

History of Updates to the Modeling Guidelines for Health Risk Assessments:

1. In April 2015, the District's *Modeling Guidelines for Health Risk Assessments* (Form-15i) was updated to incorporate the new AERMOD model and the revised Risk Assessment Guidelines published by the Office of Environmental Health Hazard Assessment in February 2015.
2. In August 2015, Form-15i was updated to include the PROFBASE parameter for Santa Barbara County meteorological site locations in Section 2.7.
3. In November 2016, Form-15i was updated to include the District's default DICE stack parameters in Appendix D.
4. In April 2017, Form-15i was updated to include the District's health risk calculation and rounding policy in Appendix E.
5. In May 2017, Form-15i was updated to include the PROFBASE parameter for the recently-approved Las Flores Canyon meteorological data set in Section 2.7.
6. Updates to Form-15i in May 2018:
 - a. Some minor formatting changes were made, including the addition of an image on the cover page.
 - b. A list of figures and a list of tables were added.
 - c. Sections 1.1 and 1.2 were consolidated into one section.
 - d. Section 2: This section was added to include information about emissions that should be modeled for different types of HRAs.
 - e. Section 3: The current version of HARP 2 was updated, and a paragraph discussing the different software available to run AERMOD was added. Some subsections were rearranged.
 - f. Section 3.4: A paragraph discussing source groups was added.
 - g. Sections 3.4.1 through 3.4.5: The emission rate source parameter was added.
 - h. Section 3.4.1: Because the POINTCAP and POINTHOR source types are no longer beta options, the sentences discussing the beta options for these source types were removed. The paragraph at the end of the section discussing the stack parameters for these source types was also removed.
 - i. Section 3.5: The name of this section was changed from "Building Impacts and Area of Influence" to "Building Impacts."
 - j. Section 3.6: A paragraph discussing graded elevations was added.
 - k. Section 3.7: The name of this section was changed from "Meteorology Data" to "Meteorological Data." Also, the table in this section was updated to include the latitude, longitude, elevation and download links for all of the fourteen recently-approved meteorological data sets in Santa Barbara County.
 - l. Section 3.8.3: The receptor spacing for Cartesian grids was updated. Grid spacing shall be no larger than 25 meters out to 200 meters from the property boundary. Between 200 and 500 meters from the boundary, the spacing shall be no larger than 50 meters. Between 500 and 2000 meters from the boundary, the spacing shall be no larger than 100 meters.

- m. Section 3.8.4: The receptor spacing for larger facilities was changed from 50 to 100 meters to 25 meters.
- n. Section 3.8.7: A paragraph discussing the placement of sensitive receptors was added at the end of this section.
- o. Section 3.8.9: This section was added to include information about the District's policy for including receptors on vacant land.
- p. Section 4.4.7: Guidance for when to use the defaults for households that garden versus households that farm was added. Table 4.4.7-1 was also added.
- q. Section 4.4.8: Guidance for when to use the defaults for households that raise/hunt versus households that farm was added. Table 4.4.8-1 was also added.
- r. Section 4.4.9: Guidance for when to use the defaults for households that raise/hunt versus households that farm was added. Table 4.4.9-1 was also added.
- s. Section 4.6: This section was added to include information about the refined acute non-cancer risk analysis in HARP 2.
- t. Section 5: The name of this section was changed from "Report for Health Risk Assessment" to "Health Risk Assessment Report." The information in this section was arranged into subsections, and risk driver pollutant and device tables were added for clarity.
- u. Section 6: References were re-formatted, some were added and some that are no longer used were deleted.
- v. Appendix A: This section was updated to correctly describe the method for entering variable emission rates for HRAs.
- w. Appendix B, Section B.2: The information in this section was split into Sections B.2.1 and B.2.2 for clarity.
- x. Appendix C, Section C.2: This section was moved.
- y. Appendix D: Language was added to clarify that the parameters in this Appendix are for stationary DICE only.
- z. Appendix G: This appendix was added to discuss the minimum source-receptor distance policy for acute risk.

