AB 2588 Health Risk Assessment Modeling Protocol Guidance

I. Purpose

When preparing an AB 2588 Health Risk Assessment (HRA), the District requires facilities to submit a modeling protocol for review and approval prior to preparing the HRA. The HRA Modeling Protocol (HRA Protocol) is a plan that identifies the steps and assumptions to be taken during the air dispersion modeling and risk assessment process. District review and approval of the HRA Protocol will prevent costly and time consuming revisions required to correct any unforeseen deficiencies. In addition, it is expected that much of the information provided in the HRA Protocol will be reused in the final HRA report.

II. Modeling Protocol Content

When preparing the HRA Protocol, users should consult District Policy APR-1906[1] and the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual[2]. The following lists the sections that should be included in the HRA Protocol as well as the expected content of each section.

A. Introduction

1. Include the facility name, address, and a brief overview describing the facility's operations.

2. Provide a description of the terrain and topography surrounding the facility and potential receptors.

3. Indicate the format in which data will be provided. The District requires that the HRA report as well as all data and model input and output files be provided electronically (e.g., USB drive or FTP drop box). The District does not accept submission of paper copies.

[1] San Joaquin Valley Air Pollution Control District. 2018. APR-1906: Framework for Performing Health Risk Assessments. Available online at https://www.valleyair.org/policies_per/Policies/APR-1906-7-1-18.pdf.

[2] Office of Environmental Health Hazard Assessment. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Available online at: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

B. Emissions

1. Tabulate all emissions that will be modeled, along with the sources (toxic devices) they are associated with. In the table(s), list the annual average emissions (pounds/year) and the maximum one-hour emissions (pounds/hour). Provide a cross-reference table linking all modeled source groups to the toxic devices in the Toxic Emissions Inventory Report (TEIR) that are included in each source group.

2. Identify the reference and method(s) used to determine emissions (e.g., source tests, emission factors, etc.). Note that the HRA Protocol must include emissions from the District approved TEIR. If the emission data presented in the HRA Protocol do not match the TEIR, then either a revised TEIR or a revised HRA Protocol will need to be submitted to the District to ensure they are consistent.

3. Identify if this will be a multi-pathway assessment based on emitted substances. See Section F.6 for further information on required pathways.

4. If the facility emits lead, describe how the non-cancer neurodevelopment health effects of lead will be evaluated. The District recommends using the Tier I method found in the *2001 CARB Risk Management Guidelines for New, Modified, and Existing Sources of Lead* to complete the assessment. The link to the guidance is below:

   https://ww2.arb.ca.gov/sites/default/files/classic/toxics/lead/mainandappend.pdf?_ga=2.267514126.1873404097.1631035087-1556288962.1621881883

C. Models / Modeling Assumptions

1. Identify the air dispersion modeling software that is being used. The District will require the use of the latest version of EPA's AERMOD at time of modeling. Any alternative modeling software will require justification for District review and approval.

2. Identify the modeling domain and the maximum distance that receptors will be placed from the property boundary.

3. Identify the model options that will be used in the analysis along with a discussion for supporting why the options were selected. This includes, but is not limited, to the following:

   a) Use of regulatory default options are expected. Use of any non-default options requires justification for District review and approval.

b) Identify the coordinate system. The District will require the use of the Universal Transverse Mercator (UTM) coordinate system with either the North American 1983 datum (NAD83) or the World Geodetic System of 1984 (WGS84).

c) Output type should be concentration. The District does not allow plume depletion.

d) Identify and support the use of urban or rural dispersion coefficients. Refer to the District's modeling guidance[3] for methods of determining whether the urban or rural dispersion coefficients should be used. If the urban option is used, provide the population data.

e) Building downwash, if applicable, will be required. Identify any sources subject to building downwash and provide the building locations and dimensions.

f) Identify the source of terrain elevations and resolution. The District requires the use of terrain data for all HRAs. The District recommends using United States Geological Survey (USGS) data at a horizontal resolution of 30 meters or less.

g) If any other non-default modeling options are used, please provide justification for the District's review and approval.

