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Walnut Creek Energy LLC
911 Bixby Drive
City of Industry, CA 91745
Phone: 760-707-6833

March 12, 2021

Eric Veerkamp
Compliance Project Manager
CA Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: **Petition to Amend – Uprate Project**
Walnut Creek Energy Park (05-ACF-02C)

Dear Mr. Veerkamp:

Walnut Creek Energy LLC (WCE) is pleased to submit the Petition to Amend (PTA) for the uprate of gas turbine Units 1-5 at Walnut Creek Energy Park (WCEP). The uprate of these turbines will not necessitate physical modifications; rather the fuel input and ammonia flow rate on an hourly basis would increase, resulting in an increase in output of the respective gas turbines. An increase in the heat input rate will enable each turbine to achieve the permitted turbine output of 100.1 megawatts (MW) net – 500.5 MW net from Units 1-5 – across typical City of Industry temperature and relative humidity ranges. WCEP's net qualifying capacity is 483.1 MW; the permit modifications for Units 1-5 would increase the net output from WCEP by approximately 17.4 MW.

The uprate project is proposed as a minor air permit modification. The air permit application has been filed with South Coast Air Quality Management District (SCAQMD) concurrently with the filing of this PTA. No changes are proposed to annual and monthly pollutant emissions, pollutant emission factors, or fuel use. Small changes to hourly and daily emissions would result. The modifications will trigger Best Available Control Technology (BACT) for NOx. WCE has proposed a reduction in the NOx concentration from 2.5 parts per million (ppm) to 2.3 ppm, which will also decrease hourly, daily, monthly and annual NOx emissions. A daily maximum fuel input will be added to the permit conditions that will minimize daily mass emission increases of CO, SOx, VOCs, and PM. Monthly CO, VOCs and PM emissions will decrease; SOx monthly emissions will not change. Corresponding changes to the Air Quality Conditions of Certification have been incorporated in the PTA.

WCE is seeking modifications of the Facility Permit to Operate to increase the fuel input and ammonia flow rate and the corresponding output from WCEP in time for summer 2021. The increase in output from WCEP is integral in addressing the State of California's urgent need for additional capacity. Southern California Edison has contracted WCE for the increased output starting June 1, 2021 in response to the California Public Utilities Commission's ruling (Rulemaking 20-11-003, dated December 28, 2020) directing the State's three large electric investor-owned utilities to seek contracts for additional power capacity.

The PTA filing fee has been sent to the Administrative Office. If you have any questions or need further information, please don't hesitate to contact me at (760) 707-6833 or Heather Mostert at (949) 903-5701.

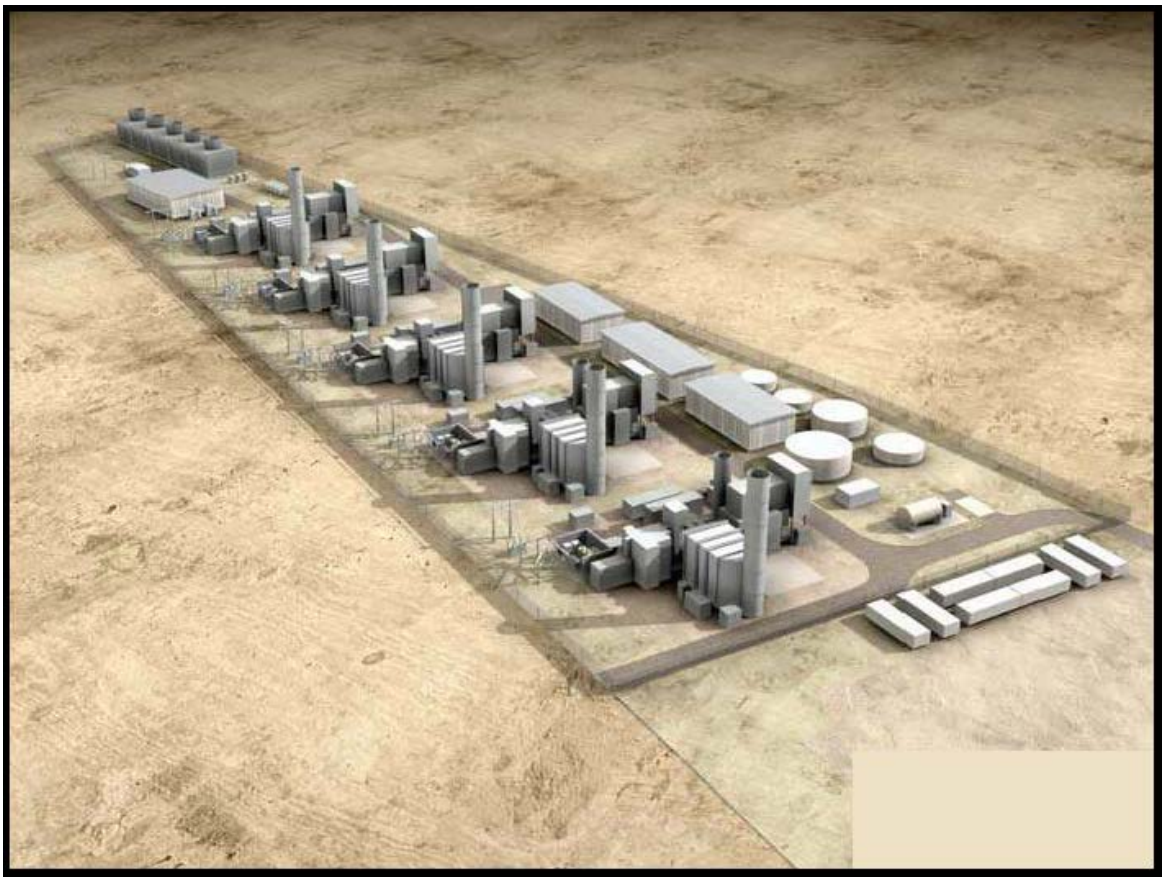
Best Regards,

On behalf of Walnut Creek Energy LLC

George L. Piantka, PE
Senior Director, Environmental

cc: Michael Murphy, Walnut Creek Energy LLC
Paul Mattesich, Walnut Creek Energy LLC
Heather Mostert, Walnut Creek Energy LLC

Walnut Creek Energy LLC
(05-AFC-2C),
Petition to Amend: Increase Turbine Heat Input Rating, March 2021



Prepared by: Yorke Engineering, LLC
31726 Rancho Viejo Road, Suite 218
San Juan Capistrano, CA 92675

Submitted by: Walnut Creek Energy, LLC
911 Bixby Drive
Walnut Creek, CA 91745

Date Submitted: March 12, 2021

Table of Contents

List of Tables

Appendices

Walnut Creek Energy LLC
Petition to Amend: Increase Turbine Heat Input Rating

1.0 INTRODUCTION

1.1 Project Overview

Walnut Creek Energy LLC (WCE) is submitting this Petition to Amend (PTA) to request modifications to increase the allowable heat input listed in the Equipment Description for each of its five (5) natural gas-fired Simple Cycle Gas Turbines (SCGTs) at the Walnut Creek Energy Park (WCEP or Facility). Modifications are requested to the Equipment Descriptions for each SCGT to better align the heat input with the 100.1 net megawatts (MW) per SCGT – 500.5 MW net from the five SCGTs - and to modify four Conditions of Certification (COCs): AQ-3, AQ-4, AQ-6, and AQ-12 related to this change. The equipment description for each SCGT in the South Coast Air Quality Management District (SCAQMD) Permit to Operate (PTO) currently lists the heat input as 891.7 million British thermal units (MMBtu) per hour and the permitted net output as 500.5 MW. With this PTA, WCE is requesting that the maximum heat input be increased to 951.0[1] MMBtu per hour, which will enable the Facility to achieve 500.5 MW net. The Facility's net qualifying capacity (NQC) is 483.1 MW and is currently dispatched to serve peak power demand and needs to be permitted to operate at the maximum possible load to service that demand. The Facility's generating capacity will remain at 520 gross MW. There are no physical modifications to the turbines proposed by this PTA.

The proposed Project will have the following impact on emissions from the Facility:

- The hourly increase in heat input requires Best Available Control Technology (BACT) review to satisfy SCAQMD New Source Review requirements. Accordingly, WCE has requested from the SCAQMD a modification of a condition in the Facility's PTO changing the NO_x emission limit from the currently permitted level of 2.5 parts per million (ppm) to 2.3 ppm to satisfy BACT. With the decrease in allowable NO_x concentration, there will be a net decrease in hourly NOx emissions from each SCGT despite the increase in the heat input. Hourly NOx emissions are not currently limited by a COC.
- The increase in hourly heat input would result in an increase in the hourly emissions of sulfur oxides (SO_x), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM_{10}) emissions without a change in the respective emission factors, although the hourly emissions are not limited by COCs.
- WCE has requested from the SCAQMD a condition setting a throughput limit of 22,350 MMBtu per day, per SCGT. This daily limit will result in a daily emission increase of CO, VOC, SO_x, and PM_{10}. Daily NO_x emissions will not increase. The daily emissions are not specifically limited by any COCs. This PTA requests changes to the COCs to reflect the

[1] This heat input is based on a heat rate of 9.5 MMBtu per hour per MW, Higher Heating Value (HHV), i.e., 9.5 x 100.1 net MW = 951.0 MMBtu per hour (HHV).

fuel use limit so that the California Energy Commission (CEC) license is consistent with the SCAQMD permit.

- WCE will continue to operate under COC AQ-6 and SCAQMD permit conditions limiting monthly fuel use to 367 million standard cubic feet (MMscf) per month, per SCGT. The requested changes will result in decreases in monthly NO_x, CO, VOC, and PM_{10} emissions. Monthly SO_x emissions will not increase.
- Hourly toxic air contaminant (TAC) emissions will increase as a result of the heat input change. Annual emissions of criteria pollutants and TACs [potential to emit (PTE) basis] will not change due to the proposed Project.

WCE requested a modification to a SCAQMD permit condition (Condition D12.2) to increase the allowable ammonia injection rate for each SCGT, which is required in order to achieve the lower BACT emission rate for NO_x. WCE is requesting that a throughput limit for ammonia injection in COC AQ-12 be modified to be consistent with the SCAQMD permits.

Finally, WCE is requesting a condition from the CEC and SCAQMD to exempt WCE from the NO_x concentration limit twice per year to allow for tuning of the SCGTs. Tuning is required to ensure efficient, low-emitting operation of the SCGTs. WCE will limit daily emissions during tuning events to no more than the daily limits during normal operations; therefore, there will be no increase in daily or annual NO_x emissions due to the requested change.

Pursuant to California Code of Regulations (CCR) Title 20 Section 1769(a)(1), as revised in September 2019, WCE, the Project Owner, is filing this PTA for to request the following five proposed amendments:

1. Changes to the heat input of the SCGTs in the Equipment Description;
2. Modification of COC AQ-3 (SCAQMD Condition A99.1) to change the NO_x concentration limit from 2.5 ppm to 2.3 ppm for each of the five SCGTs and to add language exempting each of the five SCGTs from the 2.3 ppm limit during tuning;
3. Modification of COC AQ-4 (SCAQMD Condition A195.2) to change the NO_x concentration limit from 2.5 ppm to 2.3 ppm for each of the five SCGTs;
4. Modification of COC AQ-6 (SCAQMD Condition C1.1) to add a daily heat input limit of no more than 22,350 MMBtu (21.3 MMscf[2]) per day for each of the five SCGTs so that the COC is consistent with the SCAQMD permit; and
5. Modification of COC AQ-12 (SCAQMD Condition D12.2) to change the ammonia injection rate limit from 215 pounds per hour (lb/hr) to 265 lb/hr for each of the five SCGTs so that the COC is consistent with the SCAQMD permit.

The proposed amendments comply with all laws, ordinances, regulations, and standards (LORS) and do not have a significant environmental impact, as further described in this PTA. The emission changes will not cause adverse impacts to ambient air quality, as demonstrated through an Air Quality Impact Analysis (AQIA). The emission changes will not cause adverse impacts to public

[2] Conversion using HHV = 1050 Btu/scf.

health, as demonstrated by a Health Risk Assessment (HRA). The proposed revisions to the COCs will not have significant impact on property owners, the public, or any other parties.

