



South Coast Air Quality Management District

**AB 2588 and Rule 1402 Supplemental Guidelines
(Supplemental Guidelines for Preparing Risk
Assessments for the Air Toxics “Hot Spots”
Information and Assessment Act)**

July 2018

Preface

This document (Supplemental Guidelines) is a supplementary guide to the State of California Office of Environmental Health Hazard Assessment (OEHHA) document entitled *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. The OEHHA guidance document contains several sections that refer users to their local air district for specific or additional requirements and this document describes and clarifies the requirements for the South Coast Air Quality Management District (SCAQMD). This version of the Supplemental Guidelines updates the previous November 2016 version.

The Supplemental Guidelines are intended to be a "living" document, which staff will update periodically as needed. The major revisions to this document from the previous November 2016 version include:

- Adding a description for the Voluntary Risk Reduction Program (refer to Section 3.6 and Table 3);
- Adding an HRA Summary Form (refer to Attachment A to Appendix B);
- Removing tables that are updated frequently and are listed in other SCAQMD rules or guidelines and including a reference to the applicable table(s) in the existing SCAQMD rule or guidelines instead; and
- Updating terms and acronyms (refer to Appendix G).

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1. INTRODUCTION

These Supplemental Guidelines are to be used in conjunction with the document prepared by the State of California Office of Environmental Health Hazard Assessment (OEHHA) entitled “Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments” (referred to hereafter as the 2015 OEHHA HRA Guidelines).¹ Facilities required to submit health risk assessments to the South Coast Air Quality Management District (SCAQMD) must follow the 2015 OEHHA HRA Guidelines pursuant to Health and Safety Code 44360(b)(2). Since the 2015 OEHHA HRA Guidelines defer to the local air district for specific, localized, or additional requirements, these Supplemental Guidelines address those areas and other issues that have arisen during the implementation of the AB 2588 Program at SCAQMD.

A certification form must be submitted to SCAQMD with all documents and correspondence relating to health risk assessments.²

Please visit SCAQMD’s AB 2588 Program webpage provided below for additional information, documents, and any questions regarding this document, health risk assessment methodology, and other AB 2588 Program issues.³ Questions may be emailed to AB2588@aqmd.gov or asked via phone at (909) 396-3610.

¹<https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

²<http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588/forms>

³<http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588>

2. OVERVIEW OF THE AB 2588 PROGRAM

In 1987, the California legislature adopted the Air Toxics "Hot Spots" Information and Assessment Act; also known as Assembly Bill 2588 (AB 2588). The goals of the AB 2588 Program are to collect toxic air contaminant emissions data, identify facilities having localized impacts, determine health risks, and notify affected individuals. In 1992, the California legislature added a risk reduction component, the Facility Air Toxic Contaminant Risk Audit and Reduction Plan, or Senate Bill 1731 (SB 1731), which requires facilities to develop and implement measures to reduce impacts if risks are found above thresholds specified by air districts. SCAQMD *Rule 1402 - Control of Toxic Air Contaminants from Existing Sources* implements various aspects of AB 2588 and SB 1731 including public notification and risk reduction requirements for facilities with health risks that are above specified thresholds.

Rule 1402 was amended in October 7, 2016 to include a provision to allow facilities to participate in a Voluntary Risk Reduction Program. This program is an alternative to complying with the traditional AB 2588 Program and Rule 1402 approach that provides qualifying facilities an opportunity to reduce health risks below the Notification Risk Level through a Voluntary Risk Reduction Plan (VRRP) and employ a Modified Public Notification approach as specified in Rule 1402. The Voluntary Risk Reduction Program will achieve risk reductions both sooner and beyond what is required in the traditional AB 2588, SB 1731, and Rule 1402 process.

There are five important components to the AB 2588 program as follows:

- *Emissions Reporting* - Facilities subject to the AB 2588 Program submit an air toxics inventory every four years through SCAQMD's Annual Emissions Reporting (AER) Program. Facilities are allowed to simplify AER reporting by aggregating common sources.
- *Prioritization* - From the simplified reported toxic emissions submitted through AER, SCAQMD staff prioritizes facilities, using a procedure approved by the Governing Board, into three categories: high, intermediate, and low priority. High priority facilities are then asked to prepare an Air Toxics Inventory Report (ATIR). In contrast to the simplified reporting allowed under AER, the ATIR requires greater detail which includes process, device, and stack information for each piece of equipment.
- *Health Risk Assessment* - From the detailed reported toxic emissions submitted through the ATIR, high priority facilities must prepare a Health Risk Assessment (HRA).
- *Public Notice* - If the health risks reported in the HRA exceed specified public notification thresholds, then the facility is required to provide public notice to the affected community.
- *Risk Reduction* - If the health risks reported in the HRA exceed specified action risk levels in Rule 1402, then the facility is required to reduce their health risks below the action risk levels.

Figure 1 below provides an overview of the AB 2588 Program and the different paths a facility may follow under Rule 1402.

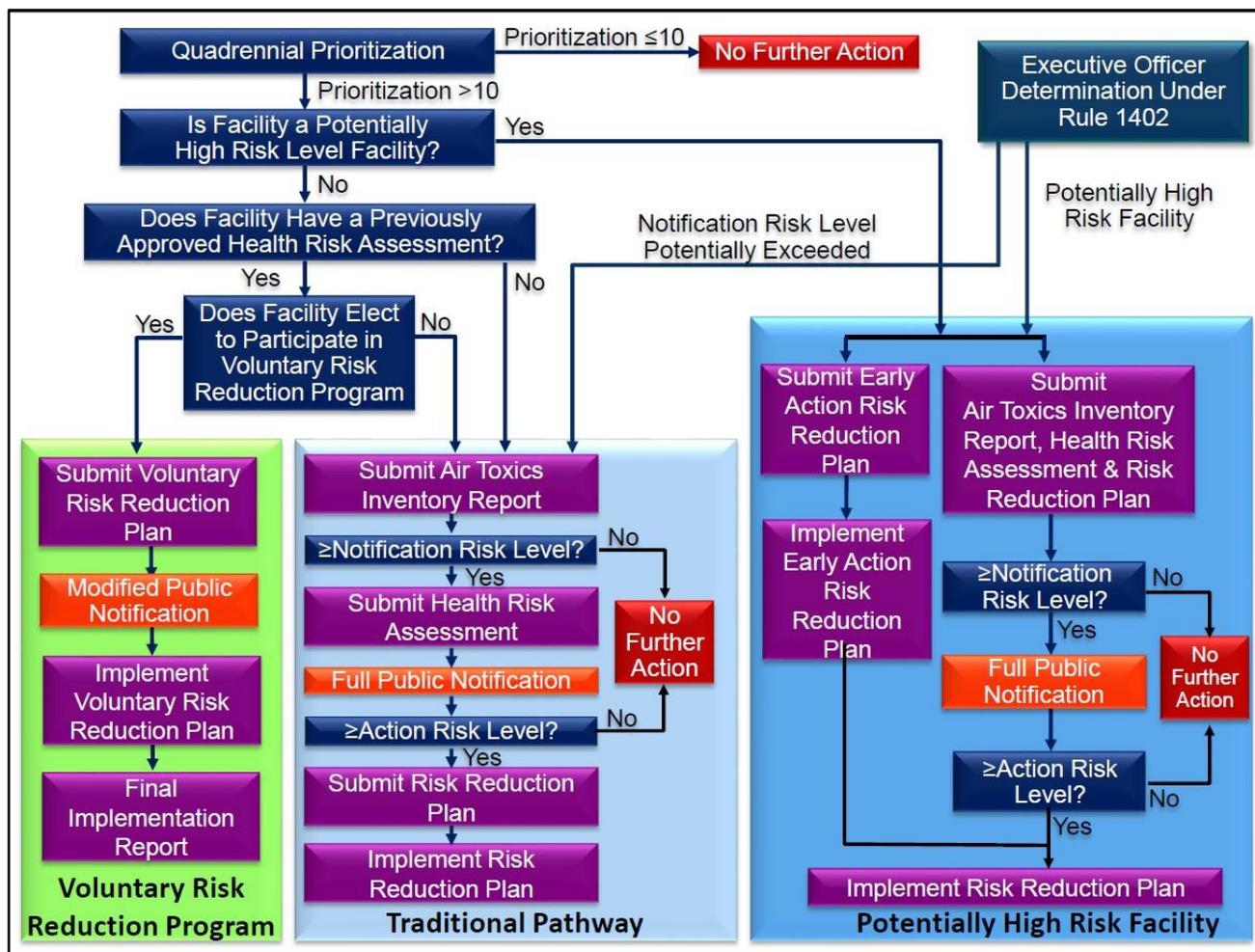


Figure 1. Overview of the AB 2588 Program and illustration of the paths by which a facility may follow

3. SUPPLEMENTAL GUIDELINES

3.1 Air Toxics Emissions Reporting

SCAQMD's AER Program is used for:

- All facilities subject to AER, including AB 2588 facilities who report their annual emissions of criteria pollutants and any one of 24 toxic air contaminants and ozone depleting compounds (ODC) (shown in Table 1 below). The report comprises the annual emissions report for toxic air contaminants.
- AB 2588 facilities which are subject to quadrennial (once in four years) reporting requirements. These facilities report any one of approximately 177 toxic air contaminants and ODCs from a detailed list of substances in Table A-1 of *Reporting Procedures for AB 2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory*.⁴ This report comprises the quadrennial emissions report for toxic air contaminants.

