Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs)

San Diego County Air Pollution Control District
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Facilities submitting Health Risk Assessments (HRA) for the Air Toxics "Hot Spots" Program may be required to submit a protocol for District review prior to submitting the HRA report. The District will review and independently verify that the HRA and report comply with Guidelines adopted by the State Office of Environmental Health Hazard Assessment (OEHHA) and these supplemental guidelines.

These supplemental guidelines address the modelling specific and user default options for the risk evaluation incorporated into the Hot Spots Analysis and Reporting Program (HARP) developed by the California Air Resources Board (ARB), OEHHA, and the Districts, which is the recommended program to use for Air Toxics "Hot Spots" HRAs. The dispersion modelling portion of the evaluation may also be performed using a vendor front-end software program (i.e., Providence/Oris BEEST, Trinity BREEZE, Lakes Environmental AERMOD View) then imported into HARP.

1. **Guidelines** HRAs submitted to the District will be reviewed according to the most recent guidelines that are approved at the time of the review. The most recent OEHHA Guidelines are at:https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0. This includes the Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (February 2015, as posted on the OEHHA website on March 6, 2015). The most recent ARB Lead Risk Management Guidelines are at: https://ww2.arb.ca.gov/resources/documents/lead-risk-management-guidelines, and include the Risk Management Guidelines for New, Modified, and Existing Sources of Lead (March 2001, as posted on the ARB website). These District supplemental guidelines may be changed or amended as necessary.

2. **Elements of a HRA** HRAs shall include the following elements: the residential 30-year cancer risk, the occupational 25-year cancer risk, the non-cancer chronic health hazard index (HHI), the 8-hour chronic HHI, and the non-cancer acute HHI. These risks shall each be made for the offsite point of maximum health impact (PMI), the maximally exposed individual resident (MEIR), and the maximally exposed individual worker (MEIW). The location of each of these receptors shall also be specified. The cancer risk, non-cancer chronic and acute HHI and their locations for nearby sensitive receptors shall also be reported. Cancer and non-cancer chronic risks shall include estimates of both inhalation and multipathway noninhalation risks. HRAs shall also include estimates of population cancer burden using the lifetime 70-year exposure duration (including the residential noninhalation pathway risks). Non-cancer sub-chronic (30-day average) lead risk must also be reported. Cancer, non-cancer chronic and acute, and cancer burden isopleths (contours) are required if offsite cancer risks are equal to or exceed 10 in a million, the non-cancer HHI's are equal to or exceed 1.0, or the cancer burden equals to or exceeds 1.0.

3. **Recommended Software** The ARB HARP computer program is the recommended program to use for Air Toxics "Hot Spots" HRAs. The most recent HARP software is available at: http://www.arb.ca.gov/toxics/harp/harp.htm. Because the Air Toxics "Hot Spots" Program is a public right-to-know law, any software other than HARP that is used to calculate health risk must be in the public domain. The District will review all submitted HRA's by showing that the results can be duplicated using the HARP program. The District will review both the

results of the HRA and the methodology used. If HARP is not used to perform the HRA, or if the software used does not facilitate District review, the District may recommend revisions to the HRA. The District will independently verify the HRA results.

All modelling and the data needed to calculate the risk using HARP shall be provided to the District. Use of the HARP program will assist in comparing facilities health risk results and will facilitate the HRA review. Specifics about HARP files and output to be supplied with the HRA report are included in these guidelines. HRAs performed using commercial front-end software for HARP may also be acceptable. Please contact the District's Health Risk Assessments Section below for guidance.

Note that if a separate program is used to do the dispersion modeling, the modeler must ensure that the sources of emissions are correctly linked between the dispersion modeling software and HARP.

4. **HRA Tiers** All HRAs submitted shall include a Tier I evaluation (OEHHA exposure parameters) for comparison with District Rule 1210 public notification and risk reduction levels. Residential cancer risks and cancer burden shall be calculated using the ARB Risk Management Policy (RMP) daily breathing rates (DBR) for inhalation-based residential cancer risk and shall include the mandatory minimum pathways. Risk management decisions will be based on the results of the Tier I evaluation. For residential cancer risk management decisions, the District will only accept a Tier 3 (Stochastic using OEHHA distributions) which may be submitted in addition to a Tier 1 evaluation to demonstrate the range of risks. The results of a Tier 3 evaluation may be considered for risk management decisions at the discretion of the District. Refer to the OEHHA Guidance Manual, Section 1.7, Tiered Approach to Risk Assessment.

5. **Notification Levels** If the HRA results at any actual exposed individual offsite receptors exceed the Significant Risk Thresholds specified by in District Rule 1210, all affected receptors must be notified of their possible exposure.