1.2 Information Requirements for Post-Certification Amendments

This Petition contains the information required under the CEC's Siting Regulations for post-certification project modifications [CCR Title 20, Section 1769(a)(1)], including the following:

A. A complete description of the proposed change, including new language for any conditions of certification that will be affected;

B. A discussion of the necessity for the proposed change and an explanation of why the change should be permitted;

C. A description of any new information or change in circumstances that necessitated the change;

D. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects;

E. An analysis of how the proposed change would affect the project's compliance with applicable laws, ordinances, regulations, and standards;

F. A discussion of how the proposed change would affect the public;

G. A list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of any affected project linears and 1,000 feet of the project site;

H. A discussion of the potential effect of the proposed change on nearby property owners, residents, and the public; and

I. A discussion of any exemptions from the California Environmental Quality Act (CEQA), of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.

2.0 REQUIRED INFORMATION FOR POST-CERTIFICATION AMENDMENTS

A. Complete description of the proposed change, including new language for any conditions of certification that will be affected.

A.1 Facility Background Information

WCE operates five (5) General Electric LMS100 PA SCGTs, each driving an electrical generator rated at 100.1 net MW, 104 gross MW, for a total nominal plant generating capacity of 500.5 net MW (520 gross MW). The Facility's NQC is 483.1 MW.

Each of the SCGTs is in a simple cycle configuration and, therefore, there are no heat recovery steam generators, duct burners, or steam turbines in operation at this plant. Selective catalytic reduction (SCR) systems and oxidation catalysts are utilized for control of NO_x and CO/VOC emissions, respectively. One 16,000-gallon ammonia (NH_3) storage tank stores 19% aqueous ammonia for use in the SCR.

A.2 Proposed Changes

As noted in the Introduction, the purpose of this PTA to request changes to the equipment description and COCs AQ-3, AQ-4, AQ-6, and AQ-12 applicable to each of the five SCGT's. The following specific changes are proposed:

1. Change the input heat input rating of the SCGTs in the equipment description from 891.7 MMBtu per hour to 951.0 MMBtu per hour to enable the Facility to achieve 500.5 MW net;
2. A modification of COC AQ-3 (SCAQMD Condition A99.1) to change the NO_x concentration limit from 2.5 ppm to 2.3 ppm for each of the five SCGTs and to add language exempting each of the five SCGTs from the 2.3 ppm limit during tuning events twice per year;
3. A modification of COC AQ-4 (SCAQMD Condition A195.2) to change the NO_x concentration limit from 2.5 ppm to 2.3 ppm for each of the five SCGTs;
4. A modification of COC AQ-6 (SCAQMD Condition C1.1) to add a daily heat input limit of no more than 22,350 MMBtu (21.3 MMscf) per day for each of the five SCGTs so that the COC is consistent with the SCAQMD permit; and
5. A modification of COC AQ-12 (SCAQMD Condition D12.2) to change the ammonia injection rate limit from 215 lb/hr to 265 lb/hr for each of the five SCGTs so that the COC is consistent with the SCAQMD permit.

The reasons these changes are needed are discussed further in Section B.

A.3 Proposed Changes to the Conditions of Certification

The following specific revisions to the Equipment Descriptions, and COC AQ-3, AQ-4, AQ-6 and AQ-12 in the CEC Final Commission Decision are proposed, using **underline bold** for inserted text and ~~**strikethrough bold**~~ for deleted text. Only the equipment description and COCs proposed for revision are included.

> **AQ-3** The ~~**2.5**~~**2.3** PPMV NOx emission limit, 2.0 PPMV VOC emission limit and the 4.0 PPMV CO emission limit shall not apply during turbine start-up and shutdown periods.

Start-up time shall not exceed 60 minutes. Shutdown time shall not exceed 10 minutes for each shutdown. The turbine shall be limited to a maximum of 480 start-ups per year. Written records of start-ups and shutdowns shall be maintained and made available upon request from the District Executive Officer and the CPM. **The 2.3 PPMV NO_x emission limit shall not apply to each turbine during tuning of that turbine.**

Verification: The project owner shall provide start-up and shutdown occurrence and duration data as part of the Quarterly Operation Report (**AQ-SC10**). The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, ARB and the Commission.

AQ-4 The ~~2.5~~**2.3** PPMV NOx emissions limit(s) is averaged over 60 minutes at 15% O2, dry.

The 4.0 PPMV CO emission limit(s) is averaged over 60 minutes at 15% O2, dry.

The 2.0 PPMV VOC emission limit(s) is averaged over 60 minutes at 15% O2, dry.

The 5.0 PPMV NH3 emission limit(s) are averaged over 60 minutes at 15% O2, dry.

Verification: The project owner shall submit to the CPM for approval all emissions and emission calculations on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC10**.

AQ-6 The project owner shall limit the fuel usage from each turbine to no more than 367 MM cubic feet in any one calendar month **and to no more than 21.3 MM cubic feet of pipeline quality natural gas in any one day**. For the purpose of this condition, fuel usage shall be defined as the total natural gas usage of a single turbine. The project owner shall maintain records in a manner approved by the District and the CPM, to demonstrate compliance with this condition. The project owner shall install and maintain a flow meter to accurately indicate the fuel usage being supplied to the turbine. The project owner shall also install and maintain a device to continuously record the parameter being measured.

Verification: The project owner shall submit to the CPM for approval all fuel usage records on a quarterly basis as part of the quarterly emissions report of Condition of Certification AQ-SC10.

AQ-12 The project owner shall install and maintain a flow meter to accurately indicate the flow rate of the total hourly throughput of injected ammonia. The project owner shall also install and maintain a device to continuously record the parameter being measured. The measuring device or gauge shall be accurate to within plus or minus 5 percent. It shall be calibrated once every 12 months. The ammonia injection rate shall not exceed ~~215~~ **265** lb/hr.

For the purpose of this condition, continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The

project owner shall submit annual calibration results within 30 days of their successful completion.

B. A discussion of the necessity for the proposed change and an explanation of why the change should be permitted.

WCE is seeking modifications to the SCAQMD Facility PTO and the corresponding CEC license to increase the fuel input and the corresponding output of the Facility in time for summer 2021. The increase in output from WCE is integral in addressing the State of California's urgent need for additional capacity. Southern California Edison (SCE) has contracted WCE for the increased output starting June 1, 2021 in response to the California Public Utilities Commission's (CPUC's) ruling (Rulemaking 20-11-003, dated December 28, 2020) directing the State's three large electric investor-owned utilities to seek contracts for additional power capacity. In response to the need for additional generation, modifications to the PTO and CEC license are needed to enable WCE achieve 500.5 net MW (520 gross MW) as described in the WCE license and PTO. The Facility's NQC is 483.1 MW and is currently dispatched to serve peak power demand as well to support baseload needs and needs to be permitted to operate at the maximum possible load to service that demand. The PTO and license modifications would increase the net output from WCEP by approximately 17.4 MW.

C. A description of any new information or change in circumstances that necessitated the change.

The prolonged heat storm experienced in August 2020 led the California Independent System Operator (CAISO) to initiate rotating outages and subsequently led to the Governor directing the CEC, CAISO and CPUC to prepare a report describing the root cause of the events leading to the rotating outages. The extreme heat storm continued in September 2020 which led to the Governor to issue orders in mid-August and early-September enabling electricity generation stations to operate above permit limits, if possible, to support the electricity demand of the State. The Department of Energy issued a 202(c) Order for some electricity generating stations to operate without federal permit limits during early-September due to the extreme heat storm. The CPUC, in response to the State's energy agencies preliminary report directed the "…large electric investor-owned utilities (IOUs) to seek contracts for capacity, available for the net peak demand in summer 2021 that conforms with the parameters outlined in (Assigned Commissioner's December 28, 2020) ruling (Rulemaking 20-11-003)." The Assigned Commissioner's Rule also directed the IOUs to seek contracts for summer 2022. WCE has been contracted by SCE to provide incremental net generation as soon as June 1, 2021. WCE, in response to this contract for incremental generation, is seeking a change to its permit to increase the heat input rate which will allow the Facility to achieve 500.5 net MW (520 gross MW) output as already described in the WCE license. The PTO and license modifications would increase the net output from WCEP by approximately 17.4 MW.

D. An analysis of the effects that the proposed change to the project may have on the environment and proposed measures to mitigate any significant environmental effects.

D.1 Overview

The proposed amendment to air quality COC will result in an increase in hourly heat input that in turn would result in an increase in the hourly emissions of SO_x, CO, VOC, and PM_{10} and a decrease in the hourly emissions of NO_x.

In addition to the increase to the hourly heat input rating, WCE is requesting that the CEC and SCAQMD impose a throughput limit of 22,350 MMBtu per day per SCGT. This daily fuel use limit will result in a daily emission increase for SO_x, CO, VOC, and PM_{10}. Daily NO_x emissions will not increase.

The requested changes will result in decreases in monthly NO_x, CO, VOC, and PM_{10} emissions. Monthly SO_x emissions remain the same.

The proposed Project does not alter annual emissions of criteria pollutants.

A summary of the expected impacts on each of the environmental resource areas is provided in Table D-1 below. A more complete analysis of the proposed impacts on air quality and public health are provided in Sections D-2 and D.3, respectively.

Table D-1: Environmental Impact Summary

Resource Area	Analysis
Air Quality	The air quality analysis is provided in Section D.2. As discussed, no significant impacts are expected from the proposed changes.
Biological Resources	No physical changes to the Project footprint are proposed and the small increase in emissions increase would not impact biological resources.
Cultural Resources	No physical changes to the Project footprint are proposed and there would be no impact to cultural resources.
Geology and Paleontology	No physical changes to the Project footprint are proposed and there would be no impact to geologic or paleontological resources.
Hazardous Materials	The proposed changes do not impact the storage or use of any hazardous material currently in use at the Facility and do not require the storage or use of any new hazardous material. Therefore, the proposed Project will not cause an adverse impact.
Land Use	The proposed changes will not affect land use; hence, there will be no impact.
Noises and Vibration	No construction is needed and the change in the heat input and power output will not cause a change in noise or vibration from the Project; hence, there will be no impact.
Public Health	The proposed changes will result in an increase in the maximum hourly emissions of TACs due to the combustion of natural gas and hourly and annual ammonia emissions due to ammonia slip from the SCR. The health risk analysis is provided in Section D.3. As discussed, no significant impacts are expected from the proposed changes.
Socioeconomic Resources	The proposed changes do not require any changes in workforce; hence, there will be no socioeconomic impact.
Soil and Water Resources	No physical changes, ground disturbance, or increased water usage are proposed; hence, there would be no impact to soil or water resources
Traffic and Transportation	The proposed changes do not require any changes in workforce; hence, there will be no traffic or transportation impact due to worker commute. Therefore, the proposed Project is not expected to cause an impact.
Visual Resources	No physical changes to the Project appearance are proposed; hence, there would be no impact to visual resources.

Resource Area	Analysis
Waste Management	The proposed changes will not affect the level of waste production from the Facility; hence, there will be no impact.
Worker Safety and Fire Protection	No construction, physical changes to the Facility, or change in workforce are proposed; hence, there will be no impact related to worker safety or fire protection.

D.2 Air Quality

The potential for impacts to air quality from the proposed changes are discussed in the following sections.

D.2.1 Criteria Pollutant Emissions

The equipment description currently lists the heat input of each SCGT as 891.7 MMBtu per hour. With this application, WCE is requesting that the heat input be updated to 951.0 MMBtu per hour. WCE is requesting that the CEC and SCAQMD lower the NO_x emission limit from 2.5 ppm to 2.3 ppm to meet BACT requirements. Additionally, WCE has requested that SCAQMD impose a condition limiting fuel input to 22,350 MMBtu per day, per turbine. The increase in hourly heat input would result in an increase in the hourly increase of CO, VOC, SO_x, and PM_{10}. The daily throughput limit would increase daily emissions of CO, VOC, SO_x, and PM_{10}, but daily NO_x emissions would decrease.

WCE is proposing an increase in the maximum hourly heat input rating for each of the five SCGTs. WCE is requesting from the CEC and SCAQMD a lower NO_x emission limit of 2.3 ppm to meet BACT requirements (compared to the current limit of 2.5 ppm). The lower NO_x concentration limit will lead to a reduction in hourly and daily NO_x emissions. WCE is requesting from the SCAQMD a daily fuel use limit of 22,350 MMBtu, which will increase daily emissions for CO, VOC, SO_x, and PM_{10}. There will be no increase in monthly or annual emissions for any criteria pollutant.