Facilities subject to the AER Program calculate and report their emissions based on their throughput data (e.g., fuel usage, material usage, etc.), appropriate emission factors, and control efficiency, if applicable. The method for reporting emissions is described on SCAQMD's website.⁵

Table 1. Annually Reported Toxic Air Contaminants and ODCs under the AER Program

Ammonia	Chlorinated dioxins and dibenzofurans	Lead
Asbestos	Chlorofluorocarbons	Methylene chloride
Arsenic (inorganic)	1,4-Dioxane	Nickel
Benzene	Ethylene dibromide	Perchloroethylene
Beryllium	Ethylene dichloride	Polynuclear aromatic hydrocarbons (PAH)
1,3-Butadiene	Ethylene oxide	1,1,1-Trichloroethane
Cadmium	Formaldehyde	Trichloroethylene
Carbon tetrachloride	Hexavalent chromium	Vinyl chloride

The data collected in the AER Program in addition to information from other sources (i.e. monitoring data, source specific information, etc...) are used to determine potential candidates for the AB 2588 Program. Facilities that meet one of the following AB 2588 Program qualification conditions are required to prepare and submit a quadrennial air toxics inventory if:

- They emit 10 tons per year or more of VOC, NO_x, SO_x, or PM;
- They emit 25 tons per year or more of a combination of VOC, NO_x, SO_x, and PM;
- They emit less than 10 tons per year of VOC, NO_x, SO_x, or PM, but the facility activity is listed in California Air Resources Board's (CARB) Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program⁶;
- Their emissions exceed one or more of the reporting thresholds in Table I or II in *Rule*

⁴http://www.aqmd.gov/docs/default-source/planning/risk-assessment/quadrennial_atir_procedure.pdf

⁵<http://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting>

⁶<http://www.arb.ca.gov/ab2588/2588guid.htm>

*1402 – Control of Toxic Air Contaminants From Existing Sources;*⁷ or

- The Executive Officer of SCAQMD determines that emissions levels from the facility have the potential to cause an exceedance of risk reduction thresholds.

Facilities subject to the AB 2588 Program must provide a quadrennial report for toxic air contaminants. These substances are listed in Table A-1 of *Reporting Procedures for AB 2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory*, which provides the substance names and associated Chemical Abstracts Service (CAS) numbers. The degree of accuracy is also provided for each substance. The degree of accuracy is a de minimis emission level for reporting. As a result, facility-wide emissions of the substance which are greater than one-half of their corresponding degree of accuracy must be inventoried and reported.

As part of the quadrennial report for toxic air contaminants, facilities must also provide the distances to the nearest residential and commercial receptors, and the facility operating schedule (e.g., operating hours per day, operating days per week, and operating weeks per year). It is critical that facilities estimate their toxic emissions as precisely and accurately as possible. These reported emissions are used to prioritize the facility as discussed in the next section, 3.2. Prioritization Procedure. A facility's prioritization score determines its fees and if it is necessary to prepare an ATIR or VRRP (if eligible).

An ATIR should be prepared by using the latest approved version of CARB's Hotspots Analysis and Reporting Program (HARP).⁸ In contrast to the simplified reporting allowed under AER, an ATIR requires a larger list of compounds (approximately 450 toxic air contaminants) and greater detail including process, device, and stack information for each piece of equipment.

When a facility is notified to prepare an ATIR or VRRP, the quadrennial toxic air contaminants emissions report is used as the 'base year emissions inventory.' This same base year emissions inventory is also used to prepare an HRA, Public Notice, and Risk Reduction Plan (RRP).

3.2. Prioritization Procedure

The AB 2588 Program requires SCAQMD staff to designate each facility as either high, intermediate, or low priority based on its individual priority score.

Per the requirements of the AB 2588 Program, SCAQMD's Prioritization Procedure considers the potency, toxicity, and quantity of hazardous materials released from the facility; the proximity of the facility to potential receptors, including, but not limited to, hospitals, schools, daycare centers, worksites, and residences; and any other factors that SCAQMD uses to determine that the facility may pose a significant risk to receptors. SCAQMD's Prioritization Procedure also includes adjustment factors for exposure period, averaging times, and the treatment of multipathway pollutants. The Prioritization Procedure is available at SCAQMD's website.⁹

A facility receives two scores: one for carcinogenic effects and the other for non-carcinogenic effects. The facility is then ranked using the higher of the two scores. Three categories are used in

⁷ <http://www.aqmd.gov/docs/default-source/rule-book/reg-xiv/rule-1402.pdf>

⁸ <http://www.arb.ca.gov/toxics/harp/harp.htm>

⁹ <http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588/prioritization>

the ranking: high priority, intermediate priority, and low priority. Facilities designated as high priority are notified by SCAQMD staff of their priority score, required to submit a comprehensive inventory of their air toxic emissions via an ATIR, and required to submit a quadrennial emissions report using the AER software. Facilities ranked as intermediate priority are considered to be “District Tracking” facilities, which are required to submit an air toxics inventory once every four years, using the AER software. Facilities ranked as low priority are exempt from quadrennial emissions reporting. Priority scores are re-calculated each time a facility updates its quadrennial air toxic emission inventory. Table 2 summarizes the priority score categories and the actions required by each category.

Table 2. Priority Score Categories

Category	Facility Priority Score (PS)	Actions
High Priority	$PS > 10$	Prepare ATIR; update emissions quadrennially through AER
Intermediate Priority	$1 < PS \leq 10$	Update emissions quadrennially through AER
Low Priority	$PS \leq 1$	Exempt from quadrennial emissions reporting

SCAQMD staff considers requests from High Priority facilities to be re-prioritized after errors or other problems with their quadrennial emissions inventory report. Once the corrections are verified by SCAQMD staff, the facility will be informed, in writing. The following sections discuss the criteria used for evaluating requests to reprioritize a facility.

3.2.1. Receptor Distance

One of the factors considered when prioritizing facilities is the receptor distance. All facilities must report the distances to the nearest residential and commercial receptors as part of their AER submittal. If receptor distances are not provided, then default values (conservative receptor distances) are used by SCAQMD staff to prioritize that facility. If a facility operator believes that their facility was incorrectly categorized due to an incorrect or default receptor distance, then the facility must prepare and submit a signed copy of the Receptor Proximity Form which can be downloaded from the SCAQMD’s website.¹⁰

3.2.2. Computational Errors

If computational errors or conservative assumptions were made in the quadrennial emissions report for toxic air contaminants inventory that overestimated emissions and resulted in a High Priority classification, the facility may correct the errors and submit the corrected estimates and supporting documentation to AB 2588 Program staff. The facility must include in their submission the nature of the error and calculations showing how the original emission estimate was determined and how the correction changes this value.

Please note that SCAQMD staff must use process rates and emissions from the quadrennial emissions reporting year to prioritize a facility. Changes in emissions estimates due to changes in

¹⁰ <http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588/forms>

process rates in years other than the quadrennial emissions reporting year cannot be used to re-categorize a facility. See section 3.3.2 for further details.

3.2.3 New Source Test Results

If new source test results are available and have been previously submitted to and approved by SCAQMD, then the approved source test results may be used with the process rates in the quadrennial emissions inventory report to recalculate emissions and the priority score of a facility.

3.2.4. Equipment/Process Shutdowns or Process Modifications

If equipment or processes with air toxic emissions have been shut down prior to High Priority classification and the permits have been surrendered, then these emission reductions may be used to recalculate the priority score of High Priority facilities. Evidence for these emission reductions must include copies of letters sent to SCAQMD requesting emission reduction credits and/or the surrender of SCAQMD permits.

If a process has been modified since the quadrennial emissions report and the equipment or process emits a different quantity of a toxic substance, and the facility has applied for and received a permit modification reflecting this change, then the emission reduction for that substance may be used to recalculate the priority score.

All supporting documentation regarding equipment shutdowns and process modifications must be received by AB 2588 Program staff in order to recalculate the priority score.

3.2.5. Facility Closures

If the entire facility is closed prior to High Priority classification or if a facility is scheduled for complete closure, this information must be reported to AB 2588 Program staff. Upon review, staff will make a decision whether the facility should submit an ATIR. Factors that must be considered include the status of permits granted to the facility by SCAQMD and the nature of any ongoing activities at the facility. Unless a facility is informed by staff in writing that an ATIR is no longer required, the facility operator must submit an ATIR by the date required.

3.2.6. Change of Ownership/Operator

If there has been a change in ownership or operator, the new owner/operator must submit the requested reports unless the facility no longer emits any substances required to be reported under AB 2588. In such case, the new facility owner/operator must provide SCAQMD staff the necessary documentation to be exempt from reporting requirements of the AB 2588 Program.

3.3. Emission Estimates Approved for Use in HRAs

Facilities subject to the submittal of HRAs under the AB 2588 Program must estimate and submit their ATIR using the latest approved version of HARP.¹¹ This ATIR should include, at a minimum, the elements outlined in Appendix A of these Supplemental Guidelines. OEHHA has grouped the substances to be reported into three groups as shown in Appendix A of the 2015 OEHHA HRA Guidelines.¹² There are distinct reporting requirements for the three groups as follows:

Appendix A-I Substances – All emissions of these substances must be quantified in the ATIR and HRA including those calculated in the ATIR as below the degree of accuracy or below detection limits.

