



BAAQMD

Prioritization Score Procedures

For

Air Toxics Hot Spots Program

And

Proposed Regulation 11, Rule 18:

Reduction of Risk from Air Toxic

Emissions at Existing Facilities

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BAAQMD Prioritization Score Procedures For:

**Air Toxics Hot Spots Program and Proposed Regulation 11,
Rule 18: Reduction of Risk from Air Toxic Emissions at
Existing Facilities**

1. INTRODUCTION

This document describes the Bay Area Air Quality Management District's procedures for calculating "Prioritization Scores" for Air District facilities. Prioritization scores represent the relative potential for health impacts from a facility based on the amount of toxic air contaminants (TACs) emitted from a facility, the relative toxicity of the TACs emitted, and the proximity of the facility to possible receptors. The Air District uses prioritization scores to rank facilities based on health impact potential and to determine when facilities should undergo further review, such as health risk assessment (HRA).

In accordance with the California AB-2588 Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Health and Safety Code §44360 and §44363), air districts are required to use prioritization scores to rank facilities into high, intermediate, and low category facilities for the purposes of annual reporting and fee payments to the California Air Resources Board (CARB). A summary of the Air Toxics "Hot Spots" Information and Assessment Act and a discussion about the statewide facility prioritization process is available at:

<https://www.arb.ca.gov/ab2588/overview.htm>

Also, as described in the draft staff report for Proposed Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities, the Air District is proposing to use prioritization scores to determine which facilities will need a new or updated facility-wide HRA and to establish a schedule for conducting these HRAs.

The following Air District Prioritization Score Procedures generally conform with statewide guidance developed by the California Air Pollution Control Officers Association (CAPCOA): CAPCOA Air Toxic "Hot Spots" Program Facility Prioritization Guidelines, August 2016, located at:

<http://www.capcoa.org>

The Air District will periodically update these Air District Prioritization Score Procedures as needed to clarify procedures or incorporate updates to CAPCOA's Facility Prioritization Guidelines.

2. PROCEDURES

Currently, the Air District calculates prioritization scores for all types of facilities that emit toxic air contaminants (TACs). Prioritization scores are typically updated for each facility during the Air District's permit renewal process, based on the most recent emissions inventory for the site. The Air District calculates this emissions inventory based on throughput data reported by the site (generally updated on an annual basis) and emission factors or other representative data developed by the Air District in consultation with the facility.

The Air District does not update prioritization scores for gasoline dispensing facilities during permit renewal, because updated annual throughput data is not routinely collected for gasoline dispensing facilities. Prioritization scores for gasoline dispensing facilities will normally be based on the maximum permitted gasoline throughput rate for the facility unless recent actual throughput data is available.

2.1 Prioritization Score Steps

The Air District calculates two types of prioritization scores: cancer and non-cancer. The general steps for calculating these prioritization scores are listed below. The Air District uses the highest prioritization score to rank the facility.

Table 1. General Prioritization Score Steps

Step 0	Begin with an approved toxic emission inventory for a facility.
Step 1	Determine the toxicity weighted emission rates (cancer and non-cancer) for each TAC emitted from a site.
Step 2	Sum the toxicity weighted emission rates for each type of health effect (cancer and non-cancer).
Step 3	Determine the highest Proximity Adjustment Factor (PAF) for the site. <ul style="list-style-type: none"> Identify the distances from the facility to the nearest receptor for each type of receptor (resident and off-site worker). Use Table 2 to determine the PAF for each type of receptor distance, and choose the highest PAF for the site.
Step 4	Calculate each type of prioritization score by multiplying the appropriate total weighted emission rate (cancer or non-cancer) by the PAF and by the appropriate normalization factor (NF_{cancer} or $NF_{\text{non-cancer}}$).
Step 5	Choose the highest prioritization score to rank the facility.

Toxicity weighted emission rates are calculated using the most recently approved toxic emission inventory for the site (E_i , pounds/year of each TAC) and OEHHA health effects data. The cancer risk weighted emission rate uses the unit risk value (U_i) for each carcinogen, which can be found at: <https://oehha.ca.gov/media/CPFs042909.pdf> The non-cancer risk weighted emission rate uses the chronic REL (REL_i) for each TAC, which can be found in Regulation 2, Rule 5, Table 2-5-1 at: http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/reg-02/rq0205_120716-pdf.pdf?la=en

The Proximity Adjustment Factor (PAF) is determined from Table 2 below and the receptor distance for a site. The receptor distance is the distance from the facility boundary to the nearest receptor for the type of receptor under evaluation (resident or off-site worker). Use Table 2 to determine the PAF for each type of receptor (residents and off-site workers), but choose the highest PAF to calculate prioritization scores. This distance may be refined for sites with known stack or source locations by using the shortest distance from a stack or source to a receptor.

Table 2. Proximity Adjustment Factors

Receptor Distance (meters)	Proximity Adjustment Factors (PAF)
0 < 100	1.000
100 < 250	0.250
250 < 500	0.040
500 < 1000	0.011
1000 < 1500	0.003
1500 < 2000	0.002
2000 and up	0.001

Normalization factors are constants that convert the raw scores into a convenient scale for facility ranking. The two types of normalization factors are the cancer normalization factor (NF_{CANCER}) and the non-cancer normalization factor ($NF_{\text{NON-CANCER}}$). Pursuant to the CAPCOA Facility Prioritization Guidelines (August 2016), the normalization factors are:

$$\begin{aligned} NF_{\text{CANCER}} &= 7700 \\ NF_{\text{NON-CANCER}} &= 150 \end{aligned}$$