4. Tabulate all modeling parameters that will be used for each emitting source. The modeling parameters must be consistent with those reported in the TEIR.

   a) All modeled sources should be modeled using a normalized emission rate. Point and Volume sources should be modeled using 1 gram/second emission rates. Area sources should be modeled using an emission rate of 1 gram/second divided by the area (m^2) of the source.

   b) Point sources should list stack parameters such as stack coordinates (UTM X and Y), diameter (m), exhaust temperature (K), exit velocity (m/s) and volumetric flowrate (m^3/s).

   c) Area sources should list the area of each source (m^2) as well as the coordinates of all the vertices (UTM X and Y) used to encompass the area source.

   d) Volume sources should list the coordinates of the center point of the volume (UTM X and Y), the height of the volume source (m), the length

[3] San Joaquin Valley Air Pollution Control District. 2006. Guidance for Air Dispersion Modeling. Available online at: https://www.valleyair.org/busind/pto/Tox_Resources/Modeling%20Guidance.pdf

of side (m), the initial vertical dimension (m), and the initial lateral dimension (m).

5. Identify any non-continuous sources that will be modeled using variable emissions (e.g., month, season, time of day, etc.), and describe the instances in which they will be used. Provide the devices' operating schedule and calculated emission factor multiplier that will be used for each time period. Ensure justification is provided for the use of variable emissions. Please contact the District if assistance is required for modeling non-continuous sources.

D. Meteorological Data

1. Specify the meteorological (MET) data that will be used. The District has pre-processed meteorological data available for 23 sites within the San Joaquin Valley. The District pre-processed MET data can be downloaded at: https://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm.

   Note that non-District MET data requires District review and approval prior to use.

2. Describe how the selected MET data site is representative of the facility site with respect to proximity, land use, topography and wind flow.

3. Identify the MET data years that will be used in the HRA.

E. Receptors

1. Identify the types of receptors that will be used and the purpose of each.

   a) Grid: Grid spacing should be sufficient in number and detail to capture the concentration at all of the receptors of interest as well as the point of maximum impact (PMI). The District recommends the following spacing at a minimum:

   - 25 m spacing from just outside of the facility boundary to 100 m. Please note, the first tier of receptors must not be placed on the facility boundary itself.
   - 50 m spacing from 100 to 250 m.
   - 100 m spacing from 250 to 500 m.
   - 250 m spacing from 500 to 1000 m.
   - 500 m spacing from 1000 m and beyond.

Note that after the zones of impact are identified, refined grids with spacing of no more than 25 m should be used to characterize maximum concentrations.

b) Discrete: Provide the UTM coordinates of any discrete residential and worker receptors.

c) Sensitive. Identify and describe the location of known or anticipated potential sensitive receptors. Provide the type of sensitive receptor (e.g., school, hospital, day care, rest home, etc.), the name of the facility, UTM coordinates, and street address.

d) On-site: If any, describe the type of on-site receptors present and provide the UTM coordinates. Some examples where the health impacts of on-site receptors may be appropriate could be military base housing, prisons, universities, day care facilities, or locations where the public may have regular access for the appropriate exposure period (e.g. a lunch time café or museum for acute exposures). When a receptor lives and works on the facility, site, or property, then these receptors should be evaluated and reported under both residential and worker scenarios and the one that is most health-protective should be used for risk management decisions.

e) Pathway: For multi-pathway analyses, identify the UTM coordinates of pathway receptors.

f) Population: To determine population exposure, discuss how census tract receptors will be placed once the zone of impact is identified.

2. Specify receptor flagpole heights. The District requires flagpole heights of 0 meters for all receptor types unless justification is reviewed and approved by the District.

   Note that the District does not employ spatial averaging.