6. **Screening HRAs** Facilities may elect to perform a screening-level HRA in lieu of a refined HRA. Screening HRAs differ from refined HRAs in that they are typically conducted using a screening-level dispersion program (AERSCREEN) and simplified procedures. A screening-level HRA can also be done using the HARP software and screening meteorological data. A screening-level HRA is less data intensive but will likely result in more conservative (i.e., higher) health risk results. They are not suitable for all situations. Facility characteristics, such as multiple emission sources, unusual source-receptor configurations, complex sources and multiple nearby buildings, etc., may make screening HRAs inappropriate. The District should be consulted prior to conducting a screening-level HRA. If the screening HRA results in risks greater than the significant risk thresholds specified in Rule 1210, a refined HRA should be performed. This is necessary to prevent notifying the public of risks that are overestimated due to the use of overly conservative analytical procedures.

7. **Emissions** HRAs conducted for the Air Toxics "Hot Spots" program are based on the emission estimates in the approved Toxics Emission Inventory (TEI) for the subject calendar year. Based on final prioritization scores for a facility, the District may determine that the Toxic Air Contaminants (TACs) at the facility are potentially significant and the facility is required to prepare an HRA. The District provides annual and hourly emission rates for each emitting device that shall be included in the HRA. If a facility has any questions about the approved TEI, they should contact the District's Emission Inventory Section as shown below and resolve those questions before submitting the HRA to the District.

8. **Geographical Reference Point** Upon request, the District will provide a geographical UTM (Universal Transverse Mercator) NAD 1983 reference point for the facility. All stack, building, fence-line, and receptor grid coordinates used in the HRA must be relative to this reference point. This reference point may be adjusted by the facility for convenience.

9. **Release Parameters** Health risk estimates depend on accurate representation of pollutant release parameters. This refers to the stack parameters (stack height, diameter, temperature, and exhaust velocity/flowrate) for point sources or volume/area source parameters (volume release height, lateral and vertical dimensions, area dimensions) for fugitive sources. Sources with rain-caps or horizontal point sources should be evaluated using the default AERMOD release type options. Fugitive sources should be represented as the smallest volume that accurately characterizes the release of pollutant(s) into ambient air. Care should be taken to not use an un-representative large volume source if emissions are spread out over a large area. In this case, it is preferred to represent the emitting device as adjacent volume sources occurring at the most common locations.

10. **Health Data** The most recent health data for toxic air contaminants (TACs) must be used to calculate the risks. The most recent health data is contained in the Consolidated Table of OEHHA/ARB Approved HRA Health Values. This table can be obtained at the OEHHA web site: https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary. The latest version of the HARP program which incorporates the most recent health table should be used.

11. **Meteorological Data** The District's Meteorology Section should be consulted to provide the appropriate AERMET surface and profile preprocessed files to be used for the HRA. For further assistance, please contact the District's Monitoring and Technical Services Division.

12. **Non-Default Options and Alternative Modeling Methodologies** If a source wishes to use Non-Default Options or Alterative Modeling Methodologies, pursuant to the OEHHA Guidance Manual or the US EPA User's Guide for the AMS/EPA Regulatory Model (AERMOD, available at: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf) within a HRA that are not otherwise discussed in these supplemental guidelines, District approval for the non-default options and/or alternative modeling methodologies is required prior to submitting the HRA for District review. In no case will the District approve the use of any option labeled as alpha (which is a non-regulatory option and is generally used for research and development work) in AERMOD.

13. **Rural/Urban Dispersion Coefficients** Considering the close proximity to the coastline, rural dispersion coefficients are the modelling default for San Diego County HRAs. However, there may be sources where the use of the urban dispersion is justified. A source can use urban dispersion if either the land use or population density procedure described in Section 4.4.1 of the OEHHA Guidance Manual indicate that urban dispersion can be used. If both procedures are used and give different results, the land use procedure results will take precedence over the population density procedure results. For further assistance, please contact the District's Monitoring and Technical Services Division.

14. **Emission Rate Factors** When appropriate, emission rate factors such as hour of day (HROFDY) scalars can be entered as inputs into the modelling program. This is to enable facilities that do not operate 24 hours per day and can substantiate the working hours to avoid including meteorological data for hours when the facility is not operating in calculations of the annual average or maximum hourly ground level concentrations. Note that

when determining acute risk, all non-zero hour of day scalers should be set to 1.0. When emission rate factors are used, it is mandatory to include in the HRA report operating-hour data for the facility that justifies the use of emission rate factors. If there are any questions, please contact the District's Health Risk Assessment section as shown below.

