South Coast Air Quality Management District

DRAFT Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act

DRAFT

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1. INTRODUCTION

This guidance document is a supplement to a document prepared by the State of California Office of Environmental Health Hazard Assessment (OEHHA) entitled, "Air Toxics Hot Spots Program Risk Assessment Guidelines" (referred to as the OEHHA Guidelines).[1] Facilities required to submit risk assessments to the South Coast Air Quality Management District (SCAQMD) under the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB2588) must follow the OEHHA Guidelines pursuant to Health and Safety Code 44360(b)(2). While the information provided in the OEHHA Guidelines is complete, there are several areas in the document that refer the user to their local air district for specific or additional requirements. This supplemental guidance addresses those areas and other issues that have arisen during the implementation of the AB2588 Program.

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

Please visit SCAQMD's AB2588 webpage provided below for additional information and documents. Questions regarding this document, health risk assessment methodology, and other AB2588 issues should be directed to Ian MacMillan at (909) 396-3244, or via email at imacmillan@aqmd.gov.

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[1] OEHHA. 2015. http://oehha.ca.gov/air/hot_spots/hotspots2015.html
[2] http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588/forms

2. OVERVIEW OF THE AB2588 PROGRAM

In 1987, the California legislature adopted the Air Toxics "Hot Spots" Information and Assessment Act; also known as Assembly Bill 2588 (or AB2588). The goals of the Act are to collect emissions data, identify facilities having localized impacts to 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 SB 1731), which requires facilities to develop and implement measures to reduce impacts if risks are found above thresholds specified by SCAQMD. There are five important components to the AB2588 program as follows:

- *Emission Reporting* – Facilities subject to AB2588 submit an air toxics inventory every four years through the Annual Emissions Reporting Program.
- *Prioritization* - From the reported toxic emissions, 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 and Air Toxics Inventory Report (ATIR)
- *Risk Assessment* - High priority facilities must prepare a Health Risk Assessment (HRA)
- *Public Notice* - If the risk reported in the HRA exceeds specific thresholds, then the facility is required to provide public notice to the affected community.
- *Risk Reduction* - Facilities with health risks above the action risk levels in Rule 1402 must reduce their risks below the action risk levels.

Figure 1 below provides an overview of the AB2588 program and the two paths by which a facility becomes subject to AB2588 requirements.

2.1 Background

There are four steps involved in the risk assessment process; 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. Each step is briefly discussed below.

Hazard Identification

For air toxics sources, hazard identification involves determining the type of adverse health effect associated with exposure of the pollutant of concern emitted by a facility, including whether a pollutant is considered human carcinogen or a potential human carcinogen.

Exposure Assessment

The purpose of exposure assessment is to estimate the extent of public exposure to emitted substances for potential cancer, noncancer health hazards for chronic and acute, and repeated 8-hour exposures. This involves estimation of long-term (annual), short-term (1-hour maximum), and 8-hour average exposure levels.

Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to a chemical by its modeled concentration. Dose can be calculated as follows:

Dose = Concentration x Exposure

Risk Characterization

This is the final step of the risk assessment in which the information from exposure assessment and dose-response assessment are combined to assess total risk to the surrounding community.

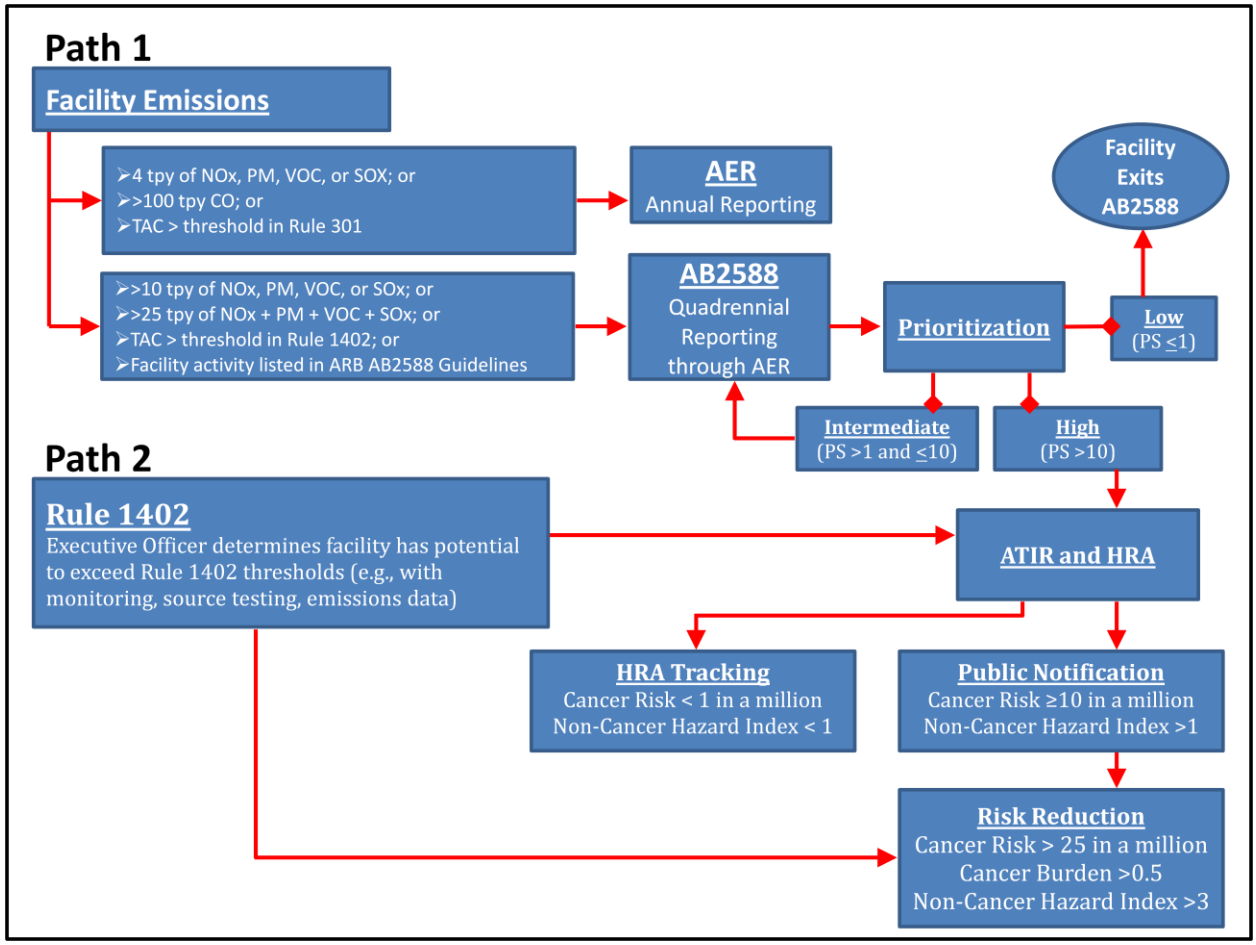

Figure 1. Overview of the AB2588 Program and illustration of the two paths by which a facility becomes subject to AB2588 requirements.

2.2 Revisions

The major revisions to this document include incorporation of updated risk assessment methodologies pursuant to OEHHA's 2015 update of its Guidance Manual. These include:

- Increased risk to children from cancer causing substances;
- Higher breathing rates for children;
- Lower exposure durations for residents and workers;
- Different multipathway calculation methodologies;
- Incorporation of AERMOD air dispersion model into HARP2 in place of the previously used ISCST3 model;
- Inclusion of the 8-hr chronic non-cancer risk estimate;
- Calculation of risk in individual age bins (e.g., third trimester, 0-2 years, etc..) rather than a single lifetime calculation;

These items are described in greater detail in the following sections. The first three come from the recent revisions to OEHHA's Guidance Manual. The last one is unique to the SCAQMD and these procedures.