Appendix A-II Substances – Emissions of these substances do not need to be quantified in the ATIR and HRA; however, facilities must report whether the substances are used, produced, or otherwise present on-site. These substances can be simply listed in a table in the HRA.

Appendix A-III Substances – These substances only need to be reported in a table in the ATIR and HRA if they are manufactured by the facility.

The intent of the AB 2588 Program is that facilities performing HRAs use the process rates and emissions data submitted in their quadrennial emissions inventory report (see Section 3.1). SCAQMD receives requests from facilities to use process rates and emissions data other than those reported in their quadrennial emissions inventory report. As a general policy, SCAQMD will allow emission changes only if (1) the changes conform to one of the situations discussed in the following sections and (2) any emission increases are also included.

3.3.1. Computational Errors

Computational errors in the quadrennial emissions inventory report must be reported to SCAQMD staff as soon as detected. Written requests to correct errors for inclusion in the risk assessment must include documentation of the nature of the error and calculations to show how the original emission value was determined and how correcting the computational error changes this value.

3.3.2. Emission Reductions from a Facility's Base Year Emissions Inventory

HRAs in the AB 2588 Program take a 'snapshot' of a base year emissions inventory (or quadrennial emissions inventory report) which is determined by the HRA request letter or notification by the Executive Officer to prepare an ATIR, HRA, or VRRP. This base year is commonly the most recent quadrennial emissions reporting year. Emissions reductions must be verified to be considered as an allowable change. The allowable changes in this section can only be considered as a revision to the quadrennial emissions inventory report that has already been submitted. Modifications after the base year are discussed in Section 3.3.3. Verified emission reductions are those which are permanent and can be substantiated as occurring during the base

¹¹ <http://www.arb.ca.gov/toxics/harp/harp.htm>

¹² <https://oehha.ca.gov/air/cmrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

year. Verification requirements include specifications in SCAQMD's permit issued to the facility, a surrender of the existing SCAQMD permit, or reductions as required by SCAQMD rule(s). Letters of intent or internal memos mandating new company policy are not considered verifiable emission reductions.

Examples of verifiable emission reductions include:

- Misreporting of throughput information, inaccurate emission factors, and incorrect emission calculation methodology.
- A previously operating permitted source has been shut down and therefore has no emissions. In order for this to be considered as a verified emissions reduction, the facility must have surrendered the permit to SCAQMD. If a facility chooses to retain the permit for possible use of the equipment in the future, that source cannot be considered a permanent verified emissions reduction. Please send a copy of the letter requesting inactivation of the permit and any other supporting documentation to AB 2588 Program staff.
- A listed substance was no longer used and therefore not emitted in a process at the facility. The permit conditions have previously been modified to reflect this change. A copy of the modified permit or, if not yet available, a copy of the 400A application form requesting a change of permit conditions and a copy of the check for filing fee submitted to SCAQMD must be sent to AB 2588 Program staff.
- Pollution control equipment which has been issued a permit-to-construct, has been installed, and was in operation. Provide a copy of the permit-to-construct (and permit-to-operate, if issued), and show calculations for emission reductions. Provide the references for any emission factors used in the calculations. If source testing data was used to calculate the emissions, provide a copy of the source test protocol and all documentation relating to the results.
- Requirements of new SCAQMD rules that have resulted in permanent and enforceable reductions. Provide documentation on how and when reductions were achieved.

If the facility wishes to use verified emission reductions in their HRA, documentation of these verified changes must be provided.

3.3.3. Modifications in Risk after the Base Year

HRAs in the AB 2588 Program take a 'snapshot' of a base year emissions inventory which is determined by the HRA request letter. This base year is commonly the most recent quadrennial emissions reporting year. In some cases, more recent emissions are substantially different than the base year emissions of a facility due to modifications. Facilities can include information about the more recent emission changes and how those affect health risks in a supplemental appendix to their HRA. If a facility includes supplemental information showing that emissions and health risks have been reduced since the base year, then this more recent emissions scenario can be used when comparing residual health risks against Rule 1402(c)(2) Risk Reduction thresholds as long as the new emissions scenario is based on emission reductions that are permanent, enforceable, and verifiable. The health risks from the base year will still be used when comparing against Rule 1402(c)(12) Public Notification Thresholds. If public notification is required, then the supplemental information about reductions in health risk since the base year can be included in the notification materials.

The facility should contact AB 2588 Program staff to obtain approval and determine if the changes occurring after the base year can be considered as verifiable, enforceable, and permanent emission reductions. Upon approval, the facility must estimate cancer risk, cancer burden, and hazard indices for both the base year and the estimated emissions after the proposed future reductions are complete. The two risk estimates must be presented separately in the HRA submitted to SCAQMD. The dual estimate provides a backup in case reductions proposed by the facility are not implemented as planned. Note that new emissions or emission increases, due to process changes or new equipment, must also be quantified and included in any HRA which incorporates emission reductions since the quadrennial emissions inventory was prepared.

3.3.4. New Source Testing Data

Data from new or yet to be completed source tests will not be approved for use in the preparation of the required HRA if an ATIR has already been approved without the use of those source tests. However, if a facility has already conducted and completed the source test with an SCAQMD-approved source test protocol, and all supporting documentation is provided to AB 2588 Program staff, it may be considered for approval. SCAQMD staff will notify the facility in writing if new source test results are approved for use in the HRA. Please call AB 2588 Program staff if you submit a request and have not been notified regarding approval before submitting the HRA.

If a facility wishes to provide unapproved source test data for informational purposes only, it must be presented in an alternate HRA (i.e., as an appendix to the HRA). The alternate HRA must be presented with separate findings and discussion of cancer risk and hazard indices. Failure to completely separate the alternate HRA from the required analysis is grounds for rejection of the HRA.

3.3.5. Diesel Particulate Matter Emissions

Diesel particulate matter emissions were identified as a toxic air contaminant by CARB in 1998, and were added to the list of compounds in SCAQMD *Rule 1401 – New Source Review* on March 7, 2008. Under the current AB 2588 Air Toxics “Hot Spots” Emission Inventory Criteria and Guidelines Regulation, amended on August 27, 2007, facility operators are required to include health risks of any diesel exhaust particulate emissions from stationary emergency and prime compression ignition internal combustion engines, as well as portable diesel engines. Please clearly identify emergency diesel internal combustion engines (DICEs) and their corresponding emissions. This is essential because, on January 5, 2007, the SCAQMD Governing Board adopted separate public notification procedures for emergency DICEs.¹³

3.4. Uncertainty Analyses and Alternative HRAs

The 2015 OEHHA HRA Guidelines describe uncertainty analyses (or HRAs with alternate assumptions) that may be provided at the discretion of SCAQMD. SCAQMD staff will allow such analyses to be included as one of the appendices to the facility's HRA. This analysis would be a supplement to the primary HRA that is carried out using the assumptions presented in the 2015

¹³ <http://www3.aqmd.gov/hb/2007/January/070128a.html>

OEHHA HRA Guidelines and the guidelines included. Deviations from the OEHHA Tier-1 point estimate methodology must be described in detail at the beginning of the appendix and the reasons for the alternative assumptions must also be described in detail with supporting documentation.

All analyses and discussion relating to an alternative analysis must appear under a separate title such as "Alternative Analysis" in an appendix to the HRA. If an alternative HRA is mixed together with the Tier-1 analysis and not presented in a separate appendix of the document as required by OEHHA and SCAQMD guidelines, the HRA will be considered unacceptable and returned to the facility owner/operator for revision. An alternative HRA is also held to the same grounds for rejection as the primary HRA in accordance with Rule 1402(e).¹⁴

3.5. HRA Format

The format for the HRA must follow the detailed outline presented in Appendix B of these Supplemental Guidelines. A completed HRA Summary must be included in the Executive Summary of all HRAs submitted to SCAQMD; a sample of the form can be downloaded from SCAQMD's AB 2588 Program website.¹⁵ The detailed HRA outline provided in Appendix B lists the HARP computer files to be included electronically with the HRA. All copies of electronic file(s) should be sent to AB 2588 Program staff. The HRA should also be submitted electronically (i.e., PDF format).

Cancer risk values should be reported to the nearest tenth and should be rounded up from 5 (e.g., 5.05 in a million is rounded up to 5.1 in a million). Non-cancer risk values should be reported to the nearest hundredth and should be rounded up from 5 (e.g., a hazard index (HI) of 0.105 is rounded to 0.11).

