Important Notes about the CARB Pollution Mapping Tool
(Updated December 22, 2017)

The CARB pollution mapping tool presents criteria pollutant, toxic air contaminant, and greenhouse gas (GHG) emissions data for large facilities in the State. These data are collected through different emissions reporting programs, each designed to meet specific goals. As such, users of the tool must be aware of a few unique characteristics inherent to each reporting program, which are described in the various sections below.

I. Criteria Pollutant Emissions

Criteria pollutant emissions data are collected under various State and federal mandates that include the California Health and Safety Code, the California Clean Air Act of 1988, the Federal Clean Air Act Amendments of 1990, and the Federal Air Emission Reporting Rule (AERR). In California, the data is collected by thirty-five local air districts that subsequently report to CARB. Under federal regulations, facilities emitting 250 tons or more per year of a criteria pollutant are required to report emissions annually, and smaller facilities are required to report triennially; however, CARB has established a much lower annual threshold (10 tons per year) in our reporting guidelines Furthermore, local air districts have the flexibility to set their own reporting thresholds.

The tool includes emissions data for the years 2008 to 2015. This snapshot is consistent with the availability of GHG emissions data starting in 2008 under CARB's Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (MRR); however, it does not reflect the longer-term emission trends due to implementation of District stationary source regulations and permitting programs. In general, facility emissions exhibit year-to-year variations that are often inherent to the type of operations run at the facility, but other times can be caused by external factors not readily discernible from the emissions data. These may include:

- *Normal year-to-year variation*. It is normal for emissions from a facility to fluctuate from one year to the next, usually in response to production and demand cycles. As an example, natural gas-fired power plants may adjust their operations as a result of increased demand during warmer years (when the need for air conditioning increases) or decreased demand in wet years when more hydroelectric power is available.

- *Economic conditions and market fluctuations*. Many facilities exhibit emission trends that reflect fluctuations in the overall economy or in specific market sectors. For instance, the emissions for several cement manufacturing facilities indicate an increasing trend starting in 2008. This represents a return to normal operations after

the recession. An analysis of the emissions for a span of time going back several more years would show that criteria pollutant emissions have actually declined over time.

- *Expanded reporting requirements*. Oversight agencies (U.S. EPA, CARB, and local air districts) may periodically update the emission reporting requirements, which may result in an expansion of the types of emissions that facilities must report. One of the more recent updates was the U.S. EPA requirement for facilities that were not reporting condensible particulate matter (emissions that are released as a gas but condense into a semi-solid particle upon cooling) to start reporting it in 2011. The reporting of condensible PM caused an increase in PM, PM10, and PM2.5 reported emissions.

- *Enhanced capture of emission sources at facilities*. Similar to expanded reporting requirements, air districts may update the types of emission processes that are subject to reporting (for instance, by lowering the emissions threshold). This can result in an increase in reported emissions in the year in which the requirement first went into effect and subsequent years.

- *Methodology changes*. Local air districts may periodically revise the estimation methods used to calculate emissions from facilities to reflect new or improved emission factors. This may result in very significant changes in the emissions reported for a particular pollutant or group of pollutants starting in the year in which the change was implemented.

- *Facility mergers*. Occasionally, a company may buy the assets of an adjacent or nearby facility, and their operations (and emissions) are merged into a single facility for reporting purposes, sometimes retaining one of the original facilities' name and ID number. This may result in an increase in the reported emissions for one of the facilities starting in the year the merger took place (reported emissions for the other facilities would drop off to zero at the same time).