3. GUIDELINES

Guidance and procedures are provided for various aspects of the AB2588 program in this section.

3.1. Initial Toxics Inventory

The Annual Emissions Reporting (AER) software is used to:

- Satisfy the quadrennial (once in four year) reporting requirements of the AB2588 Program, and
- Get an initial inventory of air toxics from facilities new to the AB2588 Program.

Facilities in the AB2588 Program are required to report their toxic emissions to the SCAQMD once every four years. Toxics emission reporting for the AB2588 Program is incorporated into the SCAQMD's AER Program. Under the AER Program, facilities which have the potential to emit: 1) four tons per year (tpy) or more of VOC, NO_X, SO_X, PM, or 100 tpy or more of CO; or 2) any one of 24 toxic air contaminants (TACs) and ozone depleting compounds (ODCs) listed in Table 2, are required to report their emissions annually to the SCAQMD. 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 software used for reporting emissions is available on the SCAQMD website.[3] There are approximately 2,000 facilities in the AER Program.

Table 1. Reported TACs and ODCs under the AER Program.

Ammonia	Chlorinated dioxins & 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

Currently, the data collected over the years in the AER program is used to determine candidates for the AB2588 Program. Facilities that meet one of the following conditions are required to prepare a comprehensive toxics inventory if:

- They emit 10 tpy or more of VOC, NOx, SOx, or PM;
- They emit 25 tpy or more of a combination of VOC, NOx, SOx, and PM;
- They emit less than 10 tpy of VOC, NOx, SOx, or PM, but the facility activity is listed in ARB's Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program[4];
- Their emissions exceed one or more of the reporting thresholds in Table 3a or 3b; 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 must report emissions of over 170 substances (Appendix A), provide the distances to the

[3] http://www.aqmd.gov/home/regulations/compliance/annual-emission-reporting
[4] http://www.arb.ca.gov/ab2588/2588guid.htm

nearest residential and commercial receptors, and note the facility operating conditions (e.g., operating hrs/day, operating days/week, operating weeks/yr) using the AER software. 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. A facility's prioritization score determines its fees and if it is necessary to prepare a HRA.

Table 2a. Emissions Reporting Thresholds for Any Industry*

Toxic Air Contaminant (Any Industry)	Threshold (lbs/yr)
1,3 Butadiene	2
Benzene	14
Cadmium	0.09
Formaldehyde	67
Hexavalent Chromium	0.002
Methylene Chloride	400
Nickel	1.5
Perchloroethylene	67

Table 2b. Emission Reporting Thresholds for Specific Industries*

Industry	TAC	Threshold (lbs/yr)
Biomedical Sterilization	Ethylene Oxide	4.5
Dry Cleaning	Perchloroethylene	67
	Methylene Chloride	400
Gas Stations	Benzene	14
Metal Finishing	Hexavalent Chromium	0.002
	Cadmium	0.09
	Nickel	1.5
	Copper	500
Motion Picture Film Processing	Perchloroethylene	67
Rubber	Chlorinated Dibenzofurans, Benzene, Xylenes, Toluene, Phenol, and Methylene Chloride	1,000 lbs of rubber product processed per year
Wood Stripping	Methylene Chloride	400
	DEHP	32
	Glycol Ether and their acetates + EGME + EGEEA	500
	EGBE + EGEE	2,000
	EGMEA + EGME	1,000

* The emission levels are back-calculated from cancer risks of 25 in one million and/or a hazard index of 3 using the risk assessment procedures for Rule 1401 and 212.

3.2. Prioritization

AB2588 requires the SCAQMD staff to designate high, intermediate, and low priority categories and include each facility within the appropriate category based on its individual priority. Per the requirements of AB2588, the 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 the SCAQMD determines that the facility may pose a significant risk to receptors. The SCAQMD procedures also include adjustment factors for exposure period, averaging times, and the treatment of multi-pathway pollutants. The prioritization procedures are available at the SCAQMD's web site.[5]

A facility receives two scores: one for carcinogenic effects and the other for non-carcinogenic effects. The facility is then ranked based on the higher of the two scores. Three categories are used in the ranking: high priority (Category A), intermediate priority (Category B), and low priority (Category C). Facilities designated as high priority are required to submit heath risk assessments to determine the risk to their surrounding community once they have been notified by SCAQMD staff of their priority score. Facilities ranked as intermediate priority are considered to be "District Tracking" facilities, which are then required to submit complete toxics inventories once every four years, using the AER software. Facilities ranked as low priority are exempt from reporting. Priority scores are re-calculated each time a facility updates its toxic emission inventory. Table 4 summarizes the priority score categories and the actions required by each category.

Table 3. Priority Score Categories

Category	Facility Priority Score (PS)	Actions
High Priority (Category A)	PS > 10	Prepare HRA; update emissions quadrennially
Intermediate Priority (Category B)	1 < PS ≤ 10	Update emissions quadrennially
Low Priority (Category C)	PS ≤ 1	Exempt from AB2588 Program

The SCAQMD staff considers requests from Category A facilities to be reprioritized after detection of errors or other problems with their initial inventory report. The following sections discuss the criteria used for evaluating requests to reprioritize a facility.

The facility is informed, in writing, if their category status has been changed. If a facility has not been informed in writing of a change in category, a health risk assessment must be prepared and submitted to the SCAQMD.

3.2.1. Receptor Distance

One of the factors considered when prioritizing facilities into Category A, B or C 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 the SCAQMD staff to prioritize that

[5] http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588/prioritization

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 website.[6]

3.2.2. Computational Errors

If computational errors or conservative assumptions were made in the initial inventory report that overestimated emissions and resulted in Category A classification, the facility may correct the errors and submit the corrected estimates and supporting documentation to the AB2588 staff. In order to be considered, 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 the SCAQMD must use process rates and emissions from the initial reporting year to prioritize a facility. Changes in emissions estimates due to changes in process rates submitted for the update cannot be used to re-categorize a facility.

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 initial inventory report to recalculate emissions and the priority score of Category A facilities.

3.2.4. Equipment/Process Shutdowns or Process Modifications

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

If a process has been modified since the initial inventory 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 the AB2588 Section.

3.2.5. Facility Closures

If the entire facility is closed prior to Category A classification or if a facility is scheduled for complete closure, this information must be reported to the AB2588 Section. Upon review, the SCAQMD staff will make a decision whether the facility should submit a risk assessment. Factors that must be considered include the status of permits granted to the facility by the SCAQMD and the nature of any ongoing activities at the facility. Unless a facility is informed by

[6] http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588/forms

the SCAQMD in writing that an AB2588 health risk assessment is no longer required, the facility operator must submit a health risk assessment 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 a health risk assessment unless the facility no longer emits any substances required to be reported under AB2588. In such case, the new facility owner/operator must provide the SCAQMD staff the necessary documentation to be exempt from reporting requirements of AB2588.

