

**Energy Efficiency and Co-Benefits Assessment of Large Industrial Sources –
Refinery Sector Public Report – Errata Sheet**

State of California
AIR RESOURCES BOARD

**ERRATA SHEET
(August 7, 2013)**

**NOTICE OF ERRATA TO THE ENERGY EFFICIENCY AND CO-BENEFITS
ASSESSMENT OF LARGE INDUSTRIAL SOURCES – REFINERY SECTOR PUBLIC
REPORT ISSUED JUNE 6, 2013**

As of August 7, 2013, the following errata to the Energy Efficiency and Co-Benefits Assessment of Large Industrial Sources – Refinery Sector Public Report are corrected below.

- 1) Revised 2009 toxic air contaminant (TAC) emissions data were submitted by the Tesoro – Los Angeles refinery to South Coast Air Quality Management District staff after the submission of their Energy Efficiency Assessment report to the Air Resources Board (ARB). The original report table is shown below with the revised TAC emissions data for the facility provided to the right (in **bold** font) and the original data shown in ~~font~~.

Original Table with Revised Data:

Table II-36: Tesoro – Los Angeles 2009 Top Ten Prioritized Toxic Air Contaminant Emissions

| Toxic Air Contaminant* | 2009 Annual Emissions (pounds per year) |
|--|--|
| Polycyclic Aromatic Hydrocarbons (total) | 474 180 |
| Cadmium | 45 16 |
| Benzene | 2,240 2,892 |
| 1,3-Butadiene | 275 |
| Nickel | 142 |
| Arsenic | 10 |
| Formaldehyde | 5,174 14,852 |
| Beryllium | 3 |
| Lead | 28 |
| Perchloroethylene (Tetrachloroethene) | 46 38 |

* Listed in rank order based on mass times cancer potency

The revised TAC emissions data were reassessed for ranking according to potential concern using the reported emissions for each pollutant and their cancer potency factor. This modified the order of the top ten TACs shown in the table above. Additionally, it was determined that one TAC that was originally omitted from the table should be

included. The table, corrected for the revised emissions data, the omitted TAC, and the revised ranking, is shown below.

**Table Revised for Corrected Data and Ranking:
Table II-36: Tesoro – Los Angeles 2009 Top Ten Prioritized Toxic Air Contaminant Emissions**

| Toxic Air Contaminant* | 2009 Annual Emissions (pounds per year) |
|--|--|
| Polycyclic Aromatic Hydrocarbons (total) | 180 |
| Chromium, hexavalent (& compounds) | 1 |
| Formaldehyde | 14,852 |
| Benzene | 2,892 |
| Cadmium | 16 |
| 1,3-Butadiene | 275 |
| Nickel | 142 |
| Arsenic | 10 |
| Beryllium | 3 |
| Lead | 28 |

* Listed in rank order based on mass times cancer potency

2) The revisions shown in section 1) above modify the total mass emissions for the TACs listed in Table I-5 of the report, the top ten TACs for the entire refinery sector. The original report table is shown below with the revised TAC emissions data for the facility provided to the right (in **bold** font) and the original data shown in ~~strikethrough~~ font. Additionally, this revision shows that the ranking order of cadmium and formaldehyde has been changed due to the change in the total mass emissions. No other ranking order has been affected.

**Table Revised for Corrected Data and Ranking:
Table I-5: Refinery Toxic Air Contaminant Emissions (2009)**

| Toxic Air Contaminant* | Total mass emissions (pounds/year) |
|--|---------------------------------------|
| Chromium, hexavalent (& compounds) | 57 |
| Polycyclic Aromatic Hydrocarbons (total) | 2,589 2,595 |
| Benzene | 49,498 50,150 |
| Cadmium Formaldehyde | 173 126,922 |
| Formaldehyde Cadmium | 117,241 174 |
| 1,3-Butadiene | 3,413 |
| Nickel | 1,354 |
| Arsenic | 77 |
| Naphthalene | 3,422 |
| Diesel, particulate matter | 166 |

*Listed in rank order based on mass times cancer potency

3) A footnote, explaining that the total polycyclic aromatic hydrocarbons do not include components that are reported separately, is added to tables II-8, II-16, and II-20. The added reference mark and footnote are shown in **bold** font below.

Tables Revised for Additional Footnote

Table II-8: Chevron – El Segundo 2010 Top Ten Prioritized Toxic Air Contaminant Emissions

| Toxic Air Contaminant* | 2010 Annual Emissions (pounds per year) |
|---|---|
| Cadmium | 37 |
| Nickel | 195 |
| Polychlorinated Dibenzofurans | <1 |
| Benzene | 916 |
| Arsenic | 7 |
| Formaldehyde | 3,282 |
| Naphthalene | 360 |
| Polycyclic Aromatic Hydrocarbons (total) ** | 7 |
| 1,3-Butadiene | 37 |
| Beryllium | <1 |

* Listed in rank order based on mass times cancer potency

** **Without individual components that are reported separately**

Table II-16: Phillips 66 – Carson 2009 Prioritized Toxic Air Contaminant Emissions

| Toxic Air Contaminant* | 2009 Annual Emissions (pound per year) |
|---|--|
| Cadmium | 9 |
| Arsenic | 10 |
| Polycyclic Aromatic Hydrocarbons (total) ** | 17 |
| Benzene | 596 |
| Nickel | 61 |
| Naphthalene | 161 |
| Beryllium | 2 |
| Formaldehyde | 393 |
| Lead | 5 |

* Listed in rank order based on mass times cancer potency

** **Without individual components that are reported separately**

Table II-20: Phillips 66 – Wilmington 2009 Top Ten Prioritized Toxic Air Contaminant Emissions

| Toxic Air Contaminant* | 2009 Annual Emissions (pounds per year) |
|---|---|
| 1,3-Butadiene | 2,263 |
| Cadmium | 11 |
| Nickel | 123 |
| Arsenic | 8 |
| Benzene | 854 |
| Naphthalene | 553 |
| Formaldehyde | 2,876 |
| Polycyclic Aromatic Hydrocarbons (total) ** | 15 |
| Beryllium | 2 |
| Lead | 25 |

* Listed in rank order based on mass times cancer potency

** **Without individual components that are reported separately**

- 4) The 2009 annual emissions of arsenic for Tesoro – Martinez was reported as “< 15” pounds per year in Table II-40. That value is corrected to “< 1” pound per year. The revised table below shows the original value in ~~strikethrough~~ font and the corrected value in **bold** font.

Table Revised for Corrected Value:

Table II-40: Tesoro – Martinez 2009 Top Ten Prioritized Toxic Air Contaminant Emissions

| Toxic Air Contaminant* | 2009 Annual Emissions (pounds per year) |
|---|---|
| Polycyclic Aromatic Hydrocarbons (total) | 130 |
| Formaldehyde | 11,903 |
| Benzene | 1,131 |
| Diesel engine exhaust, particulate matter (Diesel PM) | 30 |
| Arsenic | <15 <1 |
| Cadmium | <1 |
| Acetaldehyde | 228 |
| Nickel | 2 |
| Ethylene dichloride (EDC) | 1 |
| Perchloroethylene | <1 |

* Listed in rank order based on mass times cancer potency