II. Toxic Pollutant Emissions

Air toxics emissions data for stationary sources are collected under requirements established by the Air Toxics "Hot Spots" Act (AB2588, 1987, Connelly). Under this program, stationary source facilities are required to report the types and quantities of toxic substances they routinely release into the air. At its core, this program was designed to identify facilities having potential for localized impacts, evaluate their health risks, notify nearby residents about significant risks, and ultimately reduce the risks below a health protective threshold. Below is an overview of the emission reporting requirements and a discussion on additional considerations that are essential for interpreting emission trends:

Emissions Reporting. State law delegates to the local air districts the responsibility for regulating stationary sources; therefore, air districts are the lead agency for implementing the Air Toxics Hot Spots Program. Under the program, facilities meeting certain criteria are required to prepare air toxics emission inventories according to guidelines developed by CARB. Facility operators must submit to the district a proposed emission inventory plan indicating how they will measure or calculate emissions. Once approved, the facility operator implements the plan and submits the emission inventory. In general, most facilities subject to the program are only required to update their emission inventory every four years, although air districts have the flexibility to require more frequent updates. Additionally, if it has been determined that facilities do not pose significant risk to public health, they may be exempted from further update requirements. As a result, the toxics emission data in the Pollution Mapping Tool may exhibit a wide range in the frequency of updates, with facilities in some districts showing annual or nearly annual data submittals, others showing two or three distinct updates since 2008, and still others showing only an update for the year when the facility was determined to be exempt. The complete requirements for acceptable emission inventory plans, reports and updates are outlined in CARB's Emission Inventory Criteria and Guidelines Report.

Facility Prioritization. The Act requires air districts to prioritize facilities in their jurisdiction to determine which must conduct a health risk assessment. Districts rank facilities into high, intermediate, and low priority categories based on factors such as the potency, toxicity, quantity and volume of hazardous materials released from the facility, the proximity of the facility to potential receptors, and any other considerations that may indicate that a facility may pose a significant risk. Districts may re-prioritize a facility if their inventory update shows any significant changes. The California Air Pollution Control Officers Association (CAPCOA) has developed Air Toxics "Hot Spots" Program Facility Prioritization Guidelines to assist districts in implementing the law's prioritization provisions. The 2016 Facility Prioritization Guidelines can be found on the CAPCOA website at http://www.capcoa.org/wp-content/uploads/2016/08/CAPCOA Prioritization Guidelines - August 2016 FINAL.pdf.

Health Risk Assessment. Facilities identified as high priority must prepare a health risk assessment conducted according to methods developed by the Office of Environmental Health Hazard Assessment (OEHHA). A risk assessment includes a comprehensive analysis of the dispersion of hazardous substances into the environment, the proximity of receptors and the potential for human exposure, and a quantitative assessment of both individual and population wide health risks associated with those levels of exposure. These risk estimates incorporate a great deal of uncertainty and should not be interpreted as representing the expected rates of disease in the exposed population; rather, they are meant to be used as a way to compare one source with another and prioritize concerns.

The risk assessments are reviewed by the district and OEHHA. Districts may also require facilities in the intermediate and low priority categories to submit a health risk assessment. Facilities that are found to have a significant risk must conduct an airborne toxic risk reduction audit and develop a plan to reduce their risk below the level of significance within 5 years; however, the district may shorten or lengthen the time period under certain conditions. The

OEHHA guidelines for the preparation of health risk assessments can be found at https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

Understanding Toxic Emissions Data in the Tool. CARB's emission inventory guidelines identify hundreds of substances that must be reported under the program; furthermore, each facility has a unique mix of processes that may result in a wide range of pollutants reported. In order to present information on toxic emissions that is consistent and comparable across the majority of the facilities, the Pollution Mapping Tool displays emissions for eight representative toxic substances. CARB staff selected these substances based on a number of factors that include not only their overall emissions volume, but also their widespread occurrence among facilities; their potential cancer and non-cancer health effects; their prevalence in ambient air measurements; and the degree of certainty in the reported emissions.