7. Updates to Form-15i in August 2018:

- a. Section 2: Language was edited to match the District's *Approved Emission Factors for Toxic Air Contaminants*.
- b. Section 2.3: A paragraph was added to discuss the District's recently published approved TAC emission factors.
- c. Section 3: The current version of HARP 2 was updated.
- d. Section 3.6: A paragraph was added to discuss the importance of ensuring that the elevation of a stack on top of a building and the elevation of the building are equal.
- e. Section 3.8.2: The subsection titled "Census Receptors" was removed.
- f. Section 4.3.3.2: The numbering of Equation 4.3.3.2-1 was corrected.
- g. Section 4.7: The subsection titled "Population Exposure" was removed.
- h. Section 6: The references were updated.

- i. Appendix F: This appendix was previously titled “District-Approved Emission Factors” and stated that it was reserved for future use. This appendix is no longer reserved as the District published a separate document, *Approved Emission Factors for Toxic Air Contaminants*, in August 2018. For that reason, Appendix F was used for a new topic, Placement of Portable Equipment.
8. Updates to Form-15i in February 2019:
 - a. Section 2.3: A typographical error was corrected.
 - b. Section 3: The current version of HARP 2 was updated.
 - c. Section 3.7: The Lompoc Watt Rd meteorological data was added to Table 3.7-1. Additionally, the Santa Barbara Airport and Santa Maria Airport meteorological data sets were replaced with the data sets that use the U star adjustment option and an explanatory note was added below the table.
 - d. Section 6: The references were updated.
 - e. Appendix A, Section A.2: The description of creating AERMOD input files has been updated to reflect changes to the most recent version of HARP 2.
 9. Updates to Form-15i in July 2019:
 - a. Formatting throughout the document was changed.
 - b. Section 2.1: Language was revised to clarify that CARB’s table only shows TACs with health values.
 - c. Section 2.2.4: A typographical error was corrected. This section was also updated to reference the District’s recently published *Guidelines for Preparing Air Toxics Emission Inventory Plans and Reports*.
 - d. Section 3: The current version of HARP 2 was updated.
 - e. Section 5: This section and its subsections were updated to reference the District’s new *Modeling Protocol Tables for HRA Report*.
 - f. Section 5.1: Requirements to provide a plot plan and aerial photo map were added.
 - g. Section 5.2: Subsections were added to discuss the tables with emitting source/device information.
 - h. Section 5.4: Bullet points with information included in the *Modeling Protocol Tables for HRA Report* were removed to avoid unnecessary redundancy.
 - i. Sections 5.5 and 5.6: Added new sections to discuss the *Building Parameters Table* and *HARP 2 Options Table*, which are both part of the new *Modeling Protocol Tables for HRA Report*.
 - j. Section 5.7: This section was updated with detailed requirements for receptor information, consistent with the *AERMOD Options Table*, which is part of the new *Modeling Protocol Tables for HRA Report*.
 - k. Section 5.11: Requirements to provide a plot plan and aerial photo map were removed, as this information is now included in Section 5.1.
 - l. Section 5.12: This section was updated to include the *Modeling Protocol Tables for HRA Report* and alternative refined acute method files.

- m. Section 6: The references were updated.
- n. Appendix H: This appendix was added to discuss the alternative refined acute method.