Emission Factors

The emission factors used to calculate pre-project and post-project emissions are summarized in Table D-2.

Table D-2: Summary of Emission Factors

Pollutant	Unit of measure	Pre-Project	Post-Project
NO_x	ppmv @ 15% O_2	2.5	2.3
	lb/MMscf	9.67	8.9
CO	ppmv @ 15% O_2	4.0	4.0
	lb/MMscf	9.42	9.42
VOC	ppmv @ 15% O_2	2.0	2.0
	lb/MMscf	2.69	2.69
SO_x	lb/MMscf	0.67	0.67
PM_{10}	lb/MMscf	7.04	7.04

Summary of Emissions

Hourly emissions are summarized in Table D-3 (normal operations only, i.e., excluding startup and shutdowns); daily emissions are summarized in Table D-4; monthly emissions are summarized in Table D-5. All tables present emissions data per SCGT. Emission calculation worksheets are provided in Appendix A.

Table D-3: Summary of Normal Operating Hourly Emissions (per SCGT)

Pollutant	Pre-Project (lb/hr)	Post-Project (lb/hr)	Change (lb/hr)
NO_x	8.21	8.06	-0.15
CO	8.00	8.53	0.53
VOC	2.28	2.44	0.16
SO_x	0.57	0.61	0.04
PM_{10}	6.00	6.38	0.38

Table D-4: Summary of Daily Emissions (per SCGT)

Pollutant	Pre-Project (lb/day)	Post-Project (lb/day)	Change (lb/day)
NO_x	207.04	200.04	-7.00
CO	246.92	253.31	6.39
VOC	57.22	59.13	1.91
SO_x	13.66	14.26	0.61
PM_{10}	144.00	149.85	5.85

Table D-5: Summary of Monthly Emissions (per SCGT)

Pollutant	Pre-Project (lb/month)	Post-Project (lb/month)	Change (lb/month)
NO_x	3,746.72	3,477.12	-269.60
CO	4,554.34	4,511.81	-42.52
VOC	1,034.96	1,024.38	-10.58
SO_x	245.80	245.80	0.00
PM_{10}	2,592.00	2,582.77	-9.23

D.2.2 Air Quality Impact Analysis

Dispersion modeling was conducted to predict the proposed Project's potential impacts to ambient air quality. The air dispersion model used for the proposed Project is AERSCREEN, a screening dispersion model. AERSCREEN is based on AERMOD and is the screening dispersion model currently recommended by the Environmental Protection Agency (EPA). The Lakes Environmental Software (Lakes) implementation/user interface, AERSCREEN View™, Version 2.7.0, was used for this Project. This version of AERSCREEN View™ implements the newest version of AERMOD (version 19191).

The AQIA evaluates criteria pollutant emissions over 1-hour, 8-hour, 24-hour, and annual averaging periods, as appropriate for each California Ambient Air Quality Standard (CAAQS) and National Ambient Air Quality Standard (NAAQS). The AQIA assumes that the pre-project emissions are part of background and considers only emission increases. The AQIA results are summarized in Tables D-6 and D-7. Details of the modeling assessment are provided in Appendix B.

Table D-6: Projected Changes in Air Quality Impacts (per SCGT)

Pollutant	Averaging Period	Emissions Increase (lb/Avg. Period)	NAAQS (Project+Background) < Standard?	CAAQS (Project+Background) < Standard?
NO_2	1-Hr	No Increase	No Increase	No Increase
	Annual	No Increase	No Increase	No Increase
CO	1-Hr	0.53	Yes	Yes
	8-Hr	3.19	Yes	Yes
SO_2	1-Hr	0.04	Yes	Yes
	24-Hr	0.61	Yes	Yes
	Annual	No Increase	No Increase	No Standard Exists
PM_{10}	24-Hr	5.85	Yes	Background > Standard Project Impacts < SIL
	Annual	No Increase	No Standard Exists	No Increase

Table D-7: Air Quality Analysis of Significant Change (per SCGT)

Pollutant	Averaging Period	Project Impact ($\mu g/m^3$)	Significant Change in Air Quality ($\mu g/m^3$)	Exceeds Threshold?
PM_{10}	1-Hr	0.0355	2.5	No
	Annual	No Increase	1	No

D.3 Public Health

The potential impacts of the proposed Project on public health due to the increase in TAC emissions are addressed herein.

D.3.1 Toxic Air Contaminant Emissions

The proposed Project will result in an increase in maximum hourly emissions of TAC. TAC emissions are estimated from the pre-project and post-project heat input ratings, an HHV of 1,050 Btu/scf, consistent with RECLAIM requirements, and the SCAQMD default emission factors for combustion of natural gas in a combustion turbine. Ammonia emissions are estimated based on ammonia slip of 5.0 ppmv, as specified in Condition A195.4 of the SCAQMD permit. TAC emissions are summarized in Table D-8. Detailed emission calculations are provided in the spreadsheets in Appendix A.

D.3.2 Health Risk Assessment

The health risk impact of an increase in hourly and annual TAC emissions is evaluated using the emissions presented in Table D-8 and the Tier 3 HRA methodology as prescribed in the SCAQMD Risk Assessment Procedures, Version 8.1, dated September 1, 2017; Procedures, Equations, and Assumptions Effective On or After October 1, 2017. The results are summarized in Table D-9. As shown, the proposed Project complies with the risk threshold of Rule 1401. As such, the proposed changes will not have significant adverse impacts on air quality, public health, or the environment, and there is no need for any mitigation measures to offset significant impacts to the environment as a result of the TAC emission increases associated with the proposed Project. The HRA analysis worksheet is provided in Appendix B.

Table D-8: Summary of TAC Emissions (per SCGT)

TAC	CAS	Pre-Project MHC (lb/hr)	Post-Project MHC (lb/hr)	Change MHC (lb/hr)	Pre-Project MAC (lb/yr)	Post-Project MAC (lb/yr)	Change MAC (lb/yr)
Benzene	71432	2.83E-03	3.02E-03	1.88E-04	1.13E+01	1.13E+01	0.00E+00
1,3-Butadiene	106990	3.73E-04	3.98E-04	2.48E-05	1.49E+00	1.49E+00	0.00E+00
Formaldehyde	50000	3.12E-01	3.32E-01	2.07E-02	1.25E+03	1.25E+03	0.00E+00
Naphthalene	91203	1.13E-03	1.20E-03	7.51E-05	4.52E+00	4.52E+00	0.00E+00
Total PAHs (excluding Naphthalene)	1151	7.80E-04	8.31E-04	5.18E-05	3.12E+00	3.12E+00	0.00E+00
Acetaldehyde	75070	3.46E-02	3.70E-02	2.03E-03	1.39E+02	1.39E+02	0.00E+00
Acrolein	107028	3.13E-03	3.34E-03	2.08E-04	1.25E+01	1.25E+01	0.00E+00
Ammonia	7664417	6.07E+00	6.48E+00	4.03E-01	2.43E+04	2.43E+04	0.00E+00
Ethylbenzene	100414	2.77E-02	2.95E-02	1.84E-03	1.11E+02	1.11E+02	0.00E+00
Propylene oxide	75569	2.51E-02	2.68E-02	1.67E-03	1.01E+02	1.01E+02	0.00E+00
Toluene	108883	1.13E-01	1.20E-01	7.51E-03	4.52E+02	4.52E+02	0.00E+00
Xylene	1330207	5.55E-02	5.91E-02	3.68E-03	2.22E+02	2.22E+02	0.00E+00

Table D-9: Summary of Health Risk Assessment Results (per SCGT)

Risk Parameter	Result (Target Organ)	Significance Threshold	Exceed Threshold? (Yes/No)
HIA	2.31E-03 (EYE)	1.0	No

E. An analysis of how the proposed change would affect the project's compliance with applicable laws, ordinances, regulations, and standards.

The proposed changes affect COCs AQ-3, AQ-4, AQ-6, AQ-12 and the equipment description, which impact air quality and public health. There is no ground disturbance or other physical change to the Project that would affect any other resource area. Therefore, the following discussion of compliance with LORS is only for applicable air quality rules and regulations. (Public health is regulated by the SCAQMD with Regulation XIV - Toxics and Other Non-Criteria Pollutants.)

E.1 South Coast Air Quality Management District Rules

E.1.1 Regulation II – Permits; Rule 212 – Standards for Approving Permits and Issuing Public Notice

Rule 212(c) requires public notice for:

- (c)(1). A project requesting installation of a new source or modification of an existing source, if the source is location within 1,000 feet of the outer boundary of a school; or
- (c)(2). A project resulting in a new or modified facility with on-site emission increases exceeding any of the daily maximums from Rule 212(g); or
- (c)(3). A project requesting installation of a new source or modification of an existing source, if the emission increases result in exposure to Maximum Individual Cancer Risk (MICR) greater than or equal to the applicable thresholds in (c)(3)(A), or substances that pose a potential risk of nuisance.

The Project sources are not located within 1,000 feet of the outer boundary of a school; therefore, Rule 212(c)(1) does not apply.

Rule 212(g) lists daily maximum emission increases for criteria pollutants. The daily emission increases are compared to the Rule 212(g) thresholds in Table E-1. As shown, the daily emission increases are less than the rule limits.

Table E-10: Rule 212(g) Threshold Comparison

Pollutant	Rule 212(g) Threshold (lb/day)	Project Increase (lb/day)	Exceed Threshold? (Yes/No)
NO_x	40	-34.99	No
CO	220	31.95	No
VOC	30	9.57	No
SO_x	60	3.03	No
PM_{10}	30	29.26	No

As shown in Table D-8, the proposed Project does not result in an increase in annual emissions of any TAC. As shown in Section D.3.2, the proposed Project does not have chronic or cancer health risk impacts. Therefore, this Project would not result in an MICR greater than or equal to the applicable thresholds in (c)(3)(A).

Because the proposed Project does not exceed any of the criteria for public notice, public notice is not required for the Project.

E.1.2 Regulation IV – Prohibitions

Rule 401 – Visible Emissions

This rule prohibits the discharge into the atmosphere from any single source of emissions of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in subparagraph (b)(1)(A) of the rule.

The SCGTs combust natural gas and will continue to combust natural gas following implementation of the Project. Visible emissions are not expected.

Rule 402 – Nuisance

Rule 402 prohibits the discharge from any source of such quantities of air contaminants or other material, which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

The SCGTs combust natural gas and will continue to combust natural gas following implementation of the Project. Nuisance emissions are not expected.

Rule 404 – Particulate Matter – Concentration

Rule 404 prohibits the discharge into the atmosphere from any source particulate matter in excess of the concentration at standard conditions, shown in Table 404(a) of the rule.

The provisions of this rule do not apply to emissions resulting from the combustion of liquid or gaseous fuels in steam generators or gas turbines.

Rule 407 – Liquid and Gaseous Air Contaminants

Rule 407 prohibits the discharge into the atmosphere from any equipment: 1) CO exceeding 2,000 ppmv measured on a dry basis, averaged over 15 consecutive minutes, and 2) Sulfur compounds that would exist as liquid or gas at standard conditions, calculated as sulfur dioxide (SO_2) exceeding 500 ppmv averaged over 15 consecutive minutes.

The SCGTs operate with oxidation catalysts that ensure compliance with the permit limit of 4.0 ppm at 15% excess oxygen (O_2), thus ensuring compliance with the CO limits of this rule.

The sulfur compound limit does not apply to equipment which complies with the gaseous fuel sulfur content limits of Rule 431.1. The SCGTs described in this application combust

PUC-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1; therefore, the sulfur limits of Rule 407 do not apply.

Rule 409 – Combustion Contaminants

This rule prohibits the discharge into the atmosphere from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12% of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 15 consecutive minutes.

The SCGTs described in this application combust PUC-quality pipeline natural gas which will ensure compliance with this rule.

Rule 431.1 – Sulfur Content of Gaseous Fuels

The purpose of this rule is to reduce SO_x emissions from the burning of gaseous fuels in stationary equipment requiring a permit to operate by the SCAQMD. The rule prohibits the transfer, sell or offer for sale for use in the jurisdiction of the District natural gas containing sulfur compounds calculated as hydrogen sulfide (H_2S) in excess of 16 ppmv.