3.6. Public Notification, Risk Reduction, and Voluntary Risk Reduction Levels

The SCAQMD Governing Board has adopted risk levels for purposes of public notification pursuant to the AB 2588 Program. In addition, SCAQMD Rule 1402 establishes action risk levels that require risk reduction; the levels are summarized in Table 3 below and the elements to include in a RRP are included in Appendix D of these Supplemental Guidelines. Additional information regarding SCAQMD's public notification procedures are available on the website.¹⁶

Rule 1402 includes a provision to allow facilities to participate in the Voluntary Risk Reduction Program. If facilities choose to participate, they voluntarily reduce their health risk beyond the Action Risk Level to below the Notification Risk Level in lieu of the traditional AB 2588 Program process. Facilities also perform a modified public notification that does not require distribution of individual letters and public meetings as in the traditional AB 2588 Program approach. Additional information regarding qualifications and procedures for SCAQMD's Voluntary Risk Reduction Program are available on SCAQMD's website.¹⁷

¹⁴<http://www.aqmd.gov/docs/default-source/rule-book/reg-xiv/rule-1402.pdf?sfvrsn=4>

¹⁵<http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588/forms>

¹⁶<http://www.aqmd.gov/nav/about/public-notices/ab-2588-notices>

¹⁷http://www.aqmd.gov/docs/default-source/planning/risk-assessment/vrrp_guidelines.pdf?sfvrsn=4

Table 3. Public Notification, Risk Reduction, and Voluntary Risk Reduction Levels

Risk Variable	Public Notification Levels	Risk Reduction Levels	Voluntary Risk Reduction Levels
Cancer risk	≥ 10 in a million	≥ 25 in a million	≥ 10 in a million
Non-cancer risk	HI > 1	HI ≥ 3	HI > 1
Cancer burden	--	≥ 0.5 excess cancer cases	--

3.7. Maximum Exposed Individual

To identify the location of the maximum exposed individual, it is necessary to examine current land use and allowable land use in the vicinity of the point of maximum impact (residential, commercial/industrial, or mixed use). Currently, the use of block group or census tract centroids as surrogates for the maximum exposed individual does not provide sufficient spatial resolution and will not be approved.

Cancer risk and non-cancer chronic hazard indices (HI) must be provided for both the most exposed residential and the most exposed commercial/industrial receptors. The non-cancer acute HI must be provided for the offsite point of maximum impact (PMI). Additionally, cancer risk and HI values at each sensitive receptor located within the zone of impact must be presented in a table. The zone of impact is discussed in the next section.

3.8. Zone of Impact

In an HRA, it is necessary to define a zone of impact or a method to set boundaries on the analysis. For AB 2588 purposes, SCAQMD requires that the HRA must encompass the area subject to an added lifetime cancer risk (all pathways) of one in one million or greater (i.e. $\geq 1.0 \times 10^{-6}$). For non-cancer risks, the analysis must bound the area subject to an HI greater than or equal to one half (≥ 0.5).

3.9. Land Use Considerations

Risk estimates are sensitive to land uses (e.g. residential, commercial, vacant) since these factors can affect exposure assumptions. If residential or worker risks are not calculated at the PMI because the land is currently vacant, then the location, zoning and potential future land uses must be discussed. Updated information on current land uses is requested when updated emission estimates are reported to SCAQMD.

3.10. Maps

Maps showing the location of the source in relation to the zone of impact must be submitted. Dispersion modeling for sources should be conducted with receptors defined in terms of Universal Transverse Mercator (UTM) coordinates and a World Geodetic System 1984 (WGS84) spatial reference system. For cancer risk, total risk isopleths for facilities should be plotted on the street

map provided using HARP at cancer risk intervals of 1, 10, 25, and 100 in a million. Isopleths for non-cancer HI must include levels corresponding to an HI of 0.5, 1.0, 3.0, and 5.0.

Separate maps should be provided for each of the four risk variables: cancer risks, non-cancer acute risks, non-cancer chronic risks, and non-cancer 8-hour chronic risks. The maps must contain an accurate scale for measuring distances and a legend. The map scale that can accommodate the isopleths and show the greatest level of detail must be used. The names of streets and other locations must be presented and be legible.

The location of schools, hospitals, day-care centers, other sensitive receptors, residential areas and work-sites within the zone of impact must be identified on the map. If the area of the zone of impact is very large, then more detail should be devoted to higher concentration/risk areas versus lower risk areas. The land uses in the vicinity of the PMI must be shown in detail. This may require a separate map. If sensitive receptors are located within the zone of impact, then cancer risk and HI values must also be presented in the form of a table including all the sensitive receptors.

3.11. Air Dispersion Modeling

Air dispersion modeling is performed for the exposure assessment of the HRA. A basic understanding of dispersion modeling is presumed. For a more detailed overview of regulatory modeling procedures, refer to the U.S. EPA's "Guideline on Air Quality Models¹⁸" and/or the 2015 OEHHA HRA Guidelines.

3.11.1. Facility Description and Source Information

The HRA should contain a brief description of the facility and its activities as shown in the detailed HRA outline provided in Appendix B. Table 4 lists the information on the facility and its surroundings that must be provided in the modeling analysis. The facility location is used to determine the most representative meteorological data for the analysis. The nearby land use is needed to properly label receptors as residential, commercial, sensitive, etc.

The facility plot plan (including a length scale) is needed to determine all source locations including their elevations above sea level, building dimensions, and the property boundary. The operating schedule, the hourly emission rates, the annual average emission rates, and the source parameters listed in Table 4 are necessary to accurately characterize the source emissions. Please refer to the detailed outline provided in Appendix B for additional information and guidance.

¹⁸<https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>

Table 4. Required Source Information

<p>Information on the Facility and Its Surroundings</p> <ul style="list-style-type: none"> • Location (i.e., address and UTM coordinates in WGS84) • Local land use (within 20 km) • Local topography (within 20 km) • Facility plot plan <ul style="list-style-type: none"> - Property boundaries - Horizontal scale - Building heights (for building downwash calculations) - Source locations including elevations <p>Point Source Information (stacks, vents, etc.)</p> <ul style="list-style-type: none"> • Maximum and average hourly emission rates • Annual emissions • Stack location (in UTM coordinates in WGS84) on plot plan including elevation • Stack height • Stack gas exit velocity • Stack gas exit temperature • Building dimensions, heights, and location <p>Fugitive Source Information (area and volume sources)</p> <ul style="list-style-type: none"> • Maximum and average hourly emission rates • Annual emissions • Source location (in UTM coordinates in WGS84) on plot plan including elevations • Source height • Area or volume dimensions
--

3.11.2. Model Selection and Model Options

All HRAs prepared for the AB 2588 Program must use the most recent version of HARP.¹⁹ U.S. EPA's air quality dispersion model, AERMOD, is used by HARP for the exposure assessment. AERMOD is a Gaussian plume model capable of estimating pollutant concentrations from a wide variety of sources that are typically present in an industrial source complex. Emission sources are categorized into four basic types: point, area, volume, and open pit sources. AERMOD estimates hourly concentrations for each source/receptor pair and calculates concentrations for user-specified averaging times, including an average concentration for the complete simulation period. AERMOD includes atmospheric dispersion options for both urban and rural environments and can address flat, gently rolling, and complex terrain situations. AERMOD documentation is available on the U.S. EPA website.²⁰ Table 5 summarizes the default dispersion modeling assumptions recommended by SCAQMD. AERMOD-ready meteorological data are available on SCAQMD's website.²¹

¹⁹ <https://www.arb.ca.gov/toxics/harp/harp.htm>

²⁰ <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>

²¹ <http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data>

Table 5. Summary of SCAQMD Dispersion Modeling Guidance

Parameter	Assumption
Model Control Options	
• Use Regulatory Default?	Yes
• Urban or Rural?	Urban
Source Options	
• Include Building Downwash?	Yes
Meteorology Options	
• Meteorological Data	AERMOD-ready data available on SCAQMD website. See section 3.11.3.

AERMOD should be executed using the urban dispersion parameters (i.e., URBAN), which is SCAQMD policy for all air quality impact analyses in its jurisdiction. The U.S. EPA regulatory default options should be used for all projects. If non-default options are used, a justification must be included and SCAQMD staff approval is needed.

3.11.3. Meteorological Data

SCAQMD has AERMOD-ready meteorological data for the South Coast Air Basin available on the SCAQMD website including a map showing the locations of meteorological stations with AERMOD-ready data, a table listing the meteorological data for the meteorological stations, and a list of station data including abbreviations, geographical information, and surface characteristics.²²

The most representative meteorological station should be chosen for modeling which in most cases, is the nearest station; however, an intervening terrain feature may dictate the use of an alternate station. Modelers should contact AB 2588 Program staff regarding the most representative meteorological station, if necessary. The data are available on the following SCAQMD website.²³

3.11.4. Receptor Grid

Air dispersion modeling is required to estimate (a) annual average concentrations to calculate the Maximum Individual Cancer Risk (MICR), the maximum chronic HI, the zones of impact, and excess cancer burden and (b) peak hourly concentrations to calculate the health impact from substances with acute non-cancer health effects. To achieve these goals, the receptor grid should begin at the facility fence line and extend to cover the zone of impact. In addition, the receptor grid should be fine enough to identify the points of maximum impact.

To identify the maximum impacted receptors (i.e., peak cancer risk and peak hazard indices) a grid spacing of 100 meters or less must be used. All receptors should be identified in UTM coordinates. Receptor grid points outside of the facility boundary must be placed so that individual grid points

²² <http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data>

²³ <http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/data-for-aermod>

are placed at UTM coordinates ending in “00” (e.g., grid point UTM East 572300 and UTM North 3731000). Receptor grids with less than 100 meter spacing must include grid points at UTM coordinates ending in “00.” Elevations must be provided for all receptor grids.