15. **Worker Adjustment Factor** Potential health impacts to an offsite worker will vary depending on the worker's schedule and the operating hours of the facility. Most offsite workers are assumed to work a regular 8 hour per day, 5 day per week, 50 week per year, 25 year schedule. If a facility if a facility which is preparing the HRA operates 24 hours per day and 7 days per week, inhalation cancer risk calculations for the worker should use the same ground level concentration values calculated by the dispersion model for the residential receptor. If the facility operates for fewer than 24 hours per day and/or fewer than 7 days per week, the air concentration that the offsite worker breathes will be increased, and a correction factor must be applied to calculate occupational cancer risk and the 8-hour chronic HHI. For example, assuming the emitting source and worker's schedules are the same, the adjustment factor is 4.2 = (24 hours per day/8 hours per shift) x (7 days in a week/5 days in a work week). Note the worker adjustment factors can only be used if hour of day scalars are used (see Section 14). Refer to the OEHHA Guidance Manual, Section 4.12.2, Modeling and Adjustments for Inhalation Cancer Risk at a Worksite.

16. **Noninhalation Deposition Rate** For controlled PM sources (i.e., watering, filtered), or uncontrolled sources where the emissions are PM_{10} or smaller (i.e., internal combustion engines emit $PM_{2.5}$), use the OEHHA default deposition rate of 0.02 m/s. Refer to the OEHHA Guidance, Sections 4.13.2, Deposition, and 5.3, Estimation of Concentrations in Air, Soil, and Water, as well as the CARB 08/17/1989 Memo on Screening Deposition Velocity, available at https://www.sdapcd.org/content/dam/sdapcd/documents/permits/air-toxics/CARB-Memo-Deposition-Velocity-1989.pdf. For infrequent cases, where there are large particulate matter emissions (PM_{20} or greater) which are all uncontrolled, use the OEHHA default deposition rate of 0.05 m/s.

17. **Noninhalation Garden Fraction** If there are households that garden or farm then the Homegrown Produce ingestion pathway needs to be included. The OEHHA defaults are 13.7 percent for households that garden and 23.5 percent for households that farm. Refer to the OEHHA Guidance Manual, Table 5.17, Fraction of Food Intake that is Home-Produced.

18. **Fraction of Time at Home** From the 3rd Trimester to < 16 years of age, prior to applying a fraction of time at home (FAH) adjustment, it is recommended to initially calculate risk where the FAH = 1 (no exposure adjustment) to ensure there is no school within a 1 in one million or greater isopleth. Refer to the OEHHA Guidance Manual, Section 8.2.2, Fraction of Time Spent at Home for Cancer Risk Assessment.

19. **Geographic Coordinates** All geographic coordinates used in the HRA shall be expressed in UTM (Universal Transverse Mercator) coordinates. All UTM data, including terrain elevation data, shall be referenced to the same coordinate datum (NAD83) and the datum used shall be clearly identified in the HRA report.

20. **Receptor Grids** Receptor and grid spacing shall be used that is sufficient to show where public health impacts above District significant risk thresholds may be expected to have occurred. A fine receptor grid with a50-meter grid spacing or less shall be used in areas encompassing points of maximum cancer and non-cancer (chronic and acute) impacts (PMIs, MEIRs, MEIWs, and sensitive receptors). Spatial Averaging may be applied as a secondary option subject to District review and approval. The nested grid should be confined to the size

of the parcel.

21. **On-Site Receptors** Health risk to on-site receptors shall also be evaluated where public access occurs, such as on-site facility housing, on-site day-care centers, and other publicly accessible areas of military bases, government property, hospitals, hotels, etc.

22. **Sensitive Receptors** Health risk to sensitive receptors shall be evaluated. Sensitive receptors are those who are especially susceptible to adverse health effects from exposure to toxic air contaminants, such as children, the elderly, and the ill. Sensitive receptors shall include schools (grades Kindergarten through 12), libraries, day care centers, nursing homes, retirement homes, health clinics, and hospitals within 2 kilometers of the facility.

23. **Long-term Receptors** For evaluating cancer or chronic risk, potential receptors should be placed where people may spend the bulk of their time during the long-term exposure at, such as the living areas at residential properties or workstations at workplaces.

24. **Short-term Receptors** For evaluating acute risk, potential receptors should also include areas where the public may be present for a 1-hour period, such as public parks and bus stops (although not including general sidewalks).

25. **Lead Analysis** For evaluating the non-cancer lead risk, the District will accept either the Simplified Approach or the Tier I Detailed Approach from Section II of ARB Lead Risk Management Guidelines. For the Simplified Approach, when determining the 30-Day Maximum Offsite Concentration, the HRA could assume that the source's annual emissions of lead are emitted within a single 30-day period, in lieu of determining which 30-day period in a year produces the actual highest concentration. The Maximum Offsite Concentration would then be compared to the High Exposure Scenario Public Notification and Significant Risk Level of 0.12 $\mu g/m^3$ from Table 8 of the ARB Lead Guidelines. It is recommended to consult with the District prior to submitting a HRA that uses the Tier I Detailed Approach. Tier II and Tier III Detailed Approaches should not be used without prior discussion and approval of the District. The results of the non-cancer lead evaluation should be included in the HRA report, as appropriate.