The SCGTs described in this application combust PUC-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1.

Rule 475 – Electric Power Generating Equipment

This rule limits emissions of particulate matter to the atmosphere from equipment having a maximum rating of more than 10 net MW used to produce electric power.

For new equipment, defined as equipment for which a permit is required after May 7, 1976, emissions of particulate matter may not exceed both of the limits from (a)(3)(A) [11 pounds per hour] and (a)(3)(B) [0.01 gr/scf calculated at 3% O_2 on a dry basis and averaged over 15 consecutive minutes]. Test results show that neither limit is exceeded; therefore, continued compliance with the Rule 475 emission limits is expected.

E.1.3 Region IX – Standards of Performance for New Stationary Sources

Regulation IX incorporates federal New Source Performance Standards (NSPS) by reference. Compliance with Federal regulations is discussed in Section E.2.

E.1.4 Regulation X – National Emission Standards for Hazardous Air Pollutants (NESHAP)

Regulation X incorporates the federal NESHAP by reference. Compliance with Federal regulations is discussed in Section E.2. There are no federal NESHAP rules applicable to the proposed Project or equipment.

E.1.5 Regulation XI – Source-Specific Standards

Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines

The purpose of this rule is to reduce emissions of NO_x from stationary gas turbines. The provisions of this rule apply to all stationary gas turbines, 0.3 MW and larger. This rule does not apply to stationary gas turbines subject to Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities; gas turbines located at petroleum

refineries, landfills, or publicly owned treatment works; or gas turbines fueled by landfill gas. Because the SCGTs are subject to Rule 1135, they are not subject to Rule 1134.

Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities

The purpose of this rule is to reduce emissions of NO_x from electric generating units at electricity generating facilities. This rule applies to electric generating units at electricity generating facilities. While the Facility is currently a RECLAIM Facility and exempt from Rule 1135, Rule 1135 is the landing rule for gas turbines upon RECLAIM sunset. Thus, on and after January 1, 2024, or when required by a permit to operate issued to effectuate the requirements in this rule, whichever occurs first, the owner or operator of an electricity generating facility may not operate a gas turbine in a manner that exceeds the NO_x and ammonia emissions limits listed in Table 1 of the rule: Emissions Limits for Boilers and Gas Turbines. For a SCGT, the NO_x limit is 2.5 ppm and the ammonia slip concentration limit is 5 ppm, both at 15% excess O_2.

The SCGTs already comply with NO_x and ammonia slip limits pursuant to current permit conditions. The proposed Project will require the SCGTs to meet a NO_x concentration of 2.3 ppm to comply with BACT requirements. Therefore, compliance is expected.

WCE will comply with the remaining applicable provisions of the rule in a timely manner. WCE is aware of and will take the necessary actions to ensure that the SCAQMD permit include "…limitations for duration, mass emissions, and number of startups, shutdowns, and, if applicable, tunings…" by January 1, 2024, as required by paragraph (d)(3) of the rule. WCE is also aware of and will comply with the requirement of paragraph (d)(7) to submit a change of conditions application by July 1, 2022, to reconcile permit conditions with Rule 1135 requirements.

E.1.6 Regulation XIII – New Source Review; Rule 1303, Requirements

The purpose of this regulation is to achieve no net increases of nonattainment air contaminants or their precursors from new or modified permitted sources.

BACT

The increase in hourly heat input would result in an increase in the daily CO, VOC, and PM_{10} emissions in amounts exceeding 1 pound per day per pollutant. The emission increases trigger BACT for CO, VOC, and PM_{10}. The SCGTs combust natural gas and operate with oxidation catalysts, so BACT is satisfied for CO, VOC, and PM_{10} emissions.

Offsets

The proposed Project would increase the hourly heat input of each SCGT, but WCE is proposing to operate within the current monthly fuel use limit imposed by Condition C1.1 of its SCAQMD PTO. As a result of keeping the same fuel use limit, the change in 30-Day Average emissions for CO, VOC, and PM_{10} are each less than 1 pound per day (see Table D-5 for the change in monthly emissions); therefore, offsets are not required for this Project.

AQIA

As discussed in Section D.2.2, because the South Coast Air Basin (SCAB) is in attainment for CO and SO_2, no AQIA assessment is needed for these pollutants. Modeling is not

required for VOC. Because there is no increase in NO_x emissions, modeling is not required for nitrogen dioxide (NO_2). As shown in Table D-7, the increase in PM_{10} emissions does not cause or make worse an exceedance of an ambient air quality standard. As such, the proposed changes will not have significant adverse impacts on air quality or the environment, and there is no need for any mitigation measures to offset significant impacts to the environment as a result of the PM_{10} emission increase associated with the proposed Project. Details of the modeling assessment are provided in Appendix B.

E.1.7 Regulation XIV – Toxics and Other Non-Criteria Pollutants

Rule 1401 specifies limits for MICR, cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units that emit TAC listed in Table I of the rule. The rule establishes allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

As discussed in Section D.2.3, the proposed changes would result in an increase in hourly emissions because the heat input rating of the SCGTs will increase. However, WCE is proposing no changes to the monthly or annual fuel consumption for the SCGTs, so the annual TAC emissions are expected to be unchanged.

The health risk impacts from an increase in hourly emissions is evaluated using the emissions presented in Table D-8 of this application and the Tier 3 HRA methodology as prescribed in the Risk Assessment Procedures, Version 8.1, dated September 1, 2017; Procedures, Equations, and Assumptions Effective On or After October 1, 2017. The results are summarized in Table D-9. As shown, the proposed Project complies with the risk threshold of Rule 1401. The HRA analysis worksheet is provided in Appendix B.

E.1.8 Regulation XVII – Prevention of Significant Deterioration (PSD)

The purpose of this regulation is to establish preconstruction review requirements for stationary sources to ensure that air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth.

A Major Stationary Source is a stationary source that falls under one of the listed source categories from Rule 1702(m)(1) and has the potential to emit 100 tons per year or more of any air contaminant regulated by the Clean Air Act (CAA), or a stationary source that does not fall under one of the listed source categories from Rule 1702(m)(1) and has the potential to emit 250 tons per year or more of any air contaminant regulated by the CAA. Rule 1702(m)(1) lists "fossil fuel-fired steam electric plants of more than 250 MMBtu per hour input," and "fossil fuel boilers (or combinations thereof) totaling more than 250 MMBtu per hour heat input." WCE operates SCGTs. SCGTs are not "steam electric plants," as there is no steam turbine and are no boilers; therefore, the potential to emit threshold for PSD applicability is 250 tons per year or more.

Table E-2 summarizes the annual emissions for the Facility. The emissions for each pollutant are less than 250 tons per year and, because this Project does not propose an increase in annual emissions, WCE is not considered to be a Major Stationary Source and further review of Regulation XVII is not required.

Table E-11: Potential Annual Emissions – PSD Major Stationary Source Determination

Pollutant	Annual Emissions (tons/year)	Basis
NO_x	82.05	Calculated based on 2.3 ppmv
CO	112.96	Condition F2.1
VOC	23.97	Calculated based on 2.0 ppmv
SO_x	5.69	Calculated based on 0.67 lb/MMscf Emission Factor
PM_{10}	60.89	Condition F2.1

E.1.9 Regulation XX – RECLAIM

RECLAIM is a market-based incentive program designed to allow facilities flexibility in achieving emission reduction requirements for NO_x and SO_x under the Air Quality Management Plan using methods, which include, but are not limited to, add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions. WCE is a NO_x and SO_x RECLAIM Facility.

Rule 2005 establishes the New Source Review Requirements for RECLAIM facilities. Rule 2005 requires that a new or modified source that meets BACT prohibits a new or modified source from causing a violation or making significantly worse an existing violation of the state or national ambient air quality standard at any receptor location in the District for NO_2 and requires that the Facility holds sufficient RECLAIM Trading Credits (RTCs) to offset the total Facility emissions for the first year of operation at a 1-to-1 ratio.

BACT

WCE proposes to reduce the NO_x concentration limit for each of the five SCGT to 2.3 ppm at 15% excess O_2. A limit of 2.3 ppm is the most stringent limit achieved in practice for SCGTs, which was established in the permit for the City of Riverside Public Utilities Department facility (Facility ID 139796).

The proposed Project will result in an increase in the potential hourly emissions of SO_x. The SCGTs consume PUC pipeline quality natural gas. The use of PUC pipeline quality natural gas satisfies BACT requirements for SO_x.

AQIA

The proposed Project will reduce NO_x emissions from the Facility. Emission reductions do not require modeling. The proposed Project will increase SO_x emissions; however, because SO_x is an attainment pollutant, modeling is not required.

Offsets

The proposed Project will result in a net decrease in NO_x emissions on a monthly and annual basis due to the application of a more stringent NO_x concentration limit and retaining existing fuel use limitations. Annual SO_x emissions are unchanged as a result of the requested changes. The NO_x emission reductions and the unchanged SO_x emissions do not require the acquisition of additional RTCs.

E.1.10 Regulation XXX – Title V Permits

The Title V Permit system implements the federal Operating Permit Program as required by Title V of the federal CAA as amended in 1990 and to implements requirements for greenhouse gases (GHGs) pursuant to 40 CFR Part 70. This regulation defines permit application and permit issuance procedures, as well as compliance requirements associated with the program.

This application proposes a number of changes to the permit that impact emissions, including an increase in the maximum allowable hourly heat input per SCGT to 951.0 MMBtu per hour and a limit on the maximum daily heat input per SCGT to 22,350 MMBtu per day. As shown in Table E-3, with these proposed changes, the maximum daily emissions of the non-RECLAIM pollutants are less than the Title V Significant Permit Revision thresholds. The Project will not result in an increase in annual emissions of NO_x or SO_x and would therefore not be considered a Significant Permit Revision due to an increase in the emissions of RECLAIM pollutants as defined in Rule 3000(b)(31)(D).

Because the proposed Project is not a significant permit revision, the Project should be evaluated as a de minimis significant permit revision under Title V. Per Rule 3003, the application will be processed by SCAQMD within 180 days following submittal of a complete application.

Table E-12: Title V Significant Permit Revision Threshold Evaluation

Pollutant	Project Emission Increase (lb/day)	Title V Significant Permit Revision Threshold (lb/day)
CO	31.95	220
VOC	9.57	30
PM_{10}	29.26	30

E.2 Federal Rules

E.2.1 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBtu per hour, based on the HHV of the fuel, that commenced construction, modification, or reconstruction after February 18, 2005. The pollutants regulated by this subpart are NO_x and SO_2.

The rule limits NO_x emissions from new, modified, or reconstructed turbines firing natural gas with a heat input greater than 850 MMBtu per hour to no more than 15 ppmv at 15% O_2 or 0.43 pound per megawatt-hour (lb/MWh) of useful output.

The rule prohibits the discharge of any gases that contain SO_2 in excess of 0.90 lb/MWh gross output and prohibits the combustion of any fuel which contains total potential sulfur emissions in excess of 0.060 pounds SO_2 per MMBtu heat input.

The SCGTs discussed in this application operate with SCR to control NO_x emissions to 2.3 ppm; therefore, compliance with the NO_x limits of Subpart KKKK is expected. The SCGTs combust PUC-quality pipeline natural gas that complies with the sulfur limits of Rule 431.1; therefore, compliance with the sulfur limits of Subpart KKKK is expected.

The rule imposes a number of other requirements on the SCGTs and Facility, including monitoring, recordkeeping, and reporting requirements. WCE complies with these requirements. The proposed Project will not adversely impact continued compliance.

E.2.2 Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines

Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines applies to combustion turbines at major sources of hazardous air pollutants (HAP). WCE is not a major source of HAP; therefore, Subpart YYYY is not applicable to the Facility. There are no other NESHAP applicable to combustion turbines.

F. A discussion of how the proposed change would affect the public.

The proposed changes would affect the public in a positive way by allowing the WCE to operate at full capacity during periods of peak energy demand. This would help to prevent power interruptions, such as rolling blackouts during hot summer months when energy demand is at its highest. The small increase in short-term (i.e., hourly, daily) criteria pollutant emissions would not cause or contribute to an exceedance of an AAQS. The small increase in short-term (i.e., hourly) TAC emissions do not cause health risk impacts exceeding significance thresholds.