10. Updates to Form-15i in June 2020:

- a. Minor formatting changes were made throughout the document.
- b. Section 3: The current version of AERMOD was updated.
- c. Section 3.4.4: Table 3.4.4-1, *Summary of Suggested Procedures for Estimating Initial Vertical Dimensions for Volume Sources*, was re-numbered to Table 3.4.4-2. A new table, *Summary of Suggested Procedures for Estimating Initial Lateral Dimensions for Volume Sources*, was added and numbered as Table 3.4.4-1. The reader is now referred to Table 3.4.4-1 for calculating Syinit and the new Appendix I for modeling adjacent volume sources.
- d. Section 3.4.5: The new Appendix I is now referenced. The release height was added as a LINE source parameter input.
- e. Section 3.8.7: Information was added to clarify the District's policy for onsite pathway receptors.
- f. Section 4.4.6: A footnote was added to clarify the District's policy that the fish pathway may be required on a case-by-case basis in the final HRA if there is a water body within the modeling domain, even if there is no water body within the isopleths of 1 per million for cancer risk or a hazard index of 0.1 for chronic non-cancer risk for the initial HRA.
- g. Section 4.4.7: The District recognizes that small gardening projects and container-growing may occur at apartments. For that reason, "apartment building" was removed from the sentence that read: "If the receptors of interest clearly do not have a garden or fruit trees (e.g., at a college dormitory or apartment building), rerun the HRA without this pathway for the receptors of interest."
- h. Section 4.4.8: A footnote was added to clarify the District's policy that the beef and dairy pathways may be required on a case-by-case basis in the final HRA if there is a pasture within the modeling domain, even if there is no pasture within the isopleths of 1 per million for cancer risk or a hazard index of 0.1 for chronic non-cancer risk for the initial HRA.
- i. Section 4.4.9: A footnote was added to clarify the District's policy that the pig pathway may be required on a case-by-case basis in the final HRA if there is a pig farm within the modeling domain, even if there is no pig farm within the isopleths of 1 per million for cancer risk or a hazard index of 0.1 for chronic non-cancer risk for the initial HRA.
- j. Section 4.6: A discussion of the alternative refined acute method was included with a reference to Appendix H, *Alternative Refined Acute Method (ARAM)*.
- k. Section 6: The references were updated.
- l. Appendix D: The column titled "Exhaust Flow Rate (scfm)" in Table D-1 was corrected to "Exhaust Flow Rate (cfm)," as the flow rates in the table are in units of actual cubic feet per minute, not standard cubic feet per minute.
- m. Appendix I: This appendix was added to provide various options for modeling roadway emissions.

11. Updates to Form-15i in December 2023:

- a. Section 2.2.4: A sentence was added to include examples of permit-exempt emissions that are required to be included in AB 2588 HRAs.
- b. Table 3.2-2: Population data were updated per the 2020 census.
- c. Section 3.3: A short paragraph was added to explain that any UTM coordinates determined using Lakes' satellite imagery must be aligned with Google Earth.
- d. Section 3.4.3: Notes were added regarding the minimum Xinit, Yinit and Pitvol in Lakes Environmental's AERMOD View interface.
- e. Sections 4.4.5, 4.4.6, 4.4.8: The name of the Department of Water Resources webpage referenced in these sections was updated.
- f. Section 5: The sentence regarding the \$1500 fee was removed, as the District typically reviews HRAs on a cost reimbursement basis. Additionally, the last paragraph was updated to include the new *Source Groups Table* as part of the *Modeling Protocol Tables for HRA Report*.
- g. Section 5.2.2: This section was added to describe the new *Source Groups Table*.
- h. Section 5.2.3: The appendix reference for the TAC Device Table was corrected; the previous language was inadvertently copied from the ATEIP/R Guidelines.
- i. Section 6: The references were updated.
- j. Section 7: Contact information was updated.
- k. Appendix A: The sentence regarding potential permit conditions was bolded for emphasis. Additionally, the link for CARB's *User Manual for the Hotspots Analysis and Reporting program Air Dispersion Modeling and Risk Assessment Tool Version 2* was updated.
- l. Appendix I, Section I.3: The labeling of Figure I.3-1 was updated.
- m. Appendix I, Section I.3.3: The discussion of the receptor exclusion zone was updated to clarify that the plume width should be no larger than eight meters where receptors are placed five meters from the edge of the roadway plume.
- n. Appendix I, Section I.5: The references were updated.
- o. Appendix J: This appendix was added as an example TAC Device Table.
- p. Appendix K: This appendix was added to provide guidance for lead HRAs.

12. Updates to Form-15i in February 2025:

- a. Section 2.2.3: Minor updates were made to clarify the requirements for CEQA HRAs.
- b. Section 3: The current versions of AERMOD and HARP 2 were updated.
- c. Section 3.2: New Cuyama was removed from Table 3.2-2, as this area is not developed enough to warrant the use of the urban dispersion option.
- d. Section 3.4: The requirement to include the source group of all sources was removed.
- e. Section 3.4.2: Minor updates were made to clarify how to use area sources.
- f. Section 3.4.3: Language was added to clarify the AERMOD executable does not limit the minimum values for the Xinit, Yinit, and Pitvol parameters.

