_{2008} + GHG_{2010}) + \sum_{\text{merchant}} (GHG_{2008} + GHG_{2010})}{\sum_{\text{refinery}} (Hydrogen_{2008} + Hydrogen_{2010}) + \sum_{\text{merchant}} (Hydrogen_{2008} + Hydrogen_{2010})}$$

A "prorating factor" (PF) can be derived from the knowledge of the proportion of refinery hydrogen data excluded due to missing refinery hydrogen emission data as:

$$PF_{refinery} = \frac{\sum_{\text{refinery}} (Hydrogen_{2008} + Hydrogen_{2010})_{\ Total\ Hydrogen\ Production}}{\sum_{\text{refinery}} (Hydrogen_{2008} + Hydrogen_{2010})_{\ Included\ Hydrogen\ Production}}$$

Where:

$\sum_{\text{refinery}} (\text{Hydrogen}_{2008} + \text{Hydrogen}_{2010})_{\text{ Total Hydrogen Production}}$ is the total refinery hydrogen production in 2008 and 2010, both the amount used in the derivation of the proposed benchmark and the production excluded due to emission data problems (ARB notes in the proposal that such data is available, as it was used in the derivation of the refinery CWB benchmark – see page 5 of the proposal);

and,

$\sum_{\text{refinery}} (\text{Hydrogen}_{2008} + \text{Hydrogen}_{2010})_{\text{ Included Hydrogen Production}}$ is the refinery hydrogen production in 2008 and 2010 from refineries that had both valid production and emission data (i.e. excludes the "excluded" data, consistent with the basis of the currently proposed benchmark).

Then refinery hydrogen emissions can scaled-up as:

$$\sum_{\text{refinery}} (GHG_{2008} + GHG_{2010})_{Total\ Hydrogen\ Production} = \text{PF X } \frac{\sum_{\text{refinery}} (GHG_{2008} + GHG_{2010})}{}$$

$$\sum_{\text{refinery}} (GHG_{2008} + GHG_{2010})_{Total\ Hydrogen\ Production}$$

$$= \text{PF} \ \text{ X } \sum_{\text{refinery}} (GHG_{2008} + GHG_{2010})_{\ Included\ Hydrogen\ Production}$$

Where:

$\sum_{\text{refinery}} (\text{GHG}_{2008} + \text{GHG}_{2010})_{\text{ Included Hydrogen Production}}$ is the refinery hydrogen production emissions in 2008 and 2010 from refineries that had both valid production and emission data (i.e. excludes the "excluded" data, consistent with the basis of the currently proposed benchmark).

Then:

$$b_{hydrogen} = 0.9 \text{ X } \frac{\sum_{\text{refinery}} (GHG_{2008} + GHG_{2010})_{\,Total\ Hydrogen\ Production} + \sum_{\text{merchant}} (GHG_{2008} + GHG_{2010})}{\sum_{\text{refinery}} (Hydrogen_{2008} + Hydrogen_{2010})_{\,Total\ Hydrogen\ Production} + \sum_{\text{merchant}} (Hydrogen_{2008} + Hydrogen_{2010})}$$

3. ***Corrected hydrogen benchmark should also be retroactively applied to Compliance Years 2013 and 2014*** – Air Products has previously commented during the rulemaking process that the stringency applied to the EU ETS benchmark employed by ARB for the First Compliance Period was inconsistent with the stringency ARB applied to all other product-based benchmarks - representing approximately 80% of the industry average rather than the 90% stringency ARB has used otherwise. As such, Air Products has had conversations with ARB management seeking recognition that when ARB completed its "California-specific" hydrogen benchmark development, it would apply that value retroactively to the allowance allocations for compliance years 2013 and 2014. As the new benchmark proposal represents an approximately 1% increase in the benchmark value, this would be a significant correction to the allocations made in November of 2012 and October 2013. ARB has all the necessary production data and could make this adjustment through the normal allowance "true-up" process that begins in October 2014.

We stand ready to provide further support to CARB staff in this reconsideration of the refinery and hydrogen benchmark methodologies under the cap and trade program. If you have any questions or need additional information to support Air Products position on these matters, please contact me by phone (610-909-7313) or email adamskb@airproducts.com).

Respectfully,

Keith Adams, P.E.

Keith Adams, P.E.
Environmental Manager – Climate Change Programs

c: Eric Guter, Patrick Murphy, Lee Miller, Peter Snyder, Stephen Crowley – Air Products
Stephen Cliff, Eileen Hlavka, Mark Sippola – California Air Resources Board