G. A list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of any affected project linears and 1,000 feet of the project site.

Nearby property owners, the Public, and Parties to the Application Proceeding will not be affected by the proposed modification since the proposed modification will have no significant environmental effects and will be in compliance with applicable LORS. Because there are no potentially affected property owners, a list of property owners is not included in this PTA.

H. A discussion of the potential effect of the proposed change on nearby property owners, residents, and the public.

See Section F – The increase in short-term emissions of criteria pollutants and TAC would have a negligible effect on nearby property owners, residents, and the public.

I. A discussion of any exemptions from CEQA, of the Public Resources Code, that the project owner believes may apply to approval of the proposed change.

None.

3.0 CONCLUSIONS

Based on the information contained in this filing, WCE, the Project Owner, concludes that there will be no significant environmental impacts associated with revision of the Equipment Descriptions or COCs AQ-3, AQ-4, AQ-6, or AQ-12. These modifications will allow WCE to increase the fuel input and the corresponding output of the Facility in time for summer 2021. The increase in output from WCE is integral in addressing the State of California's urgent need for additional capacity. SCE has contracted WCE for the increased output starting June 1, 2021 in response to the CPUC ruling directing the State's three large electric IOUs to seek contracts for additional power capacity. In response to the need for additional generation, modifications to the PTO and CEC license are needed to enable WCE achieve the maximum output of 500.5 net MW (520 gross MW) as described in the WCE license and PTO. The Facility's NQC is 481.3 MW and is currently dispatched to serve peak power demand as well to support baseload needs and needs to be permitted to operate at the maximum possible load to service that demand. The PTO and license modifications would increase the net output from WCEP by approximately 17.4 MW.

The proposed changes would have a positive impact on the public by allowing the WCE to operate at full capacity during periods of peak energy demand. This would help to prevent power interruptions such as rolling blackouts during hot summer months when energy demand is at its highest. NO_x emissions (concentration, hourly, daily, monthly and annual) as well as monthly CO, VOCs, and PM_{10} emissions would decrease.

The proposed amendments comply with all LORS and do not have a significant environmental impact, as further described in this PTA. The emission changes will not cause adverse impacts to ambient air quality, as demonstrated through an AQIA. The emission changes will not cause adverse impacts to public health, as demonstrated by an HRA. The proposed revisions to the Equipment Descriptions and COCs AQ-3, AQ-4, AQ-6, and AQ-12 will not have significant impact on property owners, the public, or any other parties.

Therefore, the proposed changes should be approved.

APPENDIX A – EMISSION ESTIMATES

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Facility: Walnut Creek Energy, LLC
Facility ID: 146536

Walnut Creek Energy, LLC
Application for Increase to Heat Input Rating

Appendix B - Emission Calculations

Table B.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

	Start-ups per Day		Shutdowns per Day		Start-ups per Month		Shutdowns per Month		Start-ups per Year		Shutdowns per Year	
Pre-/Post-	Count	Hours per Day	Count	Hours per Day	Count	Hours per Month	Count	Hours per Month	Count	Hours per Year	Count	Hours per Year
Pre-	2	2.0	2	2.0	40	40.0	40	40.0	480	480.0	480	480.0
Post-	2	2.0	2	2.0	40	40.0	40	40.0	480	480.0	480	480.0

Pre-Project

Hourly Heat Input Ratings		Maximum Daily Operations			Monthly Operations			Annual Operations		
Heat Input Rating (mmBtu/hr)	Hourly Fuel Usage (mmscf/hr)	Normal Operations Hours per Day	Total Hours per Day	Daily Fuel Usage (mmscf/day)	Normal Operations Hours per Month	Total Hours per Month	Monthly Fuel Usage (mmscf/mo)	Normal Operations Hours per Year	Total Hours per Year	Annual Fuel Usage (mmscf/yr)
891.7	0.8492	20.0	24.0	20.38	352.0	432.0	366.87	3,040.0	4,000.0	3,396.95

Pre-Project hours of operation and fuel usage per A/N 450894

Post-Project

Hourly Heat Input Ratings		Maximum Daily Operations				Monthly Operations				Annual Operations			
Heat Input Rating (mmBtu/hr)	Hourly Fuel Usage (mmscf/hr)	Daily Heat Input (mmBtu/day)	Daily Fuel Use NO (mmscf/day)	Daily Fuel Use SU (mmscf/day)	Daily Fuel Use SD (mmscf/day)	Monthly Fuel Use (mmscf/mo)	Monthly Fuel Use NO (mmscf/mo)	Monthly Fuel Use SU (mmscf/mo)	Monthly Fuel Use SD (mmscf/mo)	Annual Fuel Use (mmscf/yr)	Annual Fuel Use NO (mmscf/yr)	Annual Fuel Use SU (mmscf/yr)	Annual Fuel Use SD (mmscf/yr)
951.0	0.9057	22,350	17.6629	1.8114	1.8114	367	294.4137	36.2286	36.2286	3,396.95	2,527.4667	434.7429	434.7429

SU/SD Fuel Use (mmscf/Time) = Total Event Hours per Time x Heat Input Rating (mmBtu/hr) / HHV
NO Fuel Use (mmscf/Time) = Fuel Use (mmscf/Time) - SU Fuel Use (mmscf/Time) - SD Fuel Use (mmscf/Time)

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Facility: Walnut Creek Energy, LLC
Facility ID: 146536

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Application for Increase to Heat Input Rating

Appendix B - Emission Calculations

Table B.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

Emissions

				Peak Hourly NO Emissions			Maximum Daily Emissions			Monthly Emissions			Annual Emissions		
Pollutant	**Operating Mode**	**Pre-Project Emission Factor (NO = lb/hr) (SU/SD = lb/event)**	**Post-Project Emission Factor (NO = lb/hr) or (NO = lb/mmscf) (SU/SD = lb/event)**	**Pre-Project (lb/hr)**	**Post-Project (lb/hr)**	**Change (lb/hr)**	**Pre-Project (lb/day)**	**Post-Project (lb/day)**	**Change (lb/day)**	**Pre-Project (lb/mo)**	**Post-Project (lb/mo)**	**Change (lb/mo)**	**Pre-Project (lb/yr)**	**Post-Project (lb/yr)**	**Change (lb/yr)**
NOx	Normal Operations (lb/hr)	8.21	8.06	8.21	8.06	-0.15	164.20	--	-7.00	2,889.920	--	-269.64	24,958.40	--	-2,463.95
	Normal Operations (lb/mmscf)	--	8.90	--	--	--	--	157.20		--	2,620.28		--	22,494.45	
	Startup	10.42	10.42	--	--	--	20.84	20.84	0.00	416.80	416.80	0.00	5,001.60	5,001.60	0.00
	Shutdown	11.00	11.00	--	--	--	22.00	22.00	0.00	440.00	440.00	0.00	5,280.00	5,280.00	0.00
			NOx Totals			-0.15	207.04	200.04	-7.00	3,746.72	3,477.08	-269.64	35,240.00	32,776.05	-2,463.95
CO	Normal Operations (lb/hr)	8.00	8.53	8.00	8.53	0.53	160.00	--	6.39	2,815.94	--	-42.56	24,319.46	--	-510.73
	Normal Operations (lb/mmscf)	--	9.42	--	--	--	--	166.38		--	2,773.38		--	23,808.74	
	Startup	18.73	18.73	--	--	--	37.46	37.46	0.00	749.20	749.20	0.00	8,990.40	8,990.40	0.00
	Shutdown	24.73	24.73	--	--	--	49.46	49.46	0.00	989.20	989.20	0.00	11,870.40	11,870.40	0.00
			CO Totals			**0.53**	246.92	253.30	**6.39**	4,554.34	4,511.78	-42.56	45,180.26	44,669.54	-510.73
VOC	Normal Operations (lb/hr)	2.28	2.44	2.28	2.44	0.16	45.60	--	1.91	802.56	--	-10.59	6,931.20	--	-132.31
	Normal Operations (lb/mmscf)	--	2.69	--	--	--	--	47.51		--	791.97		--	6,798.89	
	Startup	2.81	2.81	--	--	--	5.62	5.62	0.00	112.40	112.40	0.00	1,348.80	1,348.80	0.00
	Shutdown	3.00	3.00	--	--	--	6.00	6.00	0.00	120.00	120.00	0.00	1,440.00	1,440.00	0.00
			VOC Totals			**0.16**	57.22	59.13	**1.91**	1,034.96	1,024.37	-10.59	9,720.00	9,587.69	-132.31
SOx	Normal Operations (lb/hr)	0.57	0.61	0.57	0.61	0.04	11.38	--	0.45	200.28	--	-3.03	1,729.73	--	-36.33
	Normal Operations (lb/mmscf)	0.67	0.67	--	--	--	--	11.83		--	197.26		--	1,693.40	
	Startup	0.57	0.61	--	--	--	1.14	1.21	0.08	22.76	24.27	1.51	273.11	291.28	18.16
	Shutdown	0.57	0.61	--	--	--	1.14	1.21	0.08	22.76	24.27	1.51	273.11	291.28	18.16
			SOx Totals			**0.04**	13.66	14.26	**0.61**	245.80	245.80	0.00	2,275.96	2,275.96	0.00
PM10	Normal Operations (lb/hr)	6.00	6.38	6.00	6.38	0.38	120.00	--	4.35	2,112.00	--	-39.33	18,240.00	--	-446.63
	Normal Operations (lb/mmscf)	7.04	7.04	--	--	--	--	124.35		--	2,072.67		--	17,793.37	
	Startup	6.00	6.38	--	--	--	12.00	12.75	0.75	240.00	255.05	15.05	2,880.00	3,060.59	180.59
	Shutdown	6.00	6.38	--	--	--	12.00	12.75	0.75	240.00	255.05	15.05	2,880.00	3,060.59	180.59
			PM10 Totals			**0.38**	144.00	149.85	**5.85**	2,592.00	2,582.77	-9.23	24,000.00	23,914.54	-85.46

Yorke ENGINEERING, LLC
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Facility: Walnut Creek Energy, LLC
Facility ID: 146536

Walnut Creek Energy, LLC
Application for Increase to Heat Input Rating

Appendix B - Emission Calculations

Table B.1 - Fuel Usage & Criteria Pollutant Emissions (per Turbine)

NO = Normal Operations ; SU = Start-up ; SD = Shutdown

Constants

	Pre-Project	Post-Project	
HHV	1,050	1,050	mmBtu/mmscf
F-Factor (68)	8,710	dscf/mmBtu	
Ref O2	15		
Molar Volume (68)	385.3	scf/lbmol	
NOx MW	46		
CO MW	28		
VOC MW	16		Number of Turbines 5
NH3 MW	17		

Rule 212(g) - Public Notice

Pollutant	Project (lb/day)	Threshold (lb/day)
NOx	-35	40
CO	31.94	220
VOC	9.57	30
SOx	3.03	60
PM10	29.26	30
Project Exceeds Thresholds?		No

Turbines PTE (tpy)

Pollutant	Pre-Project	Post-Project
NOx	88.10	81.94
CO	112.95	111.67
VOC	24.30	23.97
SOx	5.69	5.69
PM10	60.00	59.79

Emission Factors

NOx, CO, VOC

Emission Factor = ppmv @ 15% O2 x 20.9 / (20.9 - Ref O2) x HHV x F-Factor (68) x MW / Molar Volume (68) x 10^{-6}

	Pre-Project	Post-Project	
NOx ppmv	2.5	2.3	ppmv @ 15% O2 (Conditions A99.1 and A195.2)
NOx EF	9.67	8.9	lb/mmscf
CO ppmv	4.0	4.0	ppmv @ 15% O2 (Conditions A99.2 and A195.1)
CO EF	9.42	9.42	lb/mmscf
VOC ppmv	2.0	2.0	ppmv @ 15% O2 (Conditions A99.5 and A195.3)
VOC EF	2.69	2.69	lb/mmscf
SOx EF	0.67	0.67	lb/mmscf (Condition A63.1)
PM10 EF	6.00	6.00	PM10 EF based on manufacturer guarantee of 6lbs/hr at 891.7 MMBTU/hr = 0.00673 lb/MMBTU. Refer to Page 82 of 102, Table 4 for Eng. Eval for A/N 450894, rev. 3-4-2011.
PM10 EF	7.04	7.04	lb/mmscf (Condition A63.1)

Fire Pump PTE (tpy)

Pollutant	Pre-Project	Post-Project
NOx	0.109	0.109
CO	0.009	0.009
VOC	0.001	0.001
SOx	0.0002	0.0002
PM10	0.001	0.001

Start-ups

Please refer to Page 87 of 102, Table 15 for Eng. Eval for A/N 450894, rev. 3-4-2011.

