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

San Diego 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 modelling portion of the evaluation may also be performed using a vendor front-end software program (i.e., BEE-Line BEEST and Lakes Environmental) then imported into HARP. Please direct any comments or suggestions regarding this document the District's Toxics Section.

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: http://oehha.ca.gov/air/hot_spots/hotspots2015.html . This includes the Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (February, 2015). These District supplemental guidelines may be changed or amended as necessary.

2. **Elements of a HRA** HRAs shall include the following elements: the estimated maximum residential 30-year exposures cancer risk, the maximum occupational 25-year exposure cancer risk, the estimated maximum non-cancer chronic health hazard index (HHI), the estimated 8-hour chronic HHI, and the estimated maximum non-cancer acute HHI. These risk estimates 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 health hazard indices and their locations for nearby sensitive receptors shall also be reported. Cancer and non-cancer chronic risk estimates shall include estimates of both inhalation and multipathway non-inhalation risks. HRAs shall also include estimates of population cancer burden using the lifetime 70-year exposure duration. Cancer and non-cancer chronic and acute risk isopleths (contours) are required if offsite cancer risks exceed 10 in a million or the non-cancer HHI's exceed 1.

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 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 and will facilitate the HRA review. Specifics about HARP files and output to be supplied with the HRA report are included in these guidelines. The HARP program is available from the ARB web site: http://www.arb.ca.gov/toxics/harp/harp.htm. HRAs performed using commercial front-end software for HARP may also be acceptable. Please contact the District's Toxics Section below for guidance.

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 shall be calculated using the ARB Risk Management Policy (RMP) daily breathing rates (DBR) for inhalation-based residential cancer risk. For the 30-year exposure duration, use the 95th percentile DBR for age groups less than 2 years old (3rd trimester through age 2) and the 80th DBR for age groups greater than 2 years old: Reference at: www.arb.ca.gov/toxics/harp/docs/rmpolicy.pdf and www.arb.ca.gov/toxics/harp/docs.htm#rm. Acute and chronic inhalation health effects are suitable for Tier I evaluations only. Risk management decisions will be based on the results of the Tier I evaluation. For 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. Only residential cancer risk is suitable for a Tier 3 stochastic evaluation. The results of a Tier 3 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 shows that risk estimates at any actual offsite receptors exceed public notification levels specified by the District, all affected receptors must be notified of their possible exposure according to District Rule 1210.

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 estimates. 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 estimated risks greater than the notification levels 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 emission inventory for the subject calendar year. Based on final prioritization scores for your facility, the District has determined that the Toxic Air Contaminants (TACs) at your facility are potentially significant and should be included in the

HRA. The District provides annual and hourly emission rates for each emitting device that shall be included at a minimum in the HRA.

8. **Geographical Reference Point** The District provides a geographical reference point in UTM (NAD 1927 OR 1983) 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 velocity/flow) for vertical point sources or volume/area source parameters (volume release height, lateral and vertical dimensions, area dimensions) for extended fugitive sources. Sources with rain-caps or horizontal point sources should be evaluated using the default AERSCREEN or AERMOD release type options. Fugitive sources should be represented as the smallest volume that accurately characterizes the release of pollutant into ambient air. Care should be taken not to use an un-representative large volume source if emissions are spread out over a large area over time but the actual release at any given time is localized. In this case, it is preferred to represent the emitting device as a small volume occurring at the most common location.

10. **Health Data** The most recent health data for toxic air contaminants (TACs) must be used to estimate risk. 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 ARB web site: www.arb.ca.gov/toxics/healthval/healthval.htm. Also, the HARP program incorporates health tables that incorporate the most recent approved health data.

11. **Meteorological Data** Screening meteorological data is provided with the HARP program. The District's Meteorology Section should consulted to provide the appropriate AERMET surface and profile preprocessed files to be used for the refined HRA. There are approximately ten sets of AERMET meteorological data that are available county-wide. For further assistance, please contact Monitoring and Technical Services.

12. **Rural/Urban Dispersion Coefficients** Considering the close proximity to the coastline, rural dispersion coefficients are the modelling default and should be used for San Diego County HRAs. However, on a case by case basis, there may be some sources where the use of the urban dispersion is justified. In AEMOD, the population should be limited to a three kilometer radius from the project area. For further assistance, please contact Monitoring and Technical Services.

13. **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 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. 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 Toxics section below.

14. **Worker Exposure Correction** 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, 49 week per year, 25 year schedule. If a facility 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). Refer to the OEHHA Guidance Manual, Section 4.12.2, Modeling and Adjustments for Inhalation Cancer Risk at a Worksite.

15. **Noninhalation Deposition Rate** For uncontrolled particulate matter greater than $PM_{2.5}$ microns in diameter, use the OEHHA default deposition rate of 0.05 m/s. For controlled sources (i.e., filtered), use the OEHHA default depositon rate of 0.02 m/s. Refer to the OEHHA Guidance, Section 5.3, Estimation of Concentrations in Air, Soil, and Water.

16. **Noninhatation Garden Fraction** If there are households that garden or households that 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, Table 5.17, Fraction of Food Intake that is Home-Produced.

17. **Fraction of Time at Home** From the 3rd Trimester < 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 the potential 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.

18. **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 (i.e., NAD27) and the datum used shall be clearly identified in the HRA report.

19. **Receptor Grids** A number of receptors shall be used that is sufficient to show where public health impacts above District levels of significance for public notification (10 in a million for cancer risk, health hazard index of 1 for non-cancer risk) 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.

20. **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.

21. **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), day care centers, nursing homes, retirement homes, health clinics, and hospitals within 2 kilometers of the facility.

22. **Report Format** Upon submittal, the HRA report shall constitute 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, it is recommended that the Outline for a HRA Report in Section 9.2 of the OEHHA Guidance Manual for Preparation of HRAs (February, 2015) be followed. Please consult the District regarding any deviations from this format.

23. **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.

24. **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, and sensitive receptors, plus 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 public notification or significant risk level, these locations should be identified in the HRA report.

25. **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, MEIO, MEIR) for cancer, chronic, 8-hour chronic, acute total hazard indices (THI), 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 10 in one million ($1x10^{-5}$) or chronic or acute HHIs exceed 1.0, 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.). THI 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.

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

- **Reports** Two numbered copies of the HRA, each in a three-ring binder(s) to facilitate updates and corrections. Include HRA text and tables and electronically drawn maps and figures on readable CD-ROMs. Specify file formats. Word and Excel are preferred. Text shall be paginated and any page revisions paginated and dated. It is not necessary to submit paper copies of all HARP risk calculation output reports, so long as these reports are provided on the CD. Detailed HARP risk calculation output reports for the PMI, MEIR, and MEIW for cancer risk and non-cancer chronic and acute HHI must be provided on paper as part of the report.

- **Programing data** One electronic copy on readable flash drive, DVD or CD-ROM(s) of all modelling and HARP input and output files as described in Section 9.2 (III)(F) of the OEHHA Guidelines. It would be helpful to also submit the approved meteorological data sets that were used in calculations. If submitted, detailed descriptions of the format used in naming these files are requested.

These shall be submitted to:

San Diego Air Pollution Control District, Toxics Engineering Section
10124 Old Grove Road, San Diego, CA 92131

For further assistance, please contact the District's Toxics Section.