3.3. Emission Estimates Approved for Health Risk Assessment

Facilities subject to the submittal of health risk assessments under AB2588 Program must estimate and submit their detailed toxic emissions using ARB's Hotspots Analysis and Reporting Program version 2 (HARP2).[7] This detailed Air Toxics Inventory Report (ATIR) should include, at a minimum, the elements outlined in Appendix B. OEHHA has grouped the substances to be reported into three groups as shown in Appendix A of the OEHHA Guidelines.[8] 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 HRA including those calculated in the inventory report 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 HRA; however, facilities must report whether the substance is used, produced, or otherwise present on-site. These substances can be simply listed in a table in the HRA.

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

The intent of the AB2588 program is that facilities perform risk assessments using the process rates and emissions data submitted in their initial inventory report (see Section 3.1). The SCAQMD receives requests from facilities to use process rates and emissions data other than those reported in their initial inventory report. As a general policy, the 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 air toxics inventory report must be reported to the SCAQMD 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.

[7] http://www.arb.ca.gov/toxics/harp/harp.htm
[8] http://oehha.ca.gov/air/hot_spots/hotspots2015.html

3.3.2. Emission Reductions

Emissions reductions must be verified to be considered as an allowable change. Verified emission reductions are those which are permanent, can be substantiated, and must be enforceable. Verification requirements include specifications in the SCAQMD 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:

- 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 the 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 the AB2588 Section of Planning.
- A listed substance is 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 the SCAQMD must be sent to the AB2588 Section.
- Pollution control equipment which has been issued a permit-to-construct, has been installed, and is now 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 have resulted in permanent and enforceable reductions. Provide documentation on how reductions are or will be achieved by a specified date.

If the facility wishes to use verified emission reductions in their risk assessment, documentation of these verified changes must be provided. <u>Note that new emissions or emission increases, due to process changes or new equipment, must also be quantified and included in any risk assessment which incorporates emission reductions since the initial inventory was prepared.</u>

3.3.3. Modifications in Progress

Any modifications to reduce risk must be in place and verifiable in order to be considered in calculating allowable emissions reductions. Documentation of the reductions must be submitted to the SCAQMD along with the health risk assessment. Examples of such modifications include the following:

- A permit to construct has been granted for control equipment but the equipment is not yet in place and/or a permit to operate has not been issued. In order to be considered, a copy of the permit and a letter indicating intent to construct must be provided to the AB2588 Section.
- A listed substance will be replaced or substituted. The facility must apply for a change in

permit conditions, if applicable, and have the change in place. A copy of the 400A application form submitted requesting a change of permit conditions and a copy of the check for the filing fee must also be sent to the AB2588 Section.

For these "reductions in progress", the facility should contact the AB2588 Section to obtain approval and determine if the intended changes can be considered as verifiable emission reductions. Upon approval, the facility must estimate cancer risk, cancer burden, and hazard indices for both the initial emissions and for the estimated emissions after the proposed future reductions are complete. The two risk estimates must be presented separately in the HRA submitted to the SCAQMD. The dual estimate provides a "back up" in case reductions proposed by the facility are not implemented as planned.

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 risk assessment. 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 the AB2588 Section, it may be considered for approval. The SCAQMD will notify the facility in writing if new source test results are approved for use in the AB2588 HRA. Otherwise, the facility cannot use the new source testing data. Please call the AB2588 section 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 (TAC) by California Air Resources Board (CARB) in 1998, and were added to SCAQMD Rule 1401 list of compounds on March 7, 2008. Under the current AB2588 Air Toxics “Hot Spots” Emission Inventory Criteria and Guidelines Regulation, amended on August 27, 2007, facility operators are required to include health risk impacts 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.[9]

3.4. Uncertainty Analyses and Alternative Health Risk Assessments

The OEHHA guidelines describe uncertainty analyses (or risk assessments with alternate assumptions) that may be provided at the discretion of the SCAQMD. The SCAQMD staff will allow such analyses to be included as one of the appendices to the facility's risk assessment document. This analysis would be a supplement to the primary risk assessment that is carried out using the assumptions presented in the OEHHA guidelines and the guidance given here.

[9] http://www3.aqmd.gov/hb/2007/January/070128a.html

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 risk assessment document. If an alternative risk analysis 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 risk assessment document will be considered unacceptable and returned to the facility owner/operator for revision.

3.5. Reporting Format

The reporting format for the HRA must follow the detailed outline presented in Appendix C. A completed Health Risk Assessment Summary must be included in the executive summary of all health risk assessments submitted to the SCAQMD; a sample of the form can be downloaded from the SCAQMD's AB2588 website.[10] The detailed HRA outline provided in Appendix C lists the HARP2 computer files to be included in a CD with the HRA. Three (3) copies of the HRA and three (3) copies of CD(s) should be sent to SCAQMD staff. The HRA, in electronic form (i.e., pdf format), should also be included on the CD.

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 of 0.105 is rounded to 0.11)

3.6. Notification and Risk Reduction Levels

The SCAQMD Governing Board has adopted risk levels for purposes of notification pursuant to the AB2588 program. In addition, SCAQMD Rule 1402 establishes action risk levels that require risk reduction; the levels are summarized in Table 5. Additional information regarding the SCAQMD's notification procedures are available on the web site.[11]

Table 4. Public Notification and Risk Reduction Levels.

Risk Variable	Public Notification Levels	Risk Reduction Levels
Cancer risk	≥ 10 in a million	≥ 25 in a million
Non-cancer risk	Hazard index > 1	Hazard index ≥ 3
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,

[10] http://www.aqmd.gov/home/regulations/compliance/toxic-hot-spots-ab-2588/forms
[11] http://www.aqmd.gov/home/about/public-notices/ab-2588-notices

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 (HIs) 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 hazard index 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 any risk assessment, it is necessary to define a zone of impact or a method to set boundaries on the analysis. For AB2588 purposes, the SCAQMD requires that the risk assessment must encompass the area subject to an added lifetime cancer risk (all pathways) of one in one million or greater ($\geq 1.0 \times 10^{-6}$). For non-carcinogens the analysis must bound the area subject to a hazard index of 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 point of maximum impact because the land is currently vacant, 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 the 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. For carcinogen impacts, total risk isopleths for facilities should be plotted on the street map provided through HARP2 at cancer risk intervals of 1, 10, 25, and 100 in a million. Isopleths for non-carcinogens must include levels corresponding to a HI of 0.5, 1, 3, and 5.

Separate maps should be provided for each of the three risk variables: cancer risks, non-cancer acute risks, and non-cancer 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 point of maximum impact (off-site) must be shown in detail. This may require a separate map. If sensitive receptors are located within the zone of impact, then risk and hazard index 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 health risk assessment. A basic understanding of dispersion modeling is presumed. For a more detailed overview of regulatory modeling procedures, the reader is referred to the U.S. Environmental Protection Agency's "Guideline on Air Quality Models"[12] and/or the OEHHA guidelines.

3.11.1. Facility Description and Source Information

The HRA report should contain a brief description of the facility and its activities as shown in the detailed HRA report outline provided in Appendix C. Table 6 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 6 are necessary to accurately characterize the source emissions. The reader is referred to the detailed outline provided in Appendix C for additional information and guidance.

[12] http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

Table 5. Required Source Information.

<u>Information on the Facility and Its Surroundings</u>
• Location (i.e., address and UTM coordinates in WGS84)
• Local land use (within 20 km)
• Local topography (within 20 km)
• Facility plot plan
  – Property boundaries
  – Horizontal scale
  – Building heights (for building downwash calculations)
  – Source locations including elevations
 	
<u>Point Source Information (stacks, vents, etc.)</u>
• 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
 	
<u>Fugitive Source Information (area and volume sources)</u>
• 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 AB2588 risk assessments prepared for the SCAQMD must use the most recent version of Hotspots Analysis and Reporting Program (currently HARP2).[13][7] The U.S. Environmental Protection Agency (U.S. EPA) air quality dispersion model, called AERMOD is used by HARP2 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.[14] Table 7 summarizes the dispersion modeling assumptions required by the SCAQMD. AERMOD-ready meteorological data are available on the SCAQMD website.