NOx	10.42	lb/start-up
CO	18.73	lb/start-up
VOC	2.81	lb/start-up
Pre-Project	60	min
Post-Project	60	min

Cooling Tower PTE (tpy)

Pollutant	Pre-Project	Post-Project
NOx	0.000	0.000
CO	0.000	0.000
VOC	0.000	0.000
SOx	0.0000	0.0000
PM10	0.888	0.888

Shutdowns

Please refer to Page 87 of 102, Table 15 for Eng. Eval for A/N 450894, rev. 3-4-2011.

NOx	11.00	lb/shut-down
CO	24.73	lb/shut-down
VOC	3.00	lb/shut-down
Pre-Project	60	min
Post-Project	60	min

Facility PTE (tpy)

Pollutant	Pre-Project	Post-Project
NOx	88.21	82.05
CO	112.96	111.68
VOC	24.30	23.97
SOx	5.69	5.69
PM10	60.89	60.68

Equations

Pre-Project

NO (lb/hr)	Heat Input Rating / HHV x Emission Factor
NO (lb/Time)	NO (lb/hr) x NO Hours per Time
SU (lb/Event)	See above
SU (lb/Time)	SU (lb/Event) x SU Events per Time
SD (lb/Event)	See above
SD (lb/Time)	SD (lb/Event) x SD Events per Time

Post-Project

NO (lb/mmscf)	Per 'Emission Factors' Calculations
NO (lb/Time)	NO (lb/mmscf) x Fuel Use (mmscf/Time)
SU (lb/Event)	See above
SU (lb/Time)	SU (lb/Event) x SU Events per Time
SD (lb/Event)	See above
SD (lb/Time)	SD (lb/Event) x SD Events per Time

Date Printed: 3/9/2021

Facility: Walnut Creek Energy, LLC
Facility ID: 146536

Walnut Creek Energy, LLC
Application for Increase to Heat Input Rating

Appendix B - Emission Calculations

Table B.2 - Toxic Air Contaminant (TAC) Emission Calculations (per Turbine)

			Maximum Hourly TAC Emissions			Annual TAC Emissions		
Pollutant	**CAS No.**	**Emission Factor (lb/mmscf)**	**Pre-Project[1] (lb/hr)**	**Post-Project[2] (lb/hr)**	**Increase (lb/hr)**	**Pre-Project[1] (lb/yr)**	**Post-Project[2] (lb/yr)**	**Increase (lb/yr)**
Benzene[b]	71432	3.33E-03	2.83E-03	3.02E-03	1.88E-04	1.13E+01	1.13E+01	0.00E+00
1,3-Butadiene[a]	106990	0.000439	3.73E-04	3.98E-04	2.48E-05	1.49E+00	1.49E+00	0.00E+00
Formaldehyde[b]	50000	3.67E-01	3.12E-01	3.32E-01	2.07E-02	1.25E+03	1.25E+03	0.00E+00
Naphthalene[a]	91203	0.00133	1.13E-03	1.20E-03	7.51E-05	4.52E+00	4.52E+00	0.00E+00
Total PAHs (excluding Naphthalene)[a]	1151	0.000918	7.80E-04	8.31E-04	5.18E-05	3.12E+00	3.12E+00	0.00E+00
Acetaldehyde[a]	75070	0.0408	3.46E-02	3.70E-02	2.30E-03	1.39E+02	1.39E+02	0.00E+00
Acrolein[b]	107028	3.69E-03	3.13E-03	3.34E-03	2.08E-04	1.25E+01	1.25E+01	0.00E+00
Ammonia[c]	7664417	--	6.07E+00	6.48E+00	4.04E-01	2.43E+04	2.43E+04	0.00E+00
Ethylbenzene[a]	100414	0.0326	2.77E-02	2.95E-02	1.84E-03	1.11E+02	1.11E+02	0.00E+00
Propylene oxide[a]	75569	0.0296	2.51E-02	2.68E-02	1.67E-03	1.01E+02	1.01E+02	0.00E+00
Toluene[a]	108883	0.133	1.13E-01	1.20E-01	7.51E-03	4.52E+02	4.52E+02	0.00E+00
Xylene[a]	1330207	0.0653	5.55E-02	5.91E-02	3.69E-03	2.22E+02	2.22E+02	0.00E+00

Constants

	Pre-Project	Post-Project	
HHV	1,050	1,050	mmBtu/mmscf
F-Factor (68)	8,710	dscf/mmBtu	
Ref O2	15		
Molar Volume (68)	385.3		
Ammonia MW	17		

Emission Factors

[a] Emission Factors from: SCAQMD Supplemental Instructions - Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emission Inventory, December 2016
Table B-1 - Source: Turbine
https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/supplemental-instructions-for-ab2588-facilities.pdf?sfvrsn=12

[b] Emission Factors from: USEPA - Emission Factor Documentation for AP-42 Section 3.1 Stationary Gas Turbines, April 2000
Table 3.4-1 - Control Method: CO Catalyst
https://www3.epa.gov/ttn/chief/ap42/ch03/bgdocs/b03s01.pdf

[c] Ammonia Slip

Pre-Project	Post-Project	
5	5	ppmv @ 15% O2

Ammonia EF = Ammonia Slip x 20.9 / (20.9 - Ref O2) x HHV x F-Factor (68) x Ammonia MW / Molar Volume (68) x 10^{-6}

Ammonia EF	7.15	7.15	lb/mmscf

Calculations

[1] Pre-Project (lb/hr) = Heat Input Rating / HHV x Emission Factor
Pre-Project (lb/yr) = Annual Fuel Use x Emission Factor

Heat Input Rating	891.7	mmBtu/hr
Annual Fuel Use	3,396.95	mmscf/yr

[2] Post-Project (lb/hr) = Heat Input Rating / HHV x Emission Factor
Post-Project (lb/yr) = Annual Fuel Use x Emission Factor

Heat Input Rating	951.0	mmBtu/hr
Annual Fuel Use	3,396.95	mmscf/yr

APPENDIX B – AIR QUALITY IMPACT ANALYSIS AND HEALTH RISK ASSESSMENT

Appendix B
Health Risk Assessment & Air Quality Impact Analysis

Prepared in Support of Petition to Amend to Increase Turbine Heat Input Rating

Prepared for:

Walnut Creek Energy LLC
911 Bixby Drive,
City of Industry, CA 91745
SCAQMD Facility ID: 146536

March 2021

Table of Contents

List of Tables

List of Figures

Attachments

Health Risk Assessment & Air Quality Impact Analysis

Petition to Amend to Increase Turbine Heat Input Rating

1.0 INTRODUCTION

Yorke Engineering, LLC (Yorke) has prepared this Health Risk Assessment (HRA) and Air Quality Impact Analysis (AQIA) support of the Petition to Amend (PTA) for the proposed Project.

1.1 Project Overview

Walnut Creek Energy LLC (WCE) is submitting this PTA to request modifications to the Conditions of Certification and SCAQMD Permits to Operate for its five (5) natural gas-fired Simple Cycle Gas Turbines (SCGTs) [A/N's 581392, 581393, 581396, 581397, 581399; Device ID Nos. D1, D7, D13, D19, D25, respectively] to increase the allowable heat input to better align with the 100.1 net Megawatts (MW) per SCGT listed in the Equipment Description for each SCGT. The Equipment Description for each SCGT currently lists the heat input as 891.7 million British thermal units (MMBtu) per hour. With this Petition, WCE is requesting that the maximum heat input be updated to 951.0[1] MMBtu per hour. There are no physical modifications to the SCGTs associated with this request. The facility is currently dispatched to serve peak power demand and needs to be permitted to operate at the maximum possible load to service that demand.

The proposed Project will result in an increase in the maximum hourly heat input rating for each of the SCGT and a corresponding increase in the maximum hourly emissions of Toxic Air Contaminants (TAC). The Project requires a Rule 1401 HRA.

The proposed Project is expected to result in an increase in the maximum hourly Potential to Emit (PTE) for NOx, CO, VOC, SOx, and PM10 and, since each unit must be available to operate for up to 24 hours per day, the maximum daily PTE[2] for CO, VOC, SOx, and PM10 is also expected to increase. Therefore, the Project requires an AQIA for all short-term (1 to 24-hour) Ambient Air Quality Standards (AAQS).

Appendix B contains emission data (Section 2.0), a discussion of dispersion modeling methodology (Section 3.0), a summary of the HRA (Section 4.0), and a summary of the AQIA (Section 5.0). Attachment 1 contains detailed calculation tables; Attachment 2 contains reference materials.

[1] This is based on a heat rate of 9.5 MMBtu per hour per MW, Higher Heating Value (HHV). 9.5 x 100.1 net MW = 951.0 MMBtu per hour (HHV).

[2] Daily emissions of NOx are not expected to increase due to a reduced BACT limit.

1.2 Facility Location

WCE is located at 911 Bixby Drive in the City of Industry. The facility covers a total of approximately 11.2 acres and is bordered by industrial facilities on all sides. The nearest residential property is approximately 312 meters southwest of the facility boundary. The nearest school to the facility is Glen A. Wilson High School at 16455 Wedgeworth Dr in Hacienda Heights, approximately 770 meters to the south of the facility boundary. The nearest industrial property to the power plant is approximately 46 meters southwest of the facility boundary. An aerial photograph depicting the facility and the surrounding properties is provided as Figure 1-1.

Figure 1-1 shows the approximate facility boundary and the locations of the five exhaust stacks.

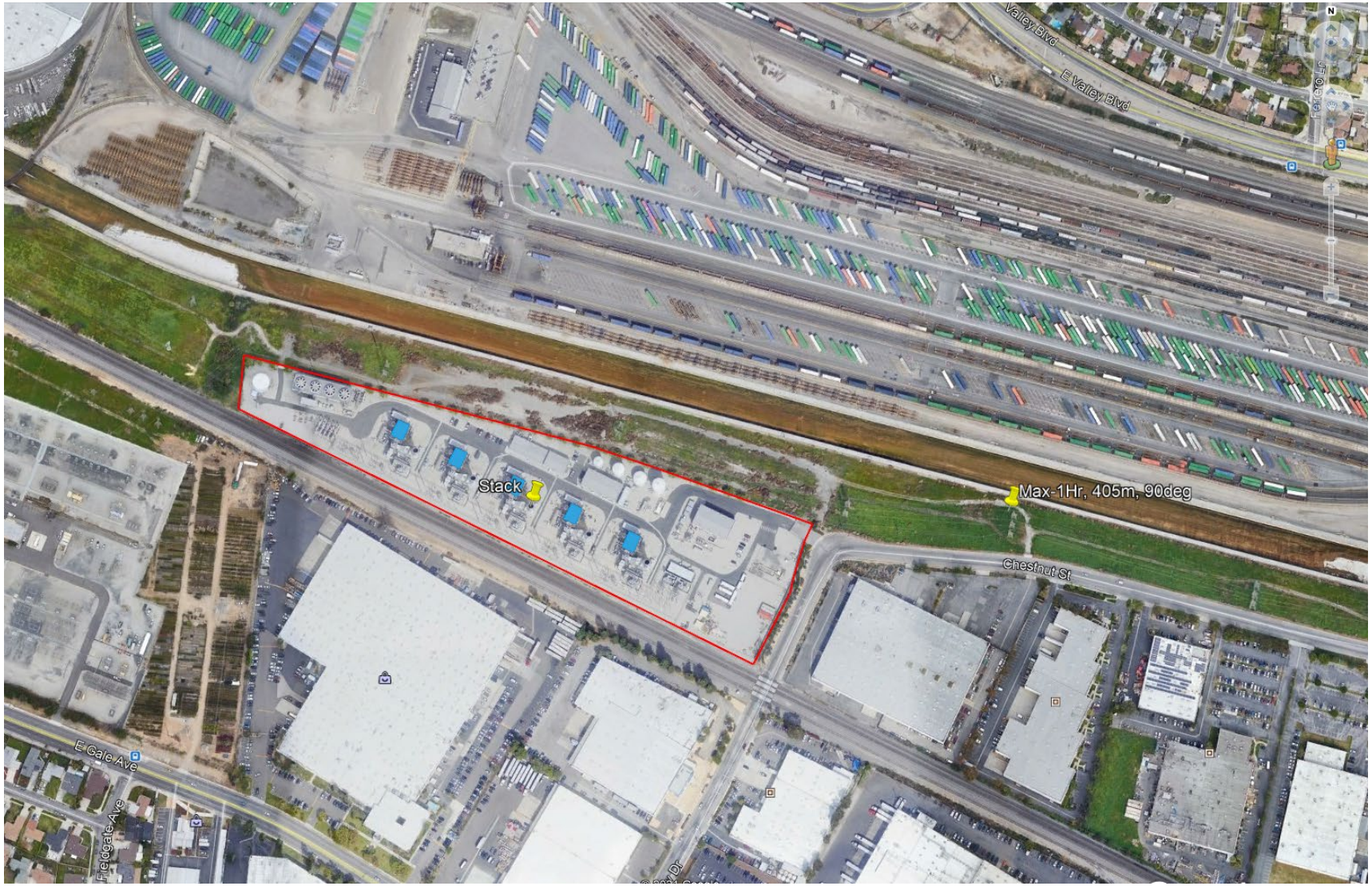

Figure 1-1: Aerial Photograph of Facility, Stack Locations and Surrounding Area

2.0 EMISSION INFORMATION

The emission sources associated with the Project are the five SCGT's. The methodologies used to estimate emissions from the Project sources are presented in Section D and Appendix A of the PTA.