- g. Section 3.4.4: Minor updates were made to clarify how to use VOLUME sources.
- h. Section 3.4.5: Minor updates were made to clarify how to use LINE sources.
- i. Section 3.7: Table 3.7-1 was updated with the newly-processed meteorological data sets. Furthermore, a map of the meteorological stations was added.
- j. Section 3.8: Minor updates were made in this section and the subsections to clarify the receptor requirements. Also, the subsections were rearranged.
- k. Section 4.2.1: A note was added to Table 4.2.1-1 explaining why the PMI is evaluated for cancer risk.
- l. Section 4.2.2: Minor language changes were made.
- m. Section 4.3: Minor language changes were made in this section and the subsections.
- n. Section 4.4: The table of multipathway pollutants was removed as it is out-of-date and pollutant health data is periodically updated by OEHHA.
- o. Section 4.4.1: Minor updates were made to clarify requirements for using the deposition rate of 0.02 m/s.
- p. Section 4.4.5: Minor language changes were made. Also, the reference to the Department of Water Resources was removed, and a description of how to determine default values for the water body volume and number of volume changes per year was added.
- q. Section 4.4.6: Minor language changes were made. Also, the reference to the Department of Water Resources was removed, Table 4.4.6-1 was inserted, and a description of how to determine default values for the water body volume and number of volume changes per year was added.
- r. Section 4.4.7: Minor updates were made to clarify when this pathway may be excluded.
- s. Section 4.4.8: Minor language changes were made. Also, the reference to the Department of Water Resources was removed, and a description of how to determine default values for the water body volume and number of volume changes per year was added.
- t. Section 4.4.9: Minor language changes were made. Also, the reference to the Department of Water Resources was removed, and a description of how to determine default values for the water body volume and number of volume changes per year was added.
- u. Section 4.6: Minor updates were made for clarity.
- v. Section 4.7: Minor updates were made for clarity.
- w. Section 5: Minor updates were made for clarity in this section and all subsections.
- x. Section 6: The references were updated.
- y. Section 7: Contact information was updated.
- z. Appendix A: Minor updates were made for clarity.
- aa. Appendix C: Minor updates were made for clarity, and a paragraph was added at the end of the appendix describing the options for creating the spatial averaging grid.

- bb. Appendix D: The default stack parameters for stationary diesel-fired internal combustion engines were updated to match CAPCOA/CARB's July 2024 *Non-Vehicular Diesel Engine Risk Assessment Guidance*.
- cc. Appendix H, Section H.4: The link to the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* was updated. Furthermore, step 6 was updated to clarify which AERMOD runs are needed for the ARAM.
- dd. Appendix I, Section I.2: This section was updated to reflect that the RLINE source type is now a regulatory option in AERMOD.
- ee. Appendix I, Section I.5: The references were updated.
- ff. Appendix J: The table was replaced with an example that includes CAS numbers.

13. Updates to Form-15i in November 2025:

- a. Inserted Section 3.8, *Population Estimates (AB 2588 Only)*, and Section 3.8.1, *Zone of Impact (AB 2588 Only)*, to align with OEHHA's requirements. Subsequent sections were re-numbered accordingly.
- b. Updated Section 3.9 to clarify that census receptors are required for AB 2588 HRAs.
- c. Inserted Section 3.9.7, *Census Receptors (AB 2588 Only)*, to align with OEHHA's requirements for AB 2588 HRAs. Subsequent sections were re-numbered accordingly.
- d. Added the following to Table 4.2.1-1, *Required Cancer Risk Scenarios*: cancer burden as population-wide assessment with a 70 year exposure duration and the RMP using the Derived Method. A note was also added to clarify this is required for AB 2588 HRAs only.
- e. Inserted Section 4.6, *Population Exposure and Cancer Burden (AB 2588 Only)*, to align with OEHHA's requirements. Subsequent sections were re-numbered accordingly.
- f. Inserted Section 5.12, *Exposed Population and Cancer Burden (AB 2588 Only)*, to align with OEHHA's requirements for HRA reports. The subsequent section was re-numbered accordingly.
- g. Updated references to sections of the document as necessary due to re-numbering.