[13] http://www.arb.ca.gov/toxics/harp/harp.htm
[14] http://www.epa.gov/scram001/dispersion_prefrec.htm

Table 6. 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 defaults options should be implemented for all projects.

3.11.3. Meteorological Data

The SCAQMD has AERMOD-ready meteorological data from 27 stations in the South Coast Air Basin, as shown in Figures 2 and 3, and listed in Tables 8 and 9.

This data is in a format which can be directly read by U.S. EPA's dispersion model, AERMOD and by ARB's health risk assessment tool, HARP2. The nearest representative meteorological station should be chosen for modeling. Usually this is simply the nearest station; however, an intervening terrain feature may dictate the use of an alternate station. Modelers should contact the AB2588 Section regarding the most representative meteorological station if necessary. The data are available on the following SCAQMD website.[15]

[15] http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-1

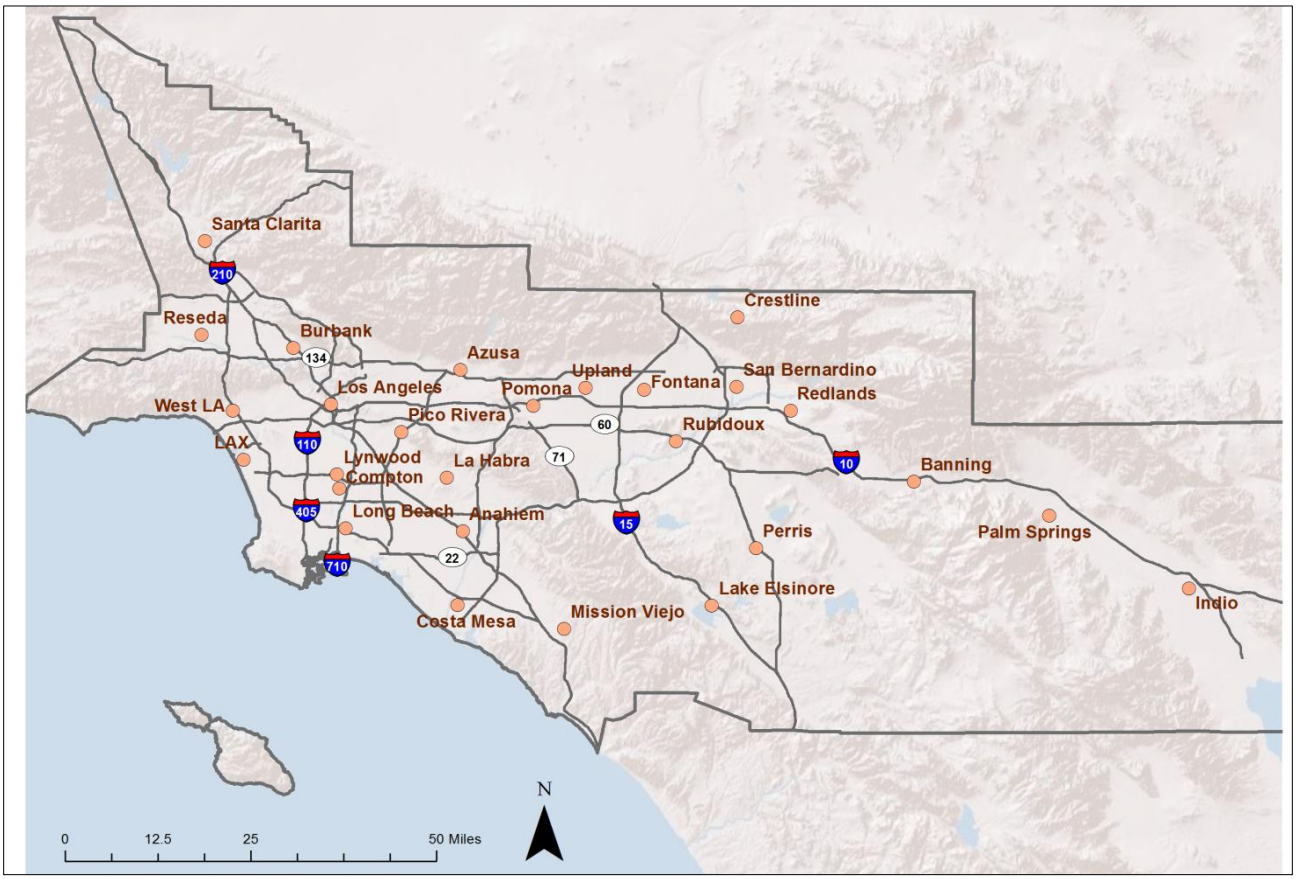

Figure 2. Locations of Meteorological Stations with AERMOD-ready data in the South Coast Air Quality Management District

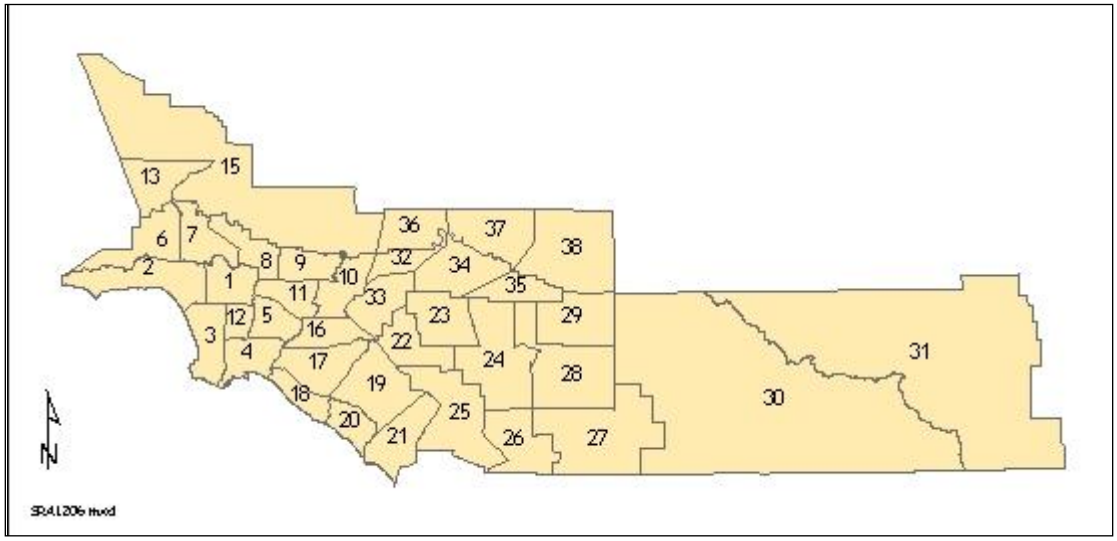

Figure 3. Source Receptor Areas (SRAs) in the South Coast Air Quality Management District. Refer to Table 9 to find the appropriate meteorological station to use for each SRA.