Rule 1401(f)(4) requires the noncancer acute health index (HIA) to be estimated from post-project emissions for a permit unit rather than the increase (post-project – pre-project). The hourly Toxic Air Contaminants (TAC) emissions used to estimate HIA are shown in Table 2-1.

Rule 1401(f)(3) allows long-term health risks [Maximum Individual Cancer Risk (MICR) and noncancer chronic health index (HIC)] to be estimated from the difference between post-project emissions and permitted pre-project emissions when pre-project emissions are limited by permit condition. Condition F2.1 limits facility-wide PM2.5 emissions using a direct limit on fuel consumption. The Project does not propose a change to this condition: annual TAC emissions are not expected to increase.

The AQIA requires the evaluation of criteria pollutant emissions over 1-Hour, 8-Hour, 24-Hour, and Annual averaging periods, as appropriate for each California Ambient Air Quality Standard (CAAQS) and National Ambient Air Quality Standard (NAAQS). The AQIA assumes that the pre-project emissions are part of background and considers only emission increases. The criteria pollutant emissions used in the AQIA are summarized in Table 2-2, with calculation details shown in Tables C.4, C.5, C.6, and C.7 in Attachment 1.

Table 2-1: Rule 1401 HRA - Hourly TAC Emissions (per SCGT)

Pollutant	CAS No.	Post-Project Emissions (lb/hr)
Benzene	71432	3.02E-03
1,3-Butadiene	106990	3.98E-04
Formaldehyde	50000	3.32E-01
Naphthalene	91203	1.20E-03
Total PAHs (excluding Naphthalene)	1151	8.31E-04
Acetaldehyde	75070	3.70E-02
Acrolein	107028	3.34E-03
Ammonia	7664417	6.48E+00
Ethylbenzene	100414	2.95E-02
Propylene oxide	75569	2.68E-02
Toluene	108883	1.20E-01
Xylene	1330207	5.91E-02

Table 2-2: AQIA Emissions Increases (per SCGT)

Pollutant	Averaging Period	Emissions Increase (lb/AvgPeriod)
NOx	1-Hr	No Increase
	Annual	No Increase
CO	1-Hr	0.53
	8-Hr	3.19
SO_2	1-Hr	0.04
	24-Hr	0.61
	Annual	No Increase
PM10	24-Hr	5.85
	Annual	No Increase

3.0 DISPERSION MODELING

Dispersion modeling was conducted to estimate project impacts to ambient air. Dispersion modeling methodology is discussed in this section. Electronic files can be provided upon request.

3.1 Dispersion Model Input

The air dispersion model used for this Project is AERSCREEN, a screening dispersion model. AERSCREEN is based on AERMOD and is the screening dispersion model currently recommended by EPA.

The Lakes Environmental Software (Lakes) implementation/user interface, AERSCREEN View™, Version 2.7.0, was used for this project. This version of AERSCREEN View™ implements the newest version of AERMOD (version 19191).

AERSCREEN was run with a single source emitting unit emissions [1 gram per second (g/s)] to obtain the "Chi/Q" (*X*/Q) values that are necessary for subsequent calculations.

3.1.1 Scenario Options

This Project used the "Urban" option. The facility is located in the County of Los Angeles. The population of the County of Los Angeles as of the 2010 census was 9,818,605. This value was used as the population of the urban area.

3.1.2 Terrain Data

Digital elevation data was imported into AERSCREEN and elevations were assigned to receptors, buildings, and emission sources, as necessary. Shuttle Radar Topography Mission 1 (SRTM1) elevation data was obtained through the AERSCREEN View™ WebGIS import feature. This dataset has a resolution of approximately 30 meters.

3.1.3 Source Parameters

The SCGT's are subject to triennial testing per Condition D29.3. The last triennial tests were conducted in 2019. Source parameters are based on data from the 2019 triennial tests.

An AERSCREEN scenario may be based on a single emission source. The 'merged stack parameter', M, was calculated for each SCGT. The parameters that resulted in the lowest value of M were used in the AERSCREEN model. The source parameter calculations are shown in detail in Table C.1 in Attachment 1 and summarized in Table 3-1. The coordinates are the approximate midpoint between the five stacks.

Table 3-1: Source Parameters

UTM E (m)	UTM N (m)	Stack Diameter (ft)	Release Height (ft)	Stack Temperature (Deg F)	Exit Velocity (fps)
412,713	3,763,500	13.5	90	758.8	121.43

3.1.4 Building Downwash

The buildings identified as blue polygons in Figure 1-1 were included in the AERSCREEN scenario. The vertices of the buildings are provided in Table 3-2; building height is entered as 50 feet. The buildings are numbered from West (1) to East (5).

Table 3-2: Building Vertices

Building ID	Point No.	UTM E (m)	UTM N (m)
BLD1	1	412,600.39	3,763,560.17
	2	412,606.41	3,763,573.09
	3	412,617.78	3,763,567.79
	4	412,611.75	3,763,554.87
BLD2	1	412,649.36	3,763,536.32
	2	412,655.54	3,763,548.98
	3	412,666.97	3,763,543.40
	4	412,660.80	3,763,530.74
BLD3	1	412,715.76	3,763,519.36
	2	412,709.41	3,763,506.89
	3	412,698.73	3,763,512.33
	4	412,705.08	3,763,524.81
BLD4	1	412,747.75	3,763,487.90
	2	412,754.23	3,763,500.61
	3	412,764.97	3,763,495.14
	4	412,758.49	3,763,482.43
BLD5	1	412,796.39	3,763,463.93
	2	412,802.62	3,763,476.69
	3	412,813.75	3,763,471.26
	4	412,807.5	3,763,458.50

3.1.5 Meteorology

AERSCREEN View™ requires the user to input a set of Meteorology Parameters and select from one of three Surface Characteristic options.

Meteorology Parameters are shown in Table 3-3. Temperature data was obtained from meteorological temperature data available for the Pico Rivera Station.

Table 3-3: Meteorology Parameters

Parameter	Value	Reference
Minimum Temperature	33.89°F	Meteorological Temperature Data for Pico Rivera Station
Maximum Temperature	109.85°F	Meteorological Temperature Data for Pico Rivera Station
Minimum Wind Speed	0.5 m/s	Default
Anemometer Height	10 m	Default
Adjust Surface Friction Velocity (ADJ_U*)	Yes	

This Project used user-specified Surface Characteristics. The District provides values for these parameters (Albedo, Bowen Ratio, and Surface Roughness) for each of its meteorological stations. The values for the Pico Rivera Station were used as the Surface Characteristics for this Project. Surface Characteristics are shown in Table 3-4.

Table 3-4: Surface Characteristics

Parameter	Value
Albedo	0.18
Bowen Ratio	1.28
Surface Roughness (m)	0.339

3.1.6 Receptors

Ground-level impacts were evaluated every 25 meters from the emission source, out to a maximum of 5,000 meters. Flagpole receptors were not considered.

3.1.7 Fumigation Options

The District recommends evaluation of the effects of Inversion Break-up Fumigation and Shoreline Fumigation for projects located on the Pacific Coast shoreline. The emission source is not located on the Pacific Coast shoreline. As a result, Inversion Break-up Fumigation and Shoreline Fumigation were not used.

3.1.8 AERSCREEN Scenarios

AERSCREEN Scenarios are summarized in Table 3-6.

Table 3-5: AERSCREEN Scenarios

Scenario No.	Receptors	Fumigation Options
1	Ground-Level	No Fumigation

3.2 Dispersion Model Output

The results of the dispersion model output are shown in detail in Table C.2 in Attachment 1 and summarized in Table 3-7.

Table 3-6: AERSCREEN Output (Unitized)

Averaging Period	Maximum Impact (ug/m^3)
1-Hour	1.924E+00
8-Hour	1.731E+00
24-Hour	1.154E+00

4.0 RULE 1401 HEALTH RISK ASSESSMENT

Rule 1401 specifies limits for maximum individual cancer risk (MICR), cancer burden, and non-cancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units which emit TAC listed in Table I of the rule. The rule establishes allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

As described in Section 2.0, the proposed Project is expected to result in an increase in maximum hourly TAC emission. The total post-Project hourly TAC emissions from Table 2-1 and the 1-Hour AERSCREEN output from Table 3-7 were used to estimate the HIA. The HIA calculations for all organs are shown in Table C.3 in Attachment 1. The maximum HIA occurred with target organ eye and is summarized in Table 4-1.

As shown in Table 4-1, the HIA is less than the Rule 1401(d)(3) limit of 1.0. The proposed Project complies with Rule 1401.

Table 4-1: Rule 1401 HRA - HIA Summary (per SCGT)

Pollutant	CAS No.	HIA (Target Organ Eye)
Benzene	71432	
1,3-Butadiene	106990	
Formaldehyde	50000	1.47E-03
Naphthalene	91203	
Total PAHs (excluding Naphthalene)	1151	
Acetaldehyde	75070	1.91E-05
Acrolein	107028	3.24E-04
Ammonia	7664417	4.91E-04
Ethylbenzene	100414	
Propylene oxide	75569	2.10E-06
Toluene	108883	5.84E-06
Xylene	1330207	6.52E-07
Total Target Organ: Eye	--	2.31E-03
	Rule 1401(d)(3) Limit	1.0
	HIA < Limit?	Yes

5.0 AIR QUALITY IMPACT ANALYSIS

WCE is a NOx RECLAIM facility. Rule 2005 requires an AQIA for NOx emissions when a project results in an increase in the maximum hourly emissions of NOx. Rule 1306(b) specifies the methodology used to determine when a Rule 1303 AQIA [Rule 1303 (b)(1)] is required. Per Rule 1306(b), a Rule 1303 AQIA is required when a project proposes to increase maximum daily emissions of a permit unit by more than 1 lb/day.

The proposed Project is not expected to result in an increase in the maximum hourly PTE for NOx. Therefore, a Rule 2005 AQIA is not required for NOx emission.

Each unit at WCE must be available to operate for up to 24 hours per day. With the increase in heat input rating, this results in an increase in the maximum daily CO, SOx, and PM10 emissions. A Rule 1303 AQIA is required for CO, SOx, and PM10 emissions. Please note that the Project is not requesting an increase in annual PTE for CO, SOx, or PM10. The AQIA was performed for the 1-Hour, 8-Hour, and 24-Hour averaging periods only.

5.1 Significant Change in Air Quality Analysis (per SCGT)

The emissions from Table 2-2 were combined with the AERSCREEN output from Table 3-7 to calculate the worst-case impacts to ambient air quality for comparison with the 'Significant Change in Air Quality' thresholds from Rules 2005 and 1303. This calculation is shown in detail in Table C.8 in Attachment 1 and summarized in Table 5-1.