F. Risk Assessment Options

1. The District requires the use of the latest version of the California Air Resources Board's (CARB) Hotspots Analysis and Reporting Program (HARP2) for determining both the carcinogenic (Cancer) and non-carcinogenic (Chronic and Acute) impacts from the facility. HARP2 may be downloaded from CARB's HARP website located at the following address: https://www.arb.ca.gov/toxics/harp/harp.htm

2. The District requires that residential exposures be evaluated over 70 years beginning at the third trimester and worker exposures be evaluated for 40 years beginning at age 16. In HARP 2, the 40 year worker exposure is

considered a Tier 2 assessment. Please refer to Table 1 for required District and OEHHA assessments.

Note that OEHHA requires 30 and 25 year exposure assessments for residents and workers, respectively. This information should be provided in an appendix to the HRA, but will not be used by the District to determine the facility's AB 2588 status.

Table 1. Required Assessments

Risk Scenario	Receptor Type				
	PMI	MEIR	MEIW	Sensitive	Census
Cancer – 70 year	D	D	--	D	S
Cancer – 30 year	S	S	--	S	--
Cancer – 40 Year	--	--	D	--	--
Cancer – 25 year	--	--	S	--	--
Chronic HI	D	D	D	D	--
Chronic 8-hour HI	--	--	S	--	--
Acute HI	D	D	D	D	--

D = Assessment required by the District. Results must be included in the HRA, and will be used to inform risk management decisions.

S = Assessment required by OEHHA. Results must be included in an appendix to the HRA as an informational item, and will not be used for risk management decisions.

3. The District does not allow the use of adjustments to the "time away from home" without justification and District review and approval prior to use. In the Risk Analysis section of the HARP2 tool, an option to apply a "fraction of time at residence' to age bins greater than or equal to 16 years is enabled by default. This option must be unselected when performing the HRA.

4. Describe the method by which 8-hour chronic non-cancer risk will be calculated. Justify any adjustments that will be made to exposure frequency.

5. The District requires the use of the OEHHA Derived Method for determining the Intake Rate Percentile.

6. Identify if an adjusted worker breathing rate will be used for cancer worker risk assessments. The District recommends the worker breathing be 24 hours, long term.

7. Identify the enabled pathways. The District requires that, at a minimum, the following pathways be enabled at all times for HRA analyses: Inhalation, Soil Ingestion, Dermal, Mother's Milk, and Home Grown Produce. If performing a multi-pathway analysis and other pathways are applicable, they must also be enabled.

a) For all selected pathways, provide the value of any required inputs as well as the source of the values. Identify any non-default options that will be used.

8. Identify the deposition rate that will be used for multi-pathway analyses.

9. Identify how the information will be graphically presented.

   a) Indicate which cancer risk isopleths will be plotted for the cancer zone of impact (e.g. 10E-06, 10E-07, etc.).
   b) Indicate the hazard indices or quotients for the non-cancer acute, 8 hour, and chronic zones of impact (e.g. 0.5, 1, etc.)

10. Identify any OEHHA Tier 2 assessment options not previously addressed that will be used in HARP2, and provide justification for their use.

    Note that Tier 2 options may not be used without District review and approval.

All required assessments are to be organized into separate file-folders and labeled according to their risk scenario and receptor type. Also, please identify which assessments are required by the District and OEHHA. Include a "read me" document that clearly describes which AERMOD files and HARP2 files were used for each assessment performed.

III. Working with the District

Modelers are encouraged to consult with the District at any time during the HRA process if questions arise. The District can be contacted at:

Address: San Joaquin Valley Air Pollution Control District
Permit Services, Technical Services Division
1990 E Gettysburg Ave
Fresno, CA 93727
Telephone: (559) 230-6000
E-mail: hotspots@valleyair.org

Modeling protocols should be sent as a PDF document to the attention of the specialist assigned to the "Hot Spots" project. The District will make every effort to review and respond to modeling protocols within 14 days of receipt.