Table 7. Locations of Meteorological Stations

Station	Latitude/Longitude		UTM Coordinates	
	Latitude	Longitude	East (km)	North (km)
Anaheim	33:49:50	117:56:19	413.14	3743.57
Azusa	34:08:11	117:55:26	414.81	3777.47
Banning Airport	33:55:15	116:51:30	513.10	3753.19
Burbank	34:10:33	118:19:01	378.62	3782.24
Central LA	34:03:59	118:13:36	386.79	3770.00
Compton	33:54:05	118:12:18	388.59	3751.88
Costa Mesa	33:40:26	117:55:33	414.16	3726.19
Crestline	34:14:29	117:16:32	474.62	3788.76
Fontana	34:06:01	117:29:31	454.62	3773.19
Indio	33:42:30	116:12:57	572.67	3729.90
La Habra	33:55:31	117:57:08	411.98	3754.08
Lake Elsinore	33:40:35	117:19:51	469.33	3726.13
LAX	33:57:15	118:25:49	367.83	3757.80
Long Beach	33:49:25	118:11:19	389.99	3743.04
Lynnwood	33:55:44	118:12:39	388.07	3754.73
Mission Viejo	33:37:49	117:40:30	437.39	3721.17
Palm Springs	33:51:10	116:32:28	542.46	3745.73
Perris	33:47:20	117:13:40	478.91	3738.58
Pico Rivera	34:00:37	118:04:07	401.31	3763.61
Pomona	34:04:00	117:45:00	430.78	3769.61
Redlands	34:03:32	117:08:52	486.36	3768.50
Reseda	34:11:57	118:31:58	358.76	3785.11
Riverside	34:00:02	117:24:55	461.64	3762.10
San Bernardino	34:06:24	117:16:25	474.76	3773.82
Santa Clarita	34:23:00	118:31:42	359.48	3805.52
Upland	34:06:14	117:37:45	441.96	3773.66
West LA	34:03:02	118:27:24	365.54	3768.52

Table 8. Meteorological Stations for Each Source Receptor Area

Meteorological Station	Source/ Receptor Area	Meteorological Station	Source/ Receptor Area
Anaheim	17	Compton/Lynwood	12
Azusa	8, 9	Mission Viejo	19, 21
Banning	29	Perris	24, 28
Burbank	7	Palm Springs	30, 31
Central LA	1	Pico Rivera	5, 11
Crestline	37	Pomona	10
Costa Mesa	18, 20	Redlands	35, 38
Fontana	34	Reseda	6
Indio	30	Riverside	22, 23
La Habra	16	Santa Clarita	13, 15
Lake Elsinore	25, 26, 27	San Bernardino	34
LAX	3	Upland	32, 33, 36
Long Beach	4	West LA	2

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 with grid spacing of 100 meters or more must be placed so that individual grid points 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”.

Receptors on the facility boundary must be placed along the boundary following the maximum

spacing requirements shown in Table 9. Sensitive receptors must be identified by exact UTM coordinates. Elevations must be provided for all receptors.

Table 9. 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, SCAQMD staff in the AB2588 Section 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. Risk Assessment

The SCAQMD requires that all AB2588 HRAs be prepared in accordance with OEHHA and ARB guidance[16] and using the ARB computer program: HotSpots Analysis and Reporting Program (HARP2). OEHHA guidance 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. ARB is developing an updated Risk Management Policy that includes recommendations for inhalation exposures.[17] Preliminary discussions have indicated that they will recommend 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 for residential exposures. In accord with these guidelines, OEHHA and SCAQMD will allow Derived Risk Calculations using ARB's Risk Management Policy to be prepared and presented in an AB2588 HRA. ARB prepared HARP2 to facilitate the preparation and transmittal of a compliant ATIR and HRA. The details are provided below.

3.12.1. OEHHA Guidance

OEHHA guidance is contained in the Air Toxics Hot Spots Program Risk Assessment

[16] http://oehha.ca.gov/air/hot_spots/hotspots2015.html
[17] Information regarding ARB's Risk Management policy can be located at: http://www.arb.ca.gov/toxics/toxics.htm

Guidelines: Guidance Manual for Preparation of Health Risk Assessments (OEHHA February 2015). This guidance manual has undergone public and peer review, was endorsed by the California Scientific Review Panel (SRP), and approved by OEHHA. The guidance manual is available from the web.[18]

OEHHA Guidance 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 Guidance Manual.

"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 reference [1]; boldface added)

"[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 reference [1]; boldface added)

As such, the SCAQMD requires that all AB 2588 HRAs 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 may be prepared and presented as an appendix to the main document. The results of the Tiers 2-4 evaluations should not be in the Executive Summary and main document. Site specific details for either a Tier-2 or Tier-4 evaluation may require review and approval by OEHHA, ARB, or SCAQMD.

3.12.3. HARP2

To facilitate the preparation and submittal of ATIRs and HRAs, CARB prepared and distributes HARP2 for free. The program and documentation are available from the web.[19]

HARP2 is "designed to meet the programmatic requirements of the Hot Spots Program." (page 10-1 of reference 7). HARP2 will calculate all four OEHHA Tiers and both the Derived Risk Calculations (as designed by OEHHA) and ARB's Risk Management Policy Inhalation Rates for Residential Cancer Risk Calculations.

The outline for an HRA is contained in Appendix C. The list of files that must be submitted with an AB2588 HRA are included in Table 10 below. Any emissions factor development, emission rates calculations, or approved source test protocol and reports must be submitted in electronic format (e.g., in Microsoft Excel) along with the facility CD. If these items have been attached to

[18] http://oehha.ca.gov/air/hot_spots/hotspots2015.html
[19] http://www.arb.ca.gov/toxics/harp/harp.htm

Annual Emissions Report (AER), you may refer to it in the cover letter and avoid a redundant submittal.

Table 10. Files that must be provided with HRA submittals

File Type	Notes
HRA Input	All files created by ARB's ADMRT
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 ARB's EIM
Emission Inventory Output	
Emission Calculations	Provided in electronic format (e.g., Excel) and documented references
Source Tests	Source tests can only be used if approved by SCAQMD staff
Air Monitoring Data	Any monitoring data used in the HRA should be provided.

3.12.4. SCAQMD Health Risk Assessment Guidance

All HRAs prepared for the SCAQMD must include an OEHHA Tier-1 evaluation. All SCAQMD risk management decisions are based on the Tier-1 risk assessment. Tier-2, Tier-3, and Tier-4 evaluations may be prepared but must be included in an appendix of 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 11 summarizes the risk assumptions required by the SCAQMD. Deviations from these defaults must be approved by SCAQMD staff prior to their use. These requirements are discussed in more detail next.

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 HARP2 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 11. Summary of SCAQMD Health Risk Assessment Guidance.

Parameter	**Assumptions**
Multi-Pathway	
• Inhalation	Required for residential & worker receptors
• Dermal	Required for residential & worker receptors
• Soil	Required for residential & worker receptors
• Homegrown Produce	Required for residential receptors
• Mother's Milk	Required for residential receptors
• Beef/Dairy	Site specific; see note #1 below
• Pigs, chickens, and/or eggs	Site specific; see note #1 below
• Deposition Velocity	0.02 meters per second
• MP Exposure Assumptions	Use HARP2 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 the dispersion model, AERMOD. The annual average estimated by the dispersion model 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 x 24/8). The reader is referred to the OEHHA guidelines for further detail on this issue.

The adjustment factors for all possible operating schedules are given in Table 12. These factors are entered into HARP2 by activating the WAF option in the Inhalation Pathway and entering the appropriate factor from Table 12.

The adjustments in Table 12 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 and worker chronic non-cancer risks.