As shown in Table 5-1, the proposed Project is not expected to cause a significant change in air quality for any of the listed pollutants over their respective averaging periods.

Table 5-1: Significant Change in Air Quality Analysis (per SCGT)

Pollutant	Averaging Period	Project Impact (ug/m^3)	Significant Change in Air Quality (ug/m^3)	Exceeds Standard?
CO	1-Hr	0.1291	1,100	No
	8-Hr	0.0871	500	No
PM10	24-Hr	0.0355	2.5	No
	Annual	No Increase	1	No Increase

5.2 Ambient Air Quality Analysis (Project)

The emissions from Table 2-2 were multiplied by five (to account for all five SCGT's) and combined with the AERSCREEN output from Table 3-7 and background data to evaluate the Project impacts to ambient air quality for comparison with the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS). Where the background exceeded the standard, the Project impacts were compared to the Significant Impact Level.

Background data is shown in Table C.9 in Attachment 1. Calculations are shown in detail in Tables C.10 and C.11 in Attachment 1 and summarized in Tables 5-2 and 5-3.

As shown in Tables 5-2 and 5-3, the Project is not expected to cause or make worse an exceedance to an ambient air quality standard.

Table 5-2: Ambient Air Quality Analysis (Project)

Pollutant	Averaging Period	NAAQS (Project + Background) < Standard?	CAAQS (Project + Background) < Standard?
NO2	1-Hr	No Increase	No Increase
	Annual	No Increase	No Increase
CO	1-Hr	Yes	Yes
	8-Hr	Yes	Yes
SO2	1-Hr	Yes	Yes
	24-Hr	Yes	Yes
	Annual	No Increase	No Standard Exists
PM10	24-Hr	Yes	Background > Standard. See SIL Analysis
	Annual	No Standard Exists	No Increase

Table 5-3: Significant Impact Level Analysis (Project)

Pollutant	Averaging Period	Project < Significant Impact Level?
PM10	24-Hr	Yes

ATTACHMENT 1 - CALCULATION TABLES

Table No.	Title
C.1	AERSCREEN Stack Parameters
C.2	AERSCREEN Output
C.3	Rule 1401 HIA Calculation
C.4	AQIA Emission Rates - 1-Hour (per SCGT)
C.5	AQIA Emission Rates - 8-Hour (per SCGT)
C.6	AQIA Emission Rates - 24-Hour (per SCGT)
C.7	AQIA Emission Rates - Annual (per SCGT)
C.8	Rule 2005/1303 Significant Change in Air Quality Analysis (per SCGT)
C.9	Background Data for AQIA
C.10	Air Quality Impact Analysis (Project)
C.11	Significant Impact Level Analysis (Project)

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Facility ID: 146536

Walnut Creek Energy, LLC
Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.1 - AERSCREEN Stack Parameters

Unit	Device ID	Stack Area (ft^2)[1]	Stack Temperature 2019 Triennial Test (Deg F)	Exit Velocity (fps)[2]	Stack Diameter[1] (ft)	Release Height from Permit (ft)	Triennial Source Test Report 2019 (acfm)	Avg Fuel Use During 2019 Triennial Test[3] (mscfh)	Avg Heat Input During 2019 Triennial Test[4] (mmBtu/hr)	Scaled Exhaust Flow[5] (acfm)	Scaled Exit Velocity[6] (fps)	Merged Stack Parameter[7] M
Unit 1	D1	143.14	751.9	114.57	13.5	90	983,999	841.9	884.0	1,058,559	123.26	71,633,742,725
Unit 2	D7	143.14	758.8	113.23	13.5	90	972,435	844.6	886.8	1,042,849	121.43	71,218,221,266
Unit 3	D13	143.14	754	118.29	13.5	90	1,015,956	831.5	873.1	1,106,660	128.86	75,097,964,417
Unit 4	D19	143.14	775	120.01	13.5	90	1,030,694	834.7	876.4	1,118,437	130.23	78,010,951,801
Unit 5	D25	143.14	779.7	117.24	13.5	90	1,006,911	844.6	886.8	1,079,821	125.73	75,774,283,468

[1] Stack Diameter (ft) from permit and source test reports ; Stack Area (ft^2) = pi / 4 x Stack Diameter (ft)
[2] Exit Velocity (fps) = Exhaust Flow (acfm) / Stack Area (ft2) / 60
[3] From 1-hr average CEMS data
[4] Avg Heat Input During Test (mmBtu/hr) = Avg Fuel Use During Test (mscfh) / 1,000 x HHV
HHV 1,050 mmBtu/mmscf
[5] Scaled Exhaust Flow (acfm) = Exhaust Flow During Test (acfm) x Post-Project Heat Input Rating (mmBtu/hr) / Avg Heat Input During Test (mmBtu/hr)
Post-Project HI Rating 951
[6] Scaled Exit Velocity (fps) = Scaled Exhaust Flow (acfm) / 60 / Stack Area (ft^2)
[7] M = Release Height x Scaled Exhaust Flow x Stack Temperature / Emission Rate
The stacks have identical pollutant emission rates and will be modeled using unitized emission rates.
M = Release Height x Scaled Exhaust Flow x Stack Temperature

Unit 2 has the lowest value of M and is therefore the worst-case stack. AERSCREEN will use the stack parameters for Unit 2.

Stack Diameter (ft)	Release Height (ft)	Stack Temperature (Deg F)	Exit Velocity (fps)
13.500	90.000	758.8	121.43

Table C.2 - AERSCREEN Output

Averaging Period	Impact (ug/m^3)
1-Hr	1.924E+00
8-Hr	1.731E+00
24-Hr	1.154E+00

Scalars

8-Hr	0.90
24-Hr	0.60

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Facility ID: 146536

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Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.3 - Rule 1401 HIA Calculation

Rule 1401(f)(4) requires acute health risk for modifications to be based on the total emissions from a permit unit.

						Target Organ									
Pollutant	**CAS No.**	**Post-Project (lb/hr)**	**Post-Project[1] (g/s)**	**Acute REL (ug/m^3)**	**HIA[2] (ug/m^3)**	**AL**	**CV**	**DEV**	**EYE**	**HEM**	**IMM**	**NS**	**REP**	**RESP**	**SKIN**
Benzene	71432	3.02E-03	3.80E-04	2.70E+01	2.71E-05			x			x	x	x		
1,3-Butadiene	106990	3.98E-04	5.01E-05	6.60E+02	1.46E-07			x					x		
Formaldehyde	50000	3.32E-01	4.19E-02	5.50E+01	1.47E-03				x						
Naphthalene	91203	1.20E-03	1.52E-04	--	--										
Total PAHs (excluding Naphthalene)	1151	8.31E-04	1.05E-04	--	--										
Acetaldehyde	75070	3.70E-02	4.66E-03	4.70E+02	1.91E-05				x					x	
Acrolein	107028	3.34E-03	4.21E-04	2.50E+00	3.24E-04				x					x	
Ammonia	7664417	6.48E+00	8.17E-01	3.20E+03	4.91E-04				x					x	
Ethylbenzene	100414	2.95E-02	3.72E-03	--	--										
Propylene oxide	75569	2.68E-02	3.38E-03	3.10E+03	2.10E-06			x	x				x	x	
Toluene	108883	1.20E-01	1.52E-02	5.00E+03	5.84E-06				x			x		x	
Xylene	1330207	5.91E-02	7.46E-03	2.20E+04	6.52E-07				x			x		x	

[1] Post-Project (g/s) = Post-Project (lb/hr) x 454 / 3,600

[2] Post-Project (g/s) x Unitized GLC (ug/m^3) / Acute REL (ug/m^3)
Unitized GLC 1.9236 ug/m^3

		Target Organ									
Pollutant	**CAS No.**	**AL**	**CV**	**DEV**	**EYE**	**HEM**	**IMM**	**NS**	**REP**	**RESP**	**SKIN**
Benzene	71432			2.71E-05			2.71E-05	2.71E-05	2.71E-05		
1,3-Butadiene	106990			1.46E-07					1.46E-07		
Formaldehyde	50000				1.47E-03						
Naphthalene	91203										
Total PAHs (excluding	1151										
Acetaldehyde	75070				1.91E-05					1.91E-05	
Acrolein	107028				3.24E-04					3.24E-04	
Ammonia	7664417				4.91E-04					4.91E-04	
Ethylbenzene	100414										
Propylene oxide	75569			2.10E-06	2.10E-06				2.10E-06	2.10E-06	
Toluene	108883				5.84E-06			5.84E-06		5.84E-06	
Xylene	1330207				6.52E-07			6.52E-07		6.52E-07	
		0.00E+00	0.00E+00	2.93E-05	2.31E-03	0.00E+00	2.71E-05	3.36E-05	2.93E-05	8.43E-04	0.00E+00

Acute Reference Exposure Levels are from OEHHA's Consolidated Table, Last Updated October 2, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/contable.pdf
Target Organs are from OEHHA's Target Organs Tables, Last Updated August 21, 2020
https://ww2.arb.ca.gov/sites/default/files/classic//toxics/healthval/totables.pdf

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Facility ID: 146536

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Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.4 - AQIA Emission Rates - 1-Hour (per SCGT)

Pollutant	Pre-Project (lb/hr)	Post-Project (lb/hr)	Increase (lb/hr)	Increase[1] (g/s)
NO2	8.21	8.06	No Increase	No Increase
CO	8.00	8.53	0.53	6.71E-02
SO2	0.57	0.61	0.04	4.77E-03

[1] Increase (g/s) = Increase (lb/hr) x 454 / 3,600

Table C.5 - AQIA Emission Rates - 8-Hour (per SCGT)

Pollutant	Pre-Project[1] (lb/8-hr)	Post-Project[2] (lb/8-hr)	Increase (lb/8-hr)	Increase[3] (g/s)
CO	85.46	88.65	3.19	5.03E-02

[1] Pre-Project (lb/8-hr) = SU Count x SU Emissions (lb/event) + (8 - SU Count x Minutes per SU / 60) x NO Emissions (lb/hr)

SU Count	2	
Minutes per SU	60	
SU Emissions	18.73	lb/event
NO Emissions	8.00	lb/hr

[2] Post-Project (lb/8-hr) = SU Count x SU Emissions (lb/event) + (8 - SU Count x Minutes per SU / 60) x NO Emissions (lb/hr)

SU Count	2	
Minutes per SU	60	
SU Emissions	18.73	lb/event
NO Emissions	8.53	lb/hr

[3] Increase (g/s) = Increase (lb/8-hr) / 8 x 454 / 3,600

Table C.6 - AQIA Emission Rates - 24-Hour (per SCGT)

Pollutant	Pre-Project[1] (lb/24-hr)	Post-Project[2] (lb/24-hr)	Increase (lb/24-hr)	Increase[3] (g/s)
SO2	13.66	14.26	0.61	3.18E-03
PM10	144.00	149.85	5.85	3.07E-02

[1] Calculated in Table B.1
[2] Calculated in Table B.1
[3] Increase (g/s) = Increase (lb/24-hr) / 24 x 454 / 3,600

Table C.7 - AQIA Emission Rates - Annual (per SCGT)

Pollutant	Pre-Project (lb/yr)	Post-Project (lb/yr)	Increase (lb/yr)	Increase (g/s)
NO2	--	--	No Increase	No Increase
SO2	--	--	No Increase	No Increase
PM10	--	--	No Increase	No Increase

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Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.8 - Rule 2005/1303 Significant Change in Air Quality Analysis (per SCGT)

Pollutant	Averaging Period	Increase (g/s)	Unitized Ground-Level Concentration (ug/m^3)	Ground-Level Impact[1] (ug/m^3)	Significant Change in Air Quality (ug/m^3)	Exceeds Standard?
CO	1-Hr	6.71E-02	1.924E+00	0.1291	1,100	No
CO	8-Hr	5.03E-02	1.731E+00	0.0871	500	No
PM10	24-Hr	3.07E-02	1.154E+00	0.0355	2.5	No
PM10	Annual	No Increase	--	No Increase	1	No Increase

[1] Ground-Level Impact (ug/m^3) = Increase (g/s) x Unitized Ground-Level Concentration (ug/m^3)

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Appendix C - HRA & AQIA

Table C.9 - Background Data for AQIA

Pollutant	Units	Averaging Time	Standard	Data Source	2017	