To allow for more comprehensive analyses of the toxic emissions at each facility, the tool also makes available a detailed list of all the substances reported by the facility. In addition to the emissions reported for each pollutant, this list includes estimates of the toxicity-weighted emissions for substances that have OEHHA approved health values. Toxicity-weighted emissions represent a normalized value that can be used to compare the relative toxicity of the pollutants emitted at a facility. CARB's equations for calculating the toxicity-weighted emissions are presented below:

1. Cancer Toxicity-Weighted Emissions:

   $$\text{Annual Emissions (lbs/year)} \times \text{Cancer Inhalation Unit Risk Factor} \times \text{MWAF} \times \mathbf{7700}$$

   where,
   *MWAF = Molecular Weight Adjustment Factor**

2. Chronic Toxicity-Weighted Emissions:

   $$\frac{\text{Annual Emissions (lbs/year)}}{\text{8760 (hours/year)}} \times \frac{1}{\text{Chronic Inhalation Reference Exposure Level}} \times \mathbf{150}$$

3. Acute** Toxicity-Weighted Emissions:

   $$\frac{\text{Annual Emissions (lbs/year)}}{\text{8760 (hours/year)}} \times \frac{1}{\text{Acute Inhalation Reference Exposure Level}} \times \mathbf{1500}$$

Notes:
**The Molecular Weight Adjustment Factor is used to account for the molecular weight fraction of a compound associated with the specific health effects. For instance, a MWAF of 0.2053 is used for barium chromate to get the proportion of the weight of carcinogenic (hexavalent) chromium.*
***Ideally, "maximum hour" emissions would be used in this calculation. However, annual emissions (lbs/yr) are used due to the limited availability of maximum hour emissions data.*

*A normalization factor (**in bold** in the equations above) is applied to put the numbers in a more useful range. The derivation of these normalization factors is described in the CAPCOA Facility Prioritization Guidelines.*

Users of the Pollution Mapping Tool are advised of the following:

- High mass emissions do not necessarily represent a high risk. Ranked-order listings of the substances with OEHHA-approved risk assessment health values for cancer and non-cancer chronic and acute effects can be found at this link:
  https://www.arb.ca.gov/ei/tools/pollution_map/data/OEHHA_Health_Values.xlsx
  A PDF copy of the of the consolidated table can be found at
  https://www.arb.ca.gov/toxics/healthval/contable.pdf

- Each facility has unique emission characteristics, and the eight substances displayed in the main toxics summary may not be representative of a facility's risk-driving pollutants. Refer to the detailed facility emissions spreadsheet (see link under the facility name in the toxics tab) for the full emission inventory data.

- As described in the section on Health Risk Assessment above, complex dispersion modeling is needed to gain an understanding of community impacts from any facility.

- The Pollution Mapping Tool currently addresses facility emissions only; however, a community may also be impacted by other types of sources such as mobile sources and dispersed areawide sources. These will be addressed in future enhancements of the tool.

- The toxicity-weighted emissions shown in the detailed facility spreadsheets (expressed in terms of "toxicity-weighted pounds") represent a normalized value that accounts for the relative toxicity of the various substances, and are intended to be used only for comparative evaluation purposes. These values do not account for receptor proximity and do not represent district prioritization scores or any measure of actual risk; therefore, they should not be compared with anything other than the toxicity-weighted emissions of other substances.

- CARB will continue to work closely with air districts to update and understand the trends associated with the air toxics emission data. Per requirements established by Assembly Bill 617 (AB617, C. Garcia, 2017), CARB will develop uniform criteria pollutant and toxic air contaminant reporting methodologies. The information collected through the AB 617 reporting mandates will improve the reporting frequency and allow for more meaningful inter-comparisons among facilities across the State.

III. Greenhouse Gas Emissions

Greenhouse gas emissions data are collected under CARB's MRR, which requires facilities emitting 10,000 metric tons or more of CO_2 equivalent emissions to report annually. Facilities report their emissions to CARB using CARB-designated quantification methods, and the data are

stored in CARB's MRR database. GHG emissions data for facilities emitting over 25,000 metric tons of CO_2 equivalents are subject to independent third-party verification by a CARB-accredited verifier.

Other points to keep in mind include:

- The data collected by the MRR reporting tool do not reflect the total GHG emissions in California. For complete GHG emissions information, please visit CARB's Greenhouse Gas Emission Inventory.