Table 12. Adjustment Factors for Off-site Worker Ground-level Concentrations.*

Hours of Operation per Day	Days of Operation per Week		
	1 to 5	6	7
1 to 8	4.2	3.5	3.0
9	3.7	3.1	2.7
10	3.4	2.8	2.4
11	3.1	2.5	2.2
12	2.8	2.3	2.0
13	2.6	2.2	1.8
14	2.4	2.0	1.7
15	2.2	1.9	1.6
16	2.1	1.8	1.5
17	2.0	1.6	1.4
18	1.9	1.6	1.3
19	1.8	1.5	1.3
20	1.7	1.4	1.2
21	1.6	1.3	1.1
22	1.5	1.3	1.1
23	1.5	1.2	1.0
24	1.4	1.2	1.0

* These adjustment factors should only be used when calculating worker cancer risks. The adjustment factors should not be used when calculating chronic non-cancer risks.

Appendix A AB2588
List of Toxics

Table A-1 contains the list of compounds to be reported by AB2588 facilities preparing their quadrennial emissions inventory under the AER Program. The table provides the compound name, its TAC code and CAS number, and the degree of accuracy for each toxic. The table is alphabetically sorted by name. Multiple compounds within a TAC code group are listed in alphabetical order and shown in italics. The degree of accuracy is nothing more than a de minimis emission level for reporting. As a result, facility-wide emissions of toxics greater than one-half of their corresponding degree of accuracy must be inventoried and reported. Conversely, total facility toxic emissions less than one-half of the degree of accuracy do not need to be reported for TAC Codes 24 through 73.

Table A-1 lists the family name and the individual species within the family for the following toxic air contaminants (TACs):

- Chlorinated dioxins and dibenzofurans (TAC code #7)
- Fluorocarbons (chlorinated) (TAC code #22)
- Glycol ethers and their acetates (TAC code #41)
- Hexachlorocyclohexanes (TAC code #43)
- Isocyanates and diisocyanates (TAC code #48)
- Mercury and mercury compounds (TAC code #50)
- PAHs (TAC code #19)
- Phosphorous compounds (TAC code #60)
- POMS and PAH-derivatives (TAC code #61)
- Selenium and compounds (TAC code #64)
- Sulfuric acid and oleum (TAC code #67)
- Xylenes (TAC code #70)

Table A-1. DeMinimis Reporting Limits for Toxics.

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
29	75070	Acetaldehyde	20
30	107028	Acrolein	0.05
31	107131	Acrylonitrile	0.1
32	7664417	Ammonia	200
14	7440382	Arsenic and Compounds (inorganic)	0.01
1	1332214	Asbestos	0.0001
2	71432	Benzene	2
3	7440417	Beryllium	0.001
4	106990	Butadiene [1,3]	0.1
5	7440439	Cadmium	0.01
6	56235	Carbon tetrachloride	1
33	463581	Carbonyl sulfide	100
34	7782505	Chlorine	0.5
35	67663	Chloroform	10
13	18540299	Chromium, hexavalent (and compounds)	0.0001
36	7440508	Copper	0.1
37	7631869	Crystalline silica	0.1
38	117817	Di(2-ethylhexyl) phthalate {DEHP}	20
7	1080	Chlorinated dioxins and dibenzofurans	0.000001
	67562394	1,2,3,4,6,7,8-Heptachlorodibenzofuran [POM]	0.000001
	55673897	1,2,3,4,7,8,9-Heptachlorodibenzofuran [POM]	0.000001
	35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin [POM]	0.000001
	70648269	1,2,3,4,7,8-Hexachlorodibenzofuran [POM]	0.000001
	57117449	1,2,3,6,7,8-Hexachlorodibenzofuran [POM]	0.000001
	72918219	1,2,3,7,8,9-Hexachlorodibenzofuran [POM]	0.000001
	60851345	2,3,4,6,7,8-Hexachlorodibenzofuran [POM]	0.000001
	39227286	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin [POM]	0.000001
	57653857	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin [POM]	0.000001
	19408743	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin [POM]	0.000001
	39001020	1,2,3,4,5,6,7,8-Octachlorodibenzofuran [POM]	0.000001
	3268879	1,2,3,4,5,6,7,8-Octachlorodibenzo-p-dioxin [POM]	0.000001
	57117416	1,2,3,7,8-Pentachlorodibenzofuran [POM]	0.000001
	57117314	2,3,4,7,8-Pentachlorodibenzofuran [POM]	0.000001
	40321764	1,2,3,7,8-Pentachlorodibenzo-p-dioxin [POM]	0.000001
	51207319	2,3,7,8-Tetrachlorodibenzofuran [POM]	0.000001
	1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin {TCDD} [POM]	0.000001
27	78875	1,2-Dichloropropane {Propylene dichloride}	20
28	542756	1,3-Dichloropropene	10
72	9901	Diesel exhaust particulates	0.1
39	131113	Dimethyl phthalate	50
8	123911	1,4-Dioxane	5
40	100414	Ethyl benzene	200
9	106934	Ethylene dibromide {1,2-Dibromoethane}	0.5
10	107062	Ethylene dichloride {1,2-Dichloroethane}	2
11	75218	Ethylene oxide	0.5

(continued)
Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
22	1104	Fluorocarbons (chlorinated)	1
	76131	Trichlorotrifluoroethane {CFC-113}	1
	75434	Dichlorofluoromethane {Freon 21}	1
	75694	Trichlorofluoromethane {Freon 11}	1
12	50000	Formaldehyde	5
41	1115	Glycol ethers and their acetates	100
	111466	Diethylene glycol	100
	111966	Diethylene glycol dimethyl ether	100
	112345	Diethylene glycol monobutyl ether	100
	111900	Diethylene glycol monoethyl ether	100
	111773	Diethylene glycol monomethyl ether	100
	25265718	Dipropylene glycol	100
	34590948	Dipropylene glycol monomethyl ether	100
	629141	Ethylene glycol diethyl ether	100
	110714	Ethylene glycol dimethyl ether	100
	111762	Ethylene glycol monobutyl ether	200
	110805	Ethylene glycol monoethyl ether	50
	111159	Ethylene glycol monoethyl ether acetate	100
	109864	Ethylene glycol monomethyl ether	10
	110496	Ethylene glycol monomethyl ether acetate	200
	2807309	Ethylene glycol monopropyl ether	100
	107982	Propylene glycol monomethyl ether	200
	108656	Propylene glycol monomethyl ether acetate	100
	112492	Triethylene glycol dimethyl ether	100
42	118741	Hexachlorobenzene	0.1
43	608731	Hexachlorocyclohexanes	0.1
	319846	alpha-Hexachlorocyclohexane	0.1
	319857	beta-Hexachlorocyclohexane	0.1
	58899	Lindane {gamma-Hexachlorocyclohexane}	0.1
44	110543	Hexane	200
45	302012	Hydrazine	0.01
46	7647010	Hydrochloric acid	20
73	7664393	Hydrogen fluoride (hydrofluoric acid)	50
47	7783064	Hydrogen sulfide	5
48	1125	Isocyanates and diisocyanates	0.05
	822060	Hexamethylene-1,6-diisocyanate	0.05
	624839	Methyl isocyanate	1
	101688	Methylene diphenyl diisocyanate {MDI} [POM]	0.1
	1204	Toluene diisocyanates	0.1
	584849	Toluene-2,4-diisocyanate	0.1
	91087	Toluene-2,6-diisocyanate	0.1
15	7439921	Lead compounds (inorganic)	0.5
49	7439965	Manganese	0.1