2.2 Standard Prioritization Score Calculation Equations

The standard prioritization score (PS) calculation equations are shown below:

$$\begin{aligned} PS_{\text{CANCER}} &= \sum \{(E_i) * (U_i)\} * (PAF) * (NF_{\text{CANCER}}) \\ PS_{\text{NON-CANCER}} &= \sum \{(E_i) / (REL_i) / (8760)\} * (PAF) * (NF_{\text{NON-CANCER}}) \end{aligned}$$

The variables for the standard prioritization score equations are:

- E_i : Toxic air contaminant emissions from the facility (pounds/year) of each TAC (i)
- OEHHA approved toxicity factors for each toxic air contaminant:
 U_i : Unit Risk Value for each carcinogenic TAC (i), $(\mu\text{g}/\text{m}^3)^{-1}$
 REL_i : Chronic Reference Exposure Level (REL) for each TAC (i), $\mu\text{g}/\text{m}^3$
- PAF: Proximity Adjustment Factors (PAF) for nearest receptor
- NF: Normalization Factors (NF) for each type of health effect (NF_{CANCER} and $NF_{\text{NON-CANCER}}$)

2.3 Alternative Prioritization Score Calculation Equations for Specific Facility Types

The Air District may generate more refined prioritization score equations for certain types of facilities, such as sites with only emergency standby diesel generators, that may have intermittent operations, single source types, or site-specific factors that may justify the use of this more refined approach. The prioritization steps are similar, except that the Air District will include exposure factors and will use the alternative prioritization score (PS) calculation equations as shown below:

$$PS_{\text{CANCER}} = \sum \{(E_i) * (U_i)\} * (PAF_{\text{RECEPTOR}}) * (EF_{\text{RECEPTOR}}) * (NF_{\text{CANCER}})$$

$$PS_{\text{NON-CANCER}} = \sum \{(E_i)/(REL_i)/(8760)\} * (PAF_{\text{RECEPTOR}}) * (EF_{\text{RECEPTOR}}) * (NF_{\text{NON-CANCER}})$$

The variables for the alternative prioritization score equations are:

- E_i : Toxic air contaminant emissions from the facility (pounds/year) of each TAC (i)
- OEHHA approved toxicity factors for each toxic air contaminant:
 U_i : Unit Risk Value for each carcinogenic TAC (i), $(\mu\text{g}/\text{m}^3)^{-1}$
 REL_i : Chronic Reference Exposure Level (REL) for each TAC (i), $\mu\text{g}/\text{m}^3$
- PAF_{RECEPTOR} : Proximity Adjustment Factor (PAF) for each type of receptor (PAF_{RESIDENT} or PAF_{WORKER})
- EF_{RECEPTOR} : Exposure Factor (EF) for each type of receptor (EF_{RESIDENT} or EF_{WORKER})
- NF: Normalization Factors (NF) for each type of health effect (NF_{CANCER} and $NF_{\text{NON-CANCER}}$)

Exposure Factors (EF) consider actual source operating times, receptor breathing rates, exposure durations, and other factors compared to the default value of $EF=1$. Residential and off-site worker assumptions from the 2015 CAPCOA HRA Guidelines may be used to calculate exposure factors for residents (EF_{RESIDENT}) or off-site workers (EF_{WORKER}) for a specific source-type, such as emergency standby engines.

3. RECENT CHANGES AND IMPACTS ON SCORES

In comparison with the Air District's previous prioritization score procedures: "Procedures for Prioritizing Facilities that Report Emissions Under AB 2588", adopted May 1990, the standard prioritization score equations have not changed. However, the values for several of the equation variables have been revised since these variables were last amended in January 2010.

For the cancer risk prioritization score, the cancer unit risk values (U_i) have not changed since 2010, but the cancer normalization factor (NF_{CANCER}) has increased from 1700 to 7700. Thus, the cancer risk prioritization score for a site will increase in proportion to the normalization factor change ($7700/1700$), and it will be 4.53 times higher than the 2016 cancer prioritization score for that site. Because of the increase in cancer normalization factor, the Air District anticipates that up to 1100 sites may have a cancer risk prioritization score greater than 10 in 2017. A prioritization score greater than 10 results in a facility ranking of intermediate and will require additional review pursuant to the Air Toxics "Hot Spots" Program and proposed Regulation 11, Rule 18. The rule development documents for proposed Regulation 11, Rule 18 contain a detailed discussion of the Air District's proposed health risk assessment and risk reduction requirements and the potential impacts for subject facilities.

For non-cancer prioritization score, the non-cancer normalization factor ($NF_{\text{NON-CANCER}}$) has not changed since 2010, but the chronic reference exposure levels (REL_i) for benzene, 1,3 butadiene, and nickel have decreased since 2010.¹ Since the non-cancer prioritization score is inversely proportional to the chronic REL, a reduction in a chronic REL will result in an increase in prioritization score. Therefore, sites emitting benzene, 1,3-butadiene, or nickel are likely to have an increase in the non-cancer prioritization score for the site due to the recent chronic REL revisions. However, these potential changes in non-cancer prioritization score are not likely to have an impact on facility rank because the cancer risk prioritization score is usually the dominating score for sites emitting these compounds.

¹ The most recent chronic REL revisions were identified in the 2016 proposed amendments to Regulation 2, Rule 5 Table 2-5-1, which are available on the Air District web site at: http://www.baaqmd.gov/~media/files/planning-and-research/public-hearings/2016/reg-2-rule-5/0205_pr_102616_apxa-pdf.pdf?la=en.

References

- 1 *“Air Toxics “Hot Spots” Program Facility Prioritization Guidelines,” CAPCOA, August, 2016*
- 2 *“Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values”, California Air Resources Board, updated March 28, 2016*
- 3 *“Air Toxics Hot Spots Program Risk Assessment Guidelines; Guidance Manual for Preparation of Health Risk Assessments”, OEHHA, February, 2015*