Receptors on the facility boundary must be placed along the boundary following the maximum spacing requirements shown in Table 6. Sensitive receptors must be identified by exact UTM coordinates. Elevations must be provided for all receptors.

Table 6. Maximum Receptor Spacing Requirements for Fenceline Receptors

Area of Facility	Maximum Receptor Spacing
Area < 4 acres	20 meters
4 acres ≤ Area < 10 acres	30 meters
10 acres ≤ Area < 25 acres	50 meters
25 acres ≤ Area < 100 acres	75 meters
Area ≥ 100 acres	100 meters

3.11.5. Stacks with Raincaps and Area Sources

Emission release points with raincaps or which are oriented so that the exhaust is vented downward or horizontally may not use the velocity inside the stack as the vertical velocity of the point source in the model. However, as a point source must be modeled with some vertical velocity, these stacks may be modeled with a positive vertical velocity of no more than 0.01 meters per second. In general, if there is uncertainty on how to represent sources in a model, AB 2588 Program staff should be consulted before proceeding with modeling.

According to U.S. EPA guidance for area sources in AERMOD, the aspect ratio (i.e., length/width) for area sources should be less than 10 to 1. If this is exceeded, then the area should be subdivided to achieve a 10 to 1 or less aspect ratio for all sub-areas.

3.12. HRA

SCAQMD requires that all HRAs for the AB 2588 Program be prepared in accordance with OEHHA and CARB guidance²⁴ and using the latest approved version of HARP. The OEHHA Guidelines requires at least a Tier-1 evaluation, which allows for Derived Risk Calculations. The Derived method uses high end exposure parameters for the top two exposure pathways and mean exposure parameters for the remaining pathways for cancer risk estimates. For chronic non-cancer assessments, the Derived method uses high end exposures for the top three exposure pathways. CARB has developed an updated Risk Management Policy that includes recommendations for inhalation exposures,²⁵ which recommends using high end breathing rates (95th percentile) for children from the 3rd trimester through age 2, and 80th percentile breathing rates for all other ages

²⁴<https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

²⁵Information regarding CARB’s Risk Management policy can be located at: <https://www.arb.ca.gov/toxics/toxics.htm>

for residential exposures. In accordance with these guidelines, SCAQMD recommends Derived Risk Calculations using CARB's Risk Management Policy to be prepared and presented in an HRA. CARB prepared HARP to facilitate the preparation and transmittal of a compliant ATIR and HRA. The details are provided below.

3.12.1. OEHHA Guidance

OEHHA's guidance for preparing HRAs is contained in the *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.²⁶ This guidance manual has undergone public and peer review, was endorsed by the California Scientific Review Panel (SRP), and approved by OEHHA in March 2015.

The 2015 OEHHA HRA Guidelines recognizes four types of evaluations.

Tier-1: point estimate, using standard assumptions

Tier-2: point estimate, using site-specific details

Tier-3: stochastic risk, using standard assumptions

Tier-4: stochastic risk, using site-specific details

The details are described in the 2015 OEHHA HRA Guidelines.

"Tier-1 is a standard point-estimate approach using the recommended point-estimates presented in this document. [...] Tier-1 evaluations are required for all HRAs prepared for the Hot Spots Program." (see Section 2.5.3. of 2015 OEHHA HRA Guidelines²⁶)

"[T]he Tier-1 evaluation is useful in comparing risks among a large number of facilities and must be included in all HRAs." (see Section 8.2.5.C. of 2015 OEHHA HRA Guidelines²⁶)

As such, SCAQMD requires that all HRAs for the AB 2588 Program contain at least a Tier-1 evaluation. The results of the Tier-1 evaluation are used for comparative and regulatory purposes (i.e., risk status, fee category, public notice, and risk reduction).

The Executive Summary and main body of the HRA shall contain only statements regarding the results of the Tier-1 evaluation. Tier-2, Tier-3, and Tier-4 evaluations should not be in the Executive Summary or main document; they may be prepared and presented as appendices to the main document. Site specific details for either a Tier-2, Tier-3, or Tier-4 evaluation will require review and approval by OEHHA, CARB, and SCAQMD.

3.12.3. HARP

HARP is designed to meet the programmatic requirements of the AB 2588 Program and will calculate all four OEHHA Tiers, both the Derived Risk Calculations (as designed by OEHHA), and CARB's "Risk Management Policy Inhalation Rates for Residential Cancer Risk Calculations."

²⁶<https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

The outline for an HRA is contained in Appendix B. The list of files that must be submitted with an HRA for the AB 2588 Program are included in Table 7. Any emissions factor development, emission rate calculations, or approved source test protocol and reports must be submitted in electronic format (e.g., in Microsoft Excel). If these items have been attached to the AER report, please refer to it in the cover letter to avoid a redundant submittal.

Table 7. Files that must be provided with HRA submittals

File Type	Notes
HRA Input	All files created by CARB's Air Dispersion Modeling and Risk Tool (ADMRT) Module
HRA Output	
Dispersion Modeling Input	All AERMOD and BPIP files used in the HRA including terrain data. All meteorological data files including any AERMET files if default SCAQMD meteorological data is not used.
Dispersion Modeling Output	
Emission Inventory Input	All files created by CARB's Emission Inventory Module (EIM)
Emission Inventory Output	
Emission Calculations	Provided in electronic format (e.g., Excel) and documented references (i.e. sample calculations)
Source Tests	Only SCAQMD-approved source tests can be used. SCAQMD approval must be included in submittal.
Air Monitoring Data	Any monitoring data used in the HRA should be provided.

3.12.4. SCAQMD's Default Assumptions for HRAs

All HRAs prepared for SCAQMD must include an OEHHA Tier-1 evaluation. All SCAQMD risk management decisions are based on the Tier-1 evaluation. Tier-2, Tier-3, and Tier-4 evaluations may be prepared but must be included in an appendix to the HRA. The results of the Tier-2, Tier-3, and/or Tier-4 evaluations must not be included in the Executive Summary or main body of the HRA. Table 8 summarizes the HRA assumptions required by SCAQMD. Deviations from these defaults must be approved by SCAQMD staff prior to their use.

Residential cancer risks assume a 30-year exposure (cancer burden assumes a 70-year exposure) and must include, at a minimum, the following pathways: home grown produce, dermal absorption, soil ingestion, and mother's milk. A deposition velocity of 0.02 m/s should be assumed for the non-inhalation pathways. The HRA should assume default values in HARP for all pathways with the exception of the dermal pathway which should assume a "warm" climate. The other pathways of fish ingestion, dairy milk ingestion, drinking water consumption, and meat (i.e., beef, pork, chicken, and egg) ingestion should be included only if the facility impacts a local fishable body of water, grazing land, dairy, or water reservoir. The "RMP Using the Derived Method" risk calculation option should be used for estimating cancer risks at residential receptors. To estimate chronic non-cancer risks at residential receptors the "OEHHA Derived Method" risk calculation option should be used. The 8-hour chronic non-cancer risk should also be calculated for residential receptors for any source that operates at least 8 hours per day and 5 days per week.

Table 8. Summary of SCAQMD Health Risk Assessment Guidance

Parameter	Assumptions
Multipathway	
• Inhalation	Required for residential and worker receptors
• Dermal	Required for residential and worker receptors
• Soil	Required for residential and worker receptors
• Homegrown Produce	Required for residential receptors
• Mother's Milk	Required for residential receptors
• Beef/Dairy	Site specific
• Pigs, Chickens, and/or Eggs	Site specific
• Deposition Velocity	0.02 meters per second
• MP Exposure Assumptions	Use HARP defaults except for dermal pathway which uses "warm" climate
Residential Cancer Risk Assumptions	
• Exposure Duration	30 years for individual receptors 70 years for cancer burden
• Analysis Option	RMP Using the Derived Method
Worker Cancer Risk Assumptions	
• Exposure Duration	25 years
• Analysis Option	OEHHA Derived Method
Residential and Worker Non-Cancer Risk Assumptions	
• Analysis Option	OEHHA Derived Method

Worker cancer risks assume a 25-year exposure and must include the pathways of dermal absorption and soil ingestion. A deposition velocity of 0.02 m/s should be assumed for these pathways and the dermal pathway should assume a 'warm' climate. The "OEHHA Derived Method" risk calculation option should be used for estimating cancer and non-cancer chronic risks at worker receptors.

The air concentration that the neighboring workers breathe when present at work is different than the annual average concentration calculated by AERMOD. The annual average estimated by AERMOD is a 24 hours per day, 7 days per week, 365 days per year average, regardless of the actual operating schedule of the emitting facility. It is assumed the off-site worker is impacted by the toxic emissions only during work hours. Thus, the model-predicted concentrations must be adjusted by a multiplying factor to reflect the pollutant concentration that the worker breathes. For example, suppose that the off-site worker and the emitting facility have the same operating schedule, perhaps 8 hours per day, 5 days per week, and 52 weeks per year. The annual average concentrations predicted by AERMOD must be adjusted by a factor of 4.2 (i.e., $7/5 \times 24/8$). Please refer to the 2015 OEHHA HRA Guidelines for further information.