(continued)
Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
50		Mercury and mercury compounds	
	7487947	Mercuric chloride	1
	7439976	Mercury	1
	593748	Methyl mercury {Dimethylmercury}	1
51	67561	Methanol	200
52	74873	Methyl chloride {Chloromethane}	20
23	71556	Methyl chloroform {1,1,1-Trichloroethane}	1
53	78933	Methyl ethyl ketone {2-Butanone}	200
54	108101	Methyl isobutyl ketone {Hexone}	20
55	1634044	Methyl tert-butyl ether	200
16	75092	Methylene chloride {Dichloromethane}	50
17	7440020	Nickel	0.1
57	106467	p-Dichlorobenzene {1,4-Dichlorobenzene}	5
19	1151	PAHs, total, w/o individ. components reported [PAH, POM]	0.2
	83329	Acenaphthene [PAH, POM]	1
	208968	Acenaphthylene [PAH, POM]	1
	120127	Anthracene [PAH, POM]	1
	56553	Benz[a]anthracene [PAH, POM]	0.5
	50328	Benzo[a]pyrene [PAH, POM]	0.05
	205992	Benzo[b]fluoranthene [PAH, POM]	0.5
	192972	Benzo[e]pyrene [PAH, POM]	0.5
	191242	Benzo[g,h,i]perylene [PAH, POM]	0.5
	205823	Benzo[j]fluoranthene [PAH, POM]	0.5
	207089	Benzo[k]fluoranthene [PAH, POM]	0.5
	218019	Chrysene [PAH, POM]	1
	53703	Dibenz[a,h]anthracene [PAH, POM]	0.1
	192654	Dibenzo[a,e]pyrene [PAH, POM]	0.05
	189640	Dibenzo[a,h]pyrene [PAH, POM]	0.001
	189559	Dibenzo[a,i]pyrene [PAH, POM]	0.001
	191300	Dibenzo[a,l]pyrene [PAH, POM]	0.001
	206440	Fluoranthene [PAH, POM]	0.5
	86737	Fluorene [PAH, POM]	0.5
	193395	Indeno[1,2,3-cd]pyrene [PAH, POM]	0.5
	91576	2-Methyl naphthalene [PAH, POM]	1
	91203	Naphthalene [PAH, POM]	0.1
	198550	Perylene [PAH, POM]	0.5
	85018	Phenanthrene [PAH, POM]	0.5
	129000	Pyrene [PAH, POM]	0.5
56	1336363	PCBs (Polychlorinated biphenyls) [POM]	0.01
58	87865	Pentachlorophenol	10
18	127184	Perchloroethylene {Tetrachloroethene}	5
59	7723140	Phosphorus	0.1

(continued)
Table A-1. (continued)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
60		Phosphorous compounds	
	7803512	Phosphine	0.01
	7664382	Phosphoric acid	50
	10025873	Phosphorus oxychloride	0.1
	10026138	Phosphorus pentachloride	0.1
	1314563	Phosphorus pentoxide	0.1
	7719122	Phosphorus trichloride	0.1
	126738	Tributyl phosphate	100
	78400	Triethyl phosphine Trimethyl	100
	512561	phosphate Triorthocresyl	100
	78308	phosphate [POM] Triphenyl	0.5
	115866	phosphate [POM] Triphenyl	100
	101020	phosphite [POM]	100
61		POMS and PAH-derivatives	
	226368	Dibenz[a,h]acridine [POM]	0.5
	224420	Dibenz[a,j]acridine [POM]	0.5
	194592	7H-Dibenzo[c,g]carbazole	0.05
	57976	7,12-Dimethylbenz[a]anthracene [PAH-Derivative, POM]	0.0001
	42397648	1,6-Dinitropyrene [PAH-Derivative, POM]	0.001
	42397659	1,8-Dinitropyrene [PAH-Derivative, POM]	0.05
	56495	3-Methylcholanthrene [PAH-Derivative, POM]	0.001
	3697243	5-Methylchrysene [PAH-Derivative, POM]	0.05
	101779	4,4'-Methylenedianiline (and its dichloride) [POM]	0.1
	602879	5-Nitroacenaphthene [POM]	1
	7496028	6-Nitrochrysene [PAH-Derivative, POM]	0.001
	607578	2-Nitrofluorene [PAH-Derivative, POM]	5
	5522430	1-Nitropyrene [PAH-Derivative, POM]	0.5
	57835924	4-Nitropyrene [POM]	1
62	75569	Propylene oxide	10
63	91225	Quinoline	100
64		Selenium and compounds	
	7783075	Hydrogen selenide	0.1
	7782492	Selenium	0.5
	7446346	Selenium sulfide	0.1
65	1310732	Sodium hydroxide	2
66	100425	Styrene	100
24	79345	1,1,2,2-Tetrachloroethane	1
67		Sulfuric acid and oleum	
	8014957	Oleum	100
	7664939	Sulfuric acid	2
	7446719	Sulfur trioxide	100
68	108883	Toluene	200
25	79005	1,1,2-Trichloroethane {Vinyl trichloride}	1
20	79016	Trichloroethylene	20
26	95636	1,2,4-Trimethylbenzene	5

(continued)

Table A-1. (concluded)

TAC Code	CAS Number	Substance	Degree of Accuracy (lbs/yr)
69	51796	Urethane {Ethyl carbamate}	0.1
21	75014	Vinyl chloride	0.5
70	1330207	Xylenes	200
	108383	m-Xylene	200
	95476	o-Xylene	200
	106423	p-Xylene	200
71	75456	Chlorodifluoromethane {Freon 22}	200

Appendix B
Elements of Air Toxics Inventory Report

1. Report Summary (hard copy)

- Facility name, ID, and location
- Facility plot plan identifying: emission source location, property line, horizontal scale, building heights and dimensions
- Facility total emission rate by substance for all emittants including the following information (OEHHA 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 & g/s)
  - maximum one-hour emissions for each substance (lbs/hr & g/s)
- Supporting documentation such as source test report and approval letter if emissions are measured

2. Use the EIM software from HARP2 to provide facility, device, process, emissions, and stack data in a HARP2 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) be sure to use 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 C
Outline for the Health Risk Assessment Report

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 noncancer health impacts and a table showing target organ systems by substance for noncancer impacts.
- Summary of results. 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 point of maximum impact (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 noncancer health hazard index 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 noncancer 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 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (2015).
- Table and text identifying all substances that are evaluated for cancer risk and/or noncancer acute and chronic health impacts. In addition, identify any substances that present a potential cancer risk or chronic noncancer hazard via noninhalation 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

Report the following information regarding the facility and its surroundings:

- Facility name
- Facility ID
- 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 presented in the appendix with the information clearly presented and cross-referenced to the text.

B.2. Emissions Inventory

Report the following information regarding the facility's sources and emissions in table format; see Appendix K of OEHHA Guidelines (2015). 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); be sure to use 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 including the following information (see Appendix K of OEHHA Guidelines, 2015). 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 & g/s). Radionuclides are reported in Curies/yr.
  - Maximum one-hour emissions for each substance (lbs/hr & 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 OEHHA Guidelines, 2015). This information should be in the main body of the report.
  - Substance name and CAS number
  - Annual average emissions for each substance (lbs/yr & g/s). Radionuclides are reported in Curies/yr.
  - Maximum one-hour emissions for each substance (lbs/hr & 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. The SCAQMD has AERMOD-ready meteorological data at 27 stations in the South Coast Air Basin. This data can be downloaded from the SCAQMD web site.
- 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.
- HARP2 should be used for all health risk assessments prepared for the AB2588 Program. Make sure that the latest version of the program is used.
- 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 the SCAQMD, include tables that summarize the annual average concentrations calculated for all substances.