26. **Report Format** The HRA report is a public document. The Air Toxic "Hot Spots" program is a Public-Right-to-Know Law and therefore information shall be provided in a manner suitable for review by the public. It also shall satisfy District requirements by providing information not only related to potential health risk but also necessary for subsequent program requirements including the Air Toxics "Hot Spots" Annual Report, Public Notification, Risk Reduction Audits and Plans, regulatory planning and public inquiries. To facilitate these objectives as well as the review of the HRA, the outline in Section 9.2 of the OEHHA Guidance Manual for Preparation of HRAs (February, 2015) should be followed. Please consult the District regarding any deviations from this format.

27. **Executive Summary** The Executive Summary is an important and integral part of the HRA report. It shall contain the summary information as detailed in the OEHHA Guidelines, Section 9.2, including summary text and tables as described below and in the OEHHA Guidelines. It shall not contain the results of alternative HRA methodologies (which may be discussed in Appendices) or be used to editorialize on the HRA.

28. **Summary Tables** Summary tables are an integral part of the HRA Report and Executive Summary. In addition to any tables requested in the OEHHA Guidelines, at a minimum, tables describing emitting devices and their release parameters and locations, emissions of TACs from each emitting device, cancer and non-cancer risk estimates at PMI, MEIR, MEIW, sensitive receptors, and cancer burden, shall be included in the report. All

calculated results shall be reported to at least two significant digits. Where appropriate, including emissions values, scientific notation shall be used. Chemical listings shall be alphabetized for easy reference. Tabular results shall include pathway, dominant pollutant, and dominant toxic end-point for the maximally exposed individuals. If the HRA shows any impact to exposed persons above the significant risk thresholds, these locations should be identified in the HRA report.

29. **Maps and Diagrams** A variety of information shall be supplied on maps in the HRA report. In addition to requirements specified in the OEHHA Guidelines, at a minimum, the following information should be presented and clearly labeled: facility location and boundary; emission points within the facility boundary; locations of maximum impacts (PMI, MEIW, MEIR) for cancer, chronic, 8-hour chronic, and acute risks, and receptor grid arrangement (i.e., receptor point grid locations or network). More than one map may be needed to clearly show all this information.

    If excess cancer risks exceed any significant risk threshold, maps with isopleths or contours encircling areas of equal or greater cancer risk or non-cancer HHI shall be included. Isopleths shall indicate individual excess lifetime cancer risk intervals starting at 10 in a million and increasing on a "one-half order-of-magnitude" basis (i.e.: 10 in million, 50 in a million, 100 in a million, etc.). HHI isopleths shall be expressed in ascending full units (i.e.: 1.0, 2.0, etc.). Isopleths shall be provided on a full U.S. Geological Society (USGS) 7.5 minute map or equivalent, such as a map generated using a Geographic Information System (GIS). Additionally, the following data shall be provided: facility boundary; discrete receptor points (PMI, MEIR, and MEIW) and sensitive receptors, and land uses in the vicinity of the points of maximum impact (for instance, using an aerial photograph as a backdrop for the map that shows residential and commercial areas).

    Several maps employing different scales may be necessary to clearly present all the required information. Maps with a scale of 1:24,000 (i.e., 7.5 minute series USGS maps) are useful in depicting PMI, MEIR and MEIW locations, risk isopleths, and sensitive receptor locations. Maps with a scale of 1:125,000 are often useful in depicting larger scale features such as the area of study and census tracts. Smaller scale maps or diagrams may be necessary to show on-site building locations and the location of emissions points. The map scale that can accommodate all the presented information and show the greatest level of detail shall be used (i.e., do not use a 30 x 60 minute map if the information will fit on a 7.5 minute series map). The facility boundary shall be included on all maps. The scale of each map shall be clearly indicated. The names of streets and other major landmarks shall be legible. Directional finder (north arrow) and (UTM) coordinates shall be indicated on all maps.

30. **Data Submittal** The following shall be submitted to the District:

    The HRA submittal must include all input, output and supporting files of the modelling and risk analyses, preferably sent via email and dropbox file transfer. The District has a dropbox that can be used if needed.

For further assistance, please contact the following District departments:

Contact the Health Risk Assessment Section at apcdengineering@sdapcd.org or 858-586-2600.

Contact the Emission Inventory Section at apcdinventory@sdapcd.org or 858-586-2600.

Contact the Monitoring and Technical Services Division at APCDWX.LUEG@sdapcd.org or 858-586-2769.