The adjustment factors for all possible operating schedules are provided in Tables 5.1 and 5.2 of *SCAQMD Permit Application Package "N" For Use in Conjunction with the Risk Assessment*

*Procedures for Rules 1401, 1401.1, and 212.*²⁷ These factors are entered into HARP by activating the Worker Adjustment Factor (WAF) option in the Inhalation Pathway and entering the appropriate factor from either one of the tables.

The adjustments in Tables 5.1 and 5.2 should only be applied when estimating worker cancer risks for facilities that do not operate continuously. The adjustments are not applicable to residential cancer risks and to residential or worker chronic non-cancer risks.

²⁷ <http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/attachmentn-v8-1.pdf>

Appendix A
Elements of an Air Toxics Inventory Report

1. Report Summary (hard copy)

- Facility name, Facility ID, and location
- Facility plot plan identifying: emission source location, property line, horizontal scale, and building heights and dimensions
- Facility total emission rate by substance for all emittants including the following information (2015 OEHHA HRA Guidelines Appendix A-I Substances must be quantified in the inventory report):
 - substance name and CAS number
 - annual average emission for each substance (lb/yr and g/s)
 - maximum one-hour emissions for each substance (lbs/hr and g/s)
- Supporting documentation such as source test report and SCAQMD approval letter if emissions are measured

2. Use the EIM portion of HARP to provide facility, device, process, emissions, and stack data in a HARP database, including but not limited to the following information:

- Source identification number used by the facility
- Source name
- SCAQMD permit number if available
- Source location using UTM coordinates (in meters) with a WGS84 projection
- Source base elevation (m)
- Source height (m)
- Source dimensions (e.g., stack diameter, building dimensions, area/volume size, etc.) (m)
- Stack gas exit velocity (m/s) if applicable
- Stack gas volumetric flow rate (ACFM) if applicable
- Stack gas exit temperature (K)
- Number of operating hours per day
- Number of operating days per week
- Number of operating weeks per year
- Report emission control equipment and efficiency by source and by substance.

The description should be brief.

- Report annual average and maximum hourly emission rates for each toxic substance for each source
- Report emission inventory methods indicating whether emissions are measured or estimated

Appendix B
Outline for the HRA

I. Table of Contents

- Section headings with page numbers indicated
- Tables and figures with page numbers indicated
- Definitions and abbreviations. Must include a definition of acute, 8-hour chronic, chronic, and cancer health impacts
- Appendices with page numbers indicated

II. Executive Summary

- Name of facility and the complete address
- Facility ID number
- Description of facility operations and a list identifying emitted substances, including a table of maximum 1-hour and annual emissions in units of lbs/hr and lbs/yr, respectively
- List the multipathway substances and their pathways
- Text presenting overview of dispersion modeling and exposure assessment
- Text defining dose-response assessment for cancer and non-cancer health impacts and a table showing target organ systems by substance for non-cancer impacts
- Summary of results (See Attachment A to this Appendix). Potential cancer risks for residents must be based on 30-year, Tier-1 analysis and potential cancer risks for workers must be based on 25-year, Tier-1 analysis. Cancer burden results must be based on 70-year, Tier-1 analysis
 - Location (address or UTM coordinates) and description of the off-site PMI, maximum exposed individual resident (MEIR), and maximum exposed individual worker (MEIW). See Attachment A for the required summary form
 - Location (address or UTM coordinates) and description of any sensitive receptors that are above a cancer risk of ten in one million or above a non-cancer health HI of one
 - Text presenting an overview of the total potential multipathway cancer risk at the PMI, MEIR, MEIW, and sensitive receptors (if applicable). Provide a table of cancer risk by substance for the MEIR and MEIW. Include a statement indicating which of the substances appear to contribute to (i.e., drive) the potential health impacts. In addition, identify the exposure pathways evaluated in the HRA
 - Provide a map of the facility and surroundings and identify the location of the MEIR, MEIW, and PMI
 - Provide a map of 30-year lifetime cancer risk zone of impact (i.e., 1 in one million risk contour), if applicable. Also show the 10, 25, and 100 in one million risk contours, if applicable. If the cancer burden is greater than 0.5, then a map showing the 1 in one million risk contour based on a 70-year lifetime should also be presented
 - Text presenting an overview of the acute and chronic non-cancer hazard quotients or the (total) hazard indices for the PMI, MEIR, MEIW, and sensitive receptors.

Include separate statements (for acute, 8-hour chronic, and annual chronic exposures) indicating which of the substances appear to drive the potential health impacts. In addition, clearly identify the primary target organ(s) that are impacted from acute and chronic exposures

- Identify any subpopulations (e.g., subsistence fishers) of concern
- Table and text presenting an overview of estimates of population exposure
- Version of the Risk Assessment Guidelines and computer program(s) used to prepare the risk assessment

III. Main Body of Report

A. Hazard Identification

- Table and text identifying all substances emitted from the facility. Include the CAS number of substance and the physical form of the substance if possible. The complete list of the substances to be considered is contained in Appendix A of the 2015 OEHHA HRA Guidelines²⁸
- Table and text identifying all substances that are evaluated for cancer risk and/or non-cancer acute and chronic health impacts. In addition, identify any substances that present a potential cancer risk or chronic non-cancer hazard via non-inhalation routes of exposure
- Describe the types and amounts of continuous or intermittent predictable emissions from the facility that occurred during the reporting year. As required by statute, releases from a facility include spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping (fugitive), leaching, dumping, or disposing of a substance into ambient air. Include the substance(s) released and a description of the processes that resulted in long-term and continuous releases

B. Exposure Assessment

This section describes the information related to the air dispersion modeling process that should be reported in the risk assessment. In addition, doses calculated by pathway of exposure for each substance should be included in this section. The educated reader should be able to reproduce the risk assessment without the need for clarification. The location of any information that is presented in appendices, on electronic media, or attached documents that supports information presented in this section, must be clearly identified by title and page number in this section's text and in the document's table of contents.

B.1 Facility Description

²⁸ <https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

Report the following information regarding the facility and its surroundings:

- Facility name
- Facility ID number
- Facility location (i.e., address)
- Local topography
- Facility plot plan identifying: emission source locations, property line, horizontal scale, building heights and dimensions
- Description of the site/route dependent exposure pathways. Provide a summary of the site-specific inputs used for each pathway (e.g., water or grazing intake assumptions). This information may be clearly presented and cross-referenced to the text in an appendix

B.2 Emissions Inventory

Report the following information regarding the facility's sources and emissions in table format; see Appendix K of 2015 OEHHA HRA Guidelines.²⁹ Depending on the number of sources and/or pollutants, this information may be placed in the main body of the report or in an appendix

- Source identification number used by the facility
- Source name
- Source location using UTM coordinates (in meters); with a WGS84 projection
- Source base elevation (m)
- Source height (m)
- Source dimensions (e.g., stack diameter, building dimensions, area/volume size, etc.) (m)
- Stack gas exit velocity (m/s) if applicable
- Stack gas volumetric flow rate (ACFM) if applicable
- Stack gas exit temperature (K)
- Number of operating hours per day and per year
- Number of operating days per week
- Number of operating days or weeks per year
- Report emission control equipment and efficiency by source and by substance. The description should be brief.
- Report emission inventory methods indicating whether emissions are measured or estimated.
- Report emission rates for each toxic substance, grouped by source, in table form

²⁹<https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>

including the following information (see Appendix K of 2015 OEHHA HRA Guidelines). Depending on the number of sources and/or pollutants, this information may be placed in the main body of the report or in an appendix

- Source name
- Source identification number
- Substance name and CAS number
- Annual average emissions for each substance (lbs/yr and g/s). Radionuclides are reported in curies/yr
- Maximum one hour emissions for each substance (lbs/hr and g/s). Radionuclides are reported in millicuries/yr
- Report facility total emission rates by substance for all emittants including the following information (see Appendix K of 2015 OEHHA HRA Guidelines). This information should be in the main body of the report
- Substance name and CAS number
- Annual average emissions for each substance (lbs/yr and g/s). Radionuclides are reported in curies/yr
- Maximum one-hour emissions for each substance (lbs/hr and g/s). Radionuclides are reported in millicuries/yr

B.3 Air Dispersion Modeling

- The HRA should indicate the source and time period of the meteorological data used. Include the meteorological data electronically with the HRA. SCAQMD has AERMOD-ready meteorological data for available stations in the South Coast Air Basin. This data can be downloaded from SCAQMD's website³⁰
- Include proper justification for using the meteorological data. The nearest representative meteorological station should be chosen for modeling. Usually this is simply the nearest station to the facility; however, an intervening terrain feature may dictate the use of an alternate site
- The latest approved version of AERMOD and HARP should be used for all HRAs prepared for the AB 2588 Program
- Table and text that specifies the following information:
 - Selected model options and parameters
 - Receptor grid spacing
- For the PMI, MEIR, MEIW, and any sensitive receptors required by SCAQMD, include tables that summarize the annual average concentrations calculated for all substances
- For the PMI, MEIR, MEIW, and any sensitive receptors required by SCAQMD,

³⁰<http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data>

include tables that summarize the maximum one-hour; chronic 8-hour; and 90-day rolling average (lead only) concentrations

C. Risk Characterization

HARP generates the risk characterization data needed for the outline below. Any data needed to support the risk characterization findings should be clearly presented and referenced in the text and appendices. A listing of HARP files that meet these HRA requirements are provided in Section V. All HARP files should be included in the HRA. Ideally, the HRA report and a summary of data used in the HRA should be on paper and all data and model input and output files should be provided electronically.