- For the PMI, MEIR, MEIW, and any sensitive receptors required by the SCAQMD, include tables that summarize the maximum one-hour; chronic 8-hour; and 90-day rolling average (lead only) concentrations.

C. Risk Characterization

HARP2 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 HARP2 files that meet these HRA requirements are provided in Section DV of the main body of the AB2588 Supplemental Guidance. All HARP2 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 (i.e., CD).

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 AB2588 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., HARP2/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
  - 9- and 70-year cancer risks
- Tables and text providing the following information regarding the acute noncancer 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 noncancer (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 hazard index 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 just 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 noncancer acute and chronic risks. Also show the facility emission points and property boundary.
  - Total multipathway cancer risk 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 breast-milk consumption) and for all applicable exposure pathways (i.e., minimum exposure pathways plus additional site/route specific pathways). Include the facility location on the maps.
  - Noncancer acute and chronic hazard index 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. Ideally, a summary of data used in the HRA will be on paper and all data and model input and

output files will be provided electronically (e.g., CD). 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 computer files that must be submitted on CD with the HRA are included in the table below:

File Type	Notes
HRA Input	All files created by ARB's ADMRT
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 ARB's EIM
Emission Inventory Output	
Emission Calculations	Provided in electronic format (e.g., Excel) and documented references
Source Tests	Source tests can only be used if approved by SCAQMD staff
Air Monitoring Data	Any monitoring data used in the HRA should be provided.

Appendix D
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 risk assessment preparation.

Facility Name: _____ Facility ID: _____

Street Address: _____

City: _____ Zip Code: _____

HRA Consultant: _____ Reviewer: _____

Dispersion Modeling

1. AERMOD Files
   a. Meteorology Input File _____
      Using Figure 2 and Table 8 the meteorological site should be the one closest to the facility.
      i. Closest to facility Yes___ No___
      ii. If not, is there a valid justification? Yes___ No___

2. Control
   a. Pollutant
      i. Pollutant ID (should be "Other") Yes___ No___
   b. Model Options ___ ___
      i. Use regulatory default (should be "Yes") Yes___ No___
      ii. Rural or Urban (should be "Urban") Yes___ No___
   c. Building Downwash ___ ___
      i. Include building downwash? (should be "Yes") Yes___ No___
   d. Terrain ___ ___
      i. Run with elevations Yes___ No___
   e. Averaging times ___ ___
      i. 1-Hour (should be "Yes") Yes___ No___
      ii. 3-Hour Yes___ No___
      iii. 8-Hour Yes ___ No___
      iv. 24-Hour Yes___ No___
      v. Monthly Yes___ No___
      vi. Period (should be "Yes") Yes___ No___
      vii. Annual Yes___ No___

3. Sources
   a. Source and building locations agree with the plot plan Yes___ No___
   b. Stack heights are reasonable Yes___ No___
   c. Volume/area source dimensions are reasonable Yes___ No___
   d. Stack parameters are consistent with those provided in the report Yes ___ No ___

4. 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___
    b. Property boundary receptors
        i. Included (should be "Yes") Yes___ No___
        ii. Spacing follows guidance in Table 2 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 Thomas Guide 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___
5. Emission Rates
    a. Include rate factors (should be "No") Yes___ No___
6. Deposition and Depletion
    a. Include deposition (should be "No") Yes___ No___
    b. Dry depletion (should be "No") Yes___ No___
    c. Wet depletion (should by "No") Yes ___ No___
7. Duplication of AERMOD Results
    a. Independently ran AERMOD Yes___ No___
    b. Average χ/Q first high values for each source group reproduced (not required; useful if diagnosing discrepancies) Yes___ ___
    c. Maximum 1-hour χ/Q first high values for each source group reproduced (not required; useful if diagnosing discrepancies) Yes___

<u>Residential Risk Assessment</u>

1. Enabled Pathways and Related Variables
    a. Drinking water (not required) Yes___ No___
    b. Fish water (not required) Yes___ No___
    c. Beef/dairy (pasture) (not required) Yes___ No___
    d. Home grown produce (required; should be "Yes") Yes___ No___
    e. Pigs, chickens, and/or eggs (not required) Yes___ No___
    f. Dermal absorption (required; should be "Yes) Yes___ No___
    g. Soil Ingestion (required; should be "Yes") Yes___ No___
    h. Mother's milk (required; should be "Yes") Yes___ No___
    i. Deposition velocity (should be 0.02 meters per second) Yes ___ No___

k. Exposure duration (should be 30 years) Yes___ No___
l. Cancer analysis method; Yes___ No___
(should be "RMP with OEHHA Derived")
m. Chronic non-cancer analysis method; No___
should be "OEHHA Derived" Yes___

2. Duplication of HARP2 Results No___
   a. Independently performed residential risk assessment Yes___ No___
   b. PMI (i.e., maximum off-site cancer risk) reproduced Yes ___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   c. Cancer MEIR reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   d. Independently verified the cancer risk isopleth map Yes___ No___
   e. Non-cancer chronic hazard index (i.e., chronic HI) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   f. Independently verified the chronic HI isopleth map Yes___ No___
   g. Non-cancer acute hazard index(i.e., acute HI) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   h. Independently verified the acute HI isopleth map Yes___ No___

<u>Worker Risk Assessment</u>

1. Enabled Pathways and Related Variables
   a. Drinking water (not required) Yes___ No ___
   b. Fish water (not required) Yes ___ No ___
   c. Beef/dairy (pasture) (not required) Yes ___ No ___
   d. Home grown produce (not appropriate; should be "No") Yes ___ No ___
   e. Pigs, chickens, and/or eggs (not required) Yes ___ No ___
   f. Dermal absorption (required; should be "Yes) Yes ___ No ___
   g. Soil Ingestion (required; should be "Yes") Yes ___ No ___
   h. Mother's milk (not appropriate; should be "No") Yes ___ No ___
   i. Deposition velocity (should be 0.02 meters per second) Yes ___ No ___
   j. Exposure duration (should be 25 years) Yes ___ No ___
   k. Cancer analysis method; should be "OEHHA Derived" Yes___ No ___

l. Facility Operating conditions hrs/day___ days/week___
- GLC adjustment factor (refer to Table 12)

m. Chronic analysis method; should be "OEHHA Derived" Yes___ No___

2. Duplication of HARP2 Results
   a. Independently performed worker risk assessment Yes___ No___
   b. Cancer MEIW reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____
   c. Non-cancer chronic hazard index (i.e., chronic HI) reproduced Yes___ No___
      i. Facility value _____ AQMD value _____
      ii. Facility location _____ AQMD location _____
      iii. Explanation if necessary _____
      _____

<u>Site Visit</u>

- Site visit conducted Yes___ No___
  Date _____ Time _____
- Confirmed location of the MEIR (cancer) Yes___ No___
- Confirmed location of the MEIW (cancer) Yes___ No___
- Confirmed location of the MEIR (chronic HI) Yes___ No___
- Confirmed location of the MEIW (chronic HI) Yes___ No___
- Confirmed location of the PMI (acute HI) Yes___ No___

Report_____
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<u>General Overall Comments</u>

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