- Only emissions directly emitted from California facilities are represented. Emissions from imported electricity and fuel suppliers are not included in the tool.

- Not all of the entities covered by the Cap-and-Trade Regulation are presented in the tool. Please read the Legal Disclaimer for more information.

- The primary sectors used to categorize GHG facilities in the tool were established during the initial reporting of 2008 data under the 2007 MRR, which applies to 2008-2010 data years. The 2010 amendments to MRR introduced additional GHG sources (such as process emissions from glass or lime manufacturing). For consistency and comparability with past data, CARB has maintained the historical source categories for displaying 2011 data and onward. For example, glass and lime manufacturing facilities are assigned to the "Other combustion source" category.

IV. Comparing the Criteria, Toxics, and GHG Emissions Reporting Programs

GHG, criteria and toxic pollutant emissions data are collected under different programs, each with its own set of requirements. The tool presents a subset of data for each of the programs. For more information on the MRR data, please click here; for more information on the criteria pollutant data click here; and for information on the toxics program click here. Below is a summary of the basic differences between the three programs:

	Criteria Pollutants	Toxic Pollutants	GHG Emissions
Reporting Requirements	Emissions data are collected under various State and federal mandates that include the California Health and Safety Code, the California Clean Air Act of 1988, the Federal Clean Air Act Amendments of 1990, and the AERR.	Emissions data are collected under the Air Toxics "Hot Spots" Act (AB2588, 1987, Connelly).	Emissions data are collected under CARB's Regulation for the Mandatory Reporting of Greenhouse Gases (MRR).
Reporting Mechanism	Emissions data are reported to CARB by the local air districts. In some cases, these emission estimates may be based on methodologies prescribed by the district and may differ from the emissions estimated by the facility. In addition, estimation methods may vary from district to district.	Emissions data are reported to CARB by the local air districts. In some cases, these emission estimates may be based on methodologies prescribed by the district and may differ from the emissions estimated by the facility. In addition, estimation methods may vary from district to district.	Facilities report their GHG emissions to CARB using CARB-designated quantification methods.

	Criteria Pollutants	Toxic Pollutants	GHG Emissions
Reporting Thresholds and Frequency	AERR requires facilities emitting 250 tons per year to report emissions annually and smaller facilities to report triennially; however, CARB guidelines set a much lower annual threshold (10 tons per year); furthermore, local air districts have the flexibility to set their own reporting thresholds.	Only facilities meeting specific criteria are required to report. In general, inventories are required every four years, but air districts may require more frequent updates. Facilities that do not pose significant risk to public health may be exempted from update requirements.	Facilities emitting 10,000 metric tons or more of CO_2equivalent emissions must report annually; facilities emitting 25,000 metric tons or more of CO_2equivalent must have their emissions reviewed by a CARB-accredited verifier.
Storage Database	Criteria pollutant emissions data are stored in the California Emissions Inventory Development and Reporting System (CEIDARS). Facility ID numbers are different from MRR database.	Toxic pollutant emissions data are stored in the California Emissions Inventory Development and Reporting System (CEIDARS). Facility ID numbers are different from MRR database.	Data are stored in CARB's Mandatory Reporting Regulation (MRR) database. Facility ID numbers are different from CEIDARS database IDs.
Oil and Gas Production Facilities	Oil & Gas Production emissions are reported at the sub-facility level, which can be a point-source facility or a collection of smaller sources within a contiguous oil or natural gas lease. In order to present GHG and criteria pollutant emissions that can be appropriately compared, the sub-facility criteria pollutant emissions were aggregated to match the MRR facility definitions.	Oil & Gas Production emissions are reported at the sub-facility level, which can be a point-source facility or a collection of smaller sources within a contiguous oil or natural gas lease. In many cases, the individual sub-facilities may be exempt from the local air district's toxic pollutant reporting requirements.	GHG emissions for Oil & Gas facilities are reported as an aggregate of a company's operations in a geologic basin that typically consists of a very large area covering one or more counties.