The potential cancer risk for the PMI, MEIR, and sensitive receptors of interest must be presented in the HRA's text, tables, and maps using a residential 30-year exposure period. MEIW location should use appropriate exposure periods. For the AB 2588 Program, the 30-year exposure duration should be used as the basis for residential public notification and risk reduction audits and plans. All HRAs must include the results of a Tier-1 exposure assessment. If persons preparing the HRA would like to present additional information (i.e., exposure duration adjustments or the inclusions of risk characterizations using Tier-2 through Tier-4 exposure data), then this information should be presented in separate, clearly titled, sections, tables, and text.

The following information should be presented in this section of the HRA. If not fully presented here, then by topic, clearly identify the section(s) and pages within the HRA where this information is presented.

- Description of receptors to be quantified
- Identify the site/route dependent exposure pathways (e.g., water ingestion) for the receptor(s), where appropriate (e.g., MEIR). Provide a summary of the site-specific inputs used for each exposure pathway (e.g., water or grazing intake assumptions). In addition, provide reference to the appendix (section and page number) that contains the modeling (i.e., HARP/dispersion modeling) files that show the same information
- Tables and text providing the following information regarding the potential multipathway cancer risks at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
 - Location in UTM coordinates
 - Contribution by substance
 - Contribution by source
- Tables and text providing the following information regarding the acute non-cancer hazard quotient at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
 - Location in UTM coordinates
 - Target organ(s)
 - Contribution by substance
 - Contribution by source

- Tables and text providing the following information regarding the chronic non-cancer (inhalation and oral) hazard quotient at the PMI, MEIR, MEIW, and any sensitive receptors of concern:
 - Location in UTM coordinates
 - Target organ(s)
 - Contribution by substance
 - Contribution by source
- Table and text presenting estimates of population exposure. Tables should indicate the number of persons exposed to a total cancer risk greater than 10^{-6} , 10^{-5} , 10^{-4} , etc. and total hazard quotient or HI greater than 0.5, 1.0, 3.0, and 5.0. Total excess cancer burden should also be provided
- Provide maps that illustrate the HRA results as noted below. The maps should be an actual street map of the area impacted by the facility with UTM coordinates and facility boundaries clearly labeled. This should be a true map (i.e., one that shows roads, structures, etc.), drawn to scale, and not a schematic drawing. Color aerial photos are usually the most appropriate choice. The following maps are required:
 - Locations of the PMI, MEIR, MEIW, and sensitive receptors for the cancer and non-cancer acute and chronic risks. Also show the facility emission points and property boundary
 - Total cancer risk (including multipathway factors) contours for the following risk levels: 100, 25, 10, and 1 in a million. Maps should be provided for the minimum exposure pathways (i.e., inhalation, soil ingestion, dermal exposure, and mother's milk) and for all applicable exposure pathways (i.e., minimum exposure pathways plus additional site/route specific pathways). Include the facility location on the maps
 - Non-cancer acute and chronic HI contours for the following levels: 5.0, 3.0, 1.0 and 0.5. Include the facility location
- The risk assessor may want to include a discussion of the strengths and weaknesses of the risk analyses and associated uncertainty directly related to the facility HRA
- If appropriate, comment on the possible alternatives for control or remedial measures
- If possible, identify any community concerns that influence public perception of risk

D. References

IV. **Appendices**

The appendices should contain all data, sample calculations, assumptions, and all modeling and risk assessment files that are needed to reproduce the HRA results. All data and model input and output files should be provided electronically (e.g., uploaded to SCAQMD's OnBase system or on USB Flash Drive). All appendices and the information they contain should be referenced, clearly titled, and paginated. The following are potential appendix topics unless presented elsewhere in the HRA:

- List of all receptors in the zone of impact and their associated risks
- Emissions by source
- Census data
- Maps and facility plot plan
- All calculations used to determine emissions, concentrations, and potential health impacts at the PMI, MEIR, MEIW, and sensitive receptors
- Presentation of alternate risk assessment methods (e.g., alternate exposure durations, or Tier-2 to Tier-4 evaluations with supporting information)

V. Computer Files

The list of electronic files that must be submitted for the HRA are found in Table 7 of Chapter 3 of this document. They must be useable (i.e., can be opened and run in AERMOD/HARP if file is an AERMOD/HARP file). Any supplementary files should be submitted in formats that will not lose formatting in transfer (i.e. pdf for text documents).

Attachment A to Appendix B

HRA Summary Form

This summary form should accompany all HRAs and be presented at the beginning of the Executive Summary.



South Coast Air Quality Management District
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HEALTH RISK ASSESSMENT SUMMARY FORM

(Required in Executive Summary of HRA)

Facility Name : _____
 Facility Address: _____

 Type of Business: _____
 SCAQMD ID No.: _____

A. Cancer Risk

(One in a million means one chance in a million of getting cancer from being constantly exposed to a certain level of a chemical over a period of time)

1. Inventory Reporting Year : _____
2. Maximum Cancer Risk to Receptors : *(Offsite and residence = 30-year exposure, worker = 25-year exposure)*
 - a. Offsite _____ in a million Location: _____
 - b. Residence _____ in a million Location: _____
 - c. Worker _____ in a million Location: _____
3. Substances Accounting for 90% of Cancer Risk: _____
 Processes Accounting for 90% of Cancer Risk: _____
4. Cancer Burden for a 70-yr exposure: *(Cancer Burden = [cancer risk] x [# of people exposed to specific cancer risk])*
 - a. Cancer Burden _____
 - b. Number of people exposed to >1 per million cancer risk for a 70-yr exposure _____
 - c. Maximum distance to edge of 70-year, 1×10^{-6} cancer risk isopleth (meters) _____

B. Hazard Indices

*[Long Term Effects (chronic) and Short Term Effects (acute)]
 (non-carcinogenic impacts are estimated by comparing calculated concentration to identified Reference Exposure Levels, and expressing this comparison in terms of a "Hazard Index")*

1. Maximum Chronic Hazard Indices:
 - a. Residence HI: _____ Location: _____ toxicological endpoint: _____
 - b. Worker HI : _____ Location: _____ toxicological endpoint: _____
2. Substances Accounting for 90% of Chronic Hazard Index: _____
3. Maximum 8-hour Chronic Hazard Index:

8-Hour Chronic HI: _____ Location: _____ toxicological endpoint: _____
4. Substances Accounting for 90% of 8-hour Chronic Hazard Index: _____
5. Maximum Acute Hazard Index:

PMI: _____ Location: _____ toxicological endpoint: _____
6. Substances Accounting for 90% of Acute Hazard Index: _____

C. Public Notification and Risk Reduction

1. Public Notification Required? Yes No
 - a. If 'Yes', estimated population exposed to risks > 10 in a million for a 30-year exposure, or an HI >1

2. Risk Reduction Required? Yes No

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Appendix C

HRA Review Check List

The check list contained here is used by SCAQMD staff to standardize the review of HRAs. It is being provided to assist facilities and consultants in their HRA preparation.

Facility Name: _____
Street Address: _____
City: _____
HRA Consultant: _____

Facility ID: _____
Zip Code: _____
Reviewer: _____

Dispersion Modeling

1. Control Pathway

- a. “Regulatory Default Option” checked? **Yes No** _____
 - i) If No, explain why: _____
- b. Urban Option
 - i) “Apply All Sources” checked? **Yes No** _____
 - ii) “Population” from the latest Census data is added for county? **Yes No** _____
 - iii) “Roughness Length” = 1.0 (default value) **Yes No** _____

2. Source Pathways

- a. Sources
 - i) Check if source list is consistent with following documents:
 - Base Year AER source list? **Yes No** _____
 - District equipment list (permit list)? **Yes No** _____
 - ii) “Source Type” determined properly? **Yes No** _____
 - iii) “Volume/Area source dimensions” are reasonable? **Yes No** _____
 - iv) “UTMs” are consistent with Plot Plan? **Yes No** _____
 - v) “Elevation” of source(s) are imported from AERMAP output file? **Yes No** _____
 - vi) Adequate “Emission Rates” used? (default 1 g/s) **Yes No** _____
 - vii) “Release Heights” reasonable? **Yes No** _____
 - viii) Stack parameters are consistent with those provided in the report **Yes No** _____
 - ix) Accurate and sufficient details entered for every source? **Yes No** _____
- b. Variable Emissions
 - i) Default emission rate used? (default: 1 g/s, 24 hrs/day, 365 days/yr) **Yes No** _____
 - ii) If not, appropriate emission rate factors are used? (Table 2) **Yes No** _____
- c. Buildings
 - i) All surrounding buildings included? **Yes No** _____
 - ii) Tier Heights and corner points reasonable? **Yes No** _____

- If No in any,

3. Receptors

a. Grid receptors

- i) Included? (should be “Yes”) Yes No
- ii) Spacing? (should be no greater than 100 meters) Yes No
- Assumed spacing meters
- iii) Elevations included? (should be “Yes”) Yes No
- iv) Is gridded area sufficient to cover acceptable risk levels? Yes No

b. Property boundary receptors

- i) Included? (should be “Yes”) Yes No
- ii) Spacing? (should follow guidance in Table 3) Yes No
- Assumed spacing meters
- iii) Elevations included (should be “Yes”) Yes No

c. Sensitive receptors

- i) Included? (should be “Yes” if cancer risks >1 in a million) Yes No
- ii) Elevation included? (should be “Yes”) Yes No
- iii) Verified from review of Google Earth or other source Yes No

d. Census block receptors

- i) Included? (should be “Yes” if cancer risks >1 in a million) Yes No
- ii) Elevation included? (should be “Yes”) Yes No

e. Pathway receptors included? (should be “No”) Yes No

4. Meteorology Pathway (The latest met data files shall be used.)

- a. Surface Met Data File: .sfc
- b. Profile Met Data File: .pfl
- c. Base Elevation of Met Station (PROFBASE): meters
- d. Does the Met Station reflect prevailing meteorological conditions (ex., prevailing winds), surrounding land use, and topography that exists at the source? This is not always the closest Met Station (Table 1) Yes No

5. Terrain Option

- a. (Step 1) is Anchor location correct? Yes No
- b. (Step 2) is appropriate DEM/NED data file linked? Yes No

- i) DEM/NED file used: _____
- ii) Is (Are) the DEM/NED file(s) covering sufficient area? **Yes No** _____
- c. (Step 3) independently ran AERMAP? **Yes No** _____
- 6. Building Downwash
- 7. Independently ran BPIP Prime? **Yes No** Duplication of AERMOD Results
 - a. Independently ran AERMOD? **Yes No** _____
 - b. Average χ/Q first high values for each source group reproduced? **Yes No** _____
(not required; useful if diagnosing discrepancies)
 - c. Max 1-hour χ/Q first high values for each source group reproduced? **Yes No** _____
(not required; useful if diagnosing discrepancies)
- 8. All plt files are generated successfully? **Yes No** _____

Site Visit

- Site visit conducted? **Yes No** _____
 - a. If Yes, **Date** _____ **Time** ,
 - b. Facility Contact: _____
 - c. SCAQMD Staff: _____

Program Used

- 1. Facility submittal package is processed by the latest version of HARP? **Yes No** _____
 - a. If NOT, name software used: _____
- 2. This review is performed using the latest version of HARP? **Yes No** _____
 - a. If NOT, name software used: _____

General Comments

Appendix D

Elements of a Risk Reduction Plan

INTRODUCTION

Facilities with an approved HRA with health risks greater than or equal to the Action Risk Levels as identified in SCAQMD Rule 1402 are required to submit an RRP within the specified timeframes for each specific category as specified in the Rule. Facilities participating in the Voluntary Risk Reduction Program under Rule 1402 should follow the *Guidelines for Participating in the Rule 1402 Voluntary Risk Reduction Program* that are available online.³¹ The owner or operator is responsible for preparing a RRP that identifies the risk reduction measures that should be implemented in order to reduce the impact of the total facility emissions below the Action Risk Levels.

ELEMENTS OF A RISK REDUCTION PLAN

1. The name, address, and SCAQMD facility identification number, and Standard Industrial Code (SIC) and North American Industry Classification System (NAICS) codes of the facility;
2. A facility risk characterization which includes an updated ATIR and HRA, if the risk due to total facility emissions has increased above or decreased below the levels indicated in the previously approved HRA;
3. Identification of each source from which risk needs to be reduced in order to achieve a risk below Rule 1402 Action Risk Levels;
4. For each source identified in subparagraph (3), an evaluation of the risk reduction measures available to the owner or operator, including emission and risk reduction potential, and time necessary for implementation;
 - An updated ATIR and HRA if total facility risks are different than what was approved in the previously approved HRA.
5. Specification of the risk reduction measures that shall be implemented by the owner or operator to comply with the requirements of Rule 1402, subdivision (i) to achieve the Action Risk Level or the lowest achievable level;
6. A schedule for implementing the specified risk reduction measures as quickly as feasible. The schedule shall include the submittal of all necessary applications for permits to construct or modify within 180 days of approval of the RRP, or in accordance with another schedule subject to approval by the Executive Officer, and specify the dates for other increments of progress associated with implementation of the risk reduction measures;
7. If requesting a time extension, the plan must also include the following information:
 - A description of the risk reduction measure(s) for which a time extension is needed;
 - The reason(s) a time extension is needed;
 - Progress in implementing risk reduction measures in the plan;
 - For RRP, estimated health risks at the time of the extension request and at the end

³¹ http://www.aqmd.gov/docs/default-source/planning/risk-assessment/vrrp_guidelines.pdf?sfvrsn=4

of the risk reduction period; and the length of time extension requested.

The Executive Officer will review the request for the time extension and will approve or reject the time extension based on the following criteria:

- The facility-wide health risk is below the Significant Risk Level at the time of submittal of the time extension request;
 - The owner or operator provides sufficient details identifying the reason(s) a time extension is needed that demonstrates to the Executive Officer that there are specific circumstances beyond the control of the owner or operator that necessitate additional time to complete implementation of the plan. Such a demonstration may include, but is not limited to, providing detailed schedules, engineering designs, construction plans, permit applications, purchase orders, economic burden, and technical infeasibility; and
 - The time extension will not result in an unreasonable risk to public health.
8. An estimation of the residual health risk after implementation of the specified risk reduction measures; and
9. Proof of certification of the RRP as meeting all requirements by an individual who is officially responsible for the processes and operations of the facility. The person who makes this certification must be one of the following:
- An engineer who is registered as a professional engineer pursuant to Business and Professional Code section 6762.
 - An individual who is responsible for the operations and processes of the facility.
 - An environmental assessor registered pursuant to Health and Safety Code section 25570.3.

Appendix E
Elements of a Risk Reduction Progress Report

INTRODUCTION

Facilities with an approved RRP or VRRP as identified in SCAQMD Rule 1402 are required to submit an **Annual Progress Report** every twelve months as long as their total facility risk meets or exceeds the Rule 1402 Action or Significance Risk Levels.

ELEMENTS OF A RISK REDUCTION PROGRESS REPORT

1. A description of any increases or decreases in emissions of toxic air contaminants that have occurred at the facility, including a description of any associated permits that were subject to Rule 1401, since approval of the RRP or VRRP;
2. The increments of progress (interim facility risks) achieved in implementing the risk reduction measures specified in the RRP or VRRP. The interim facility risk should represent the previous twelve month period;
3. Submittal dates of all applicable permit application(s), the status of the application(s), the name of the regulatory agency, and the corresponding permit number(s);
4. A schedule indicating dates for future increments of progress; and
5. Identification of any increments of progress that will be achieved later than specified in the plan and the reason for achieving the increments late.

Appendix F

Elements of Early Action Reduction Plans for Potentially High Risk Level Facilities

INTRODUCTION

Facilities designated as a Potentially High Risk Level Facility by the Executive Officer, as identified in SCAQMD Rule 1402, are required to submit an Early Action Reduction Plan within 90 days of notification of such designation. The purpose of the Early Action Reduction Plan is to expedite risk reduction to mitigate the elevated health risk to protect public health.

ELEMENTS OF AN EARLY ACTION REDUCTION PLANS FOR POTENTIALLY HIGH RISK LEVEL FACILITIES

Within 90 days of the date of notification by the Executive Officer that the facility is a Potentially High Risk Level Facility, an owner or operator shall submit an Early Action Reduction Plan that identifies a list of measures that can be implemented immediately to reduce the facility-wide health risk. The Early Action Reduction Plan shall include:

1. The name, address, and SCAQMD Facility ID number;
2. Identification of device(s) or process(es) that are the key health risk driver(s);
3. Risk reduction measure(s) that can be implemented by the owner or operator that includes but are not limited to procedural changes, process changes, physical modifications, and curtailments; and
4. A schedule for implementing the specified risk reduction measures.

Appendix G
List of Acronyms and Abbreviations

List of Acronyms and Abbreviations

Acronym	Description
AB 2588	Air Toxics “Hot Spots” Information and Assessment Act
AER	Annual Emissions Reporting
ATIR	Air Toxics Inventory Report
CARB	California Air Resources Board
CAS	Chemical Abstracts Service
DICE	Diesel Internal Combustion Engine
EIM	Emission Inventory Module
HARP	Hotspots Analysis and Reporting Program
HI	Hazard Index
HRA	Health Risk Assessment
MEIR	Maximum Exposed Individual Resident
MEIW	Maximum Exposed Individual Worker
MICR	Maximum Individual Cancer Risk
NAICS	North American Industry Classification System
ODC	Ozone Depleting Compound
OEHHA	Office of Environmental Health Hazard Assessment
PMI	Point of Maximum Impact
RRP	Risk Reduction Plan
SB 1731	Facility Air Toxic Contaminant Risk Audit and Reduction Plan
SIC	Standard Industrial Code
SRP	(California) Scientific Review Panel
SCAQMD	South Coast Air Quality Management District
U.S. EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VRRP	Voluntary Risk Reduction Plan
WAF	Worker Adjustment Factor
WGS84	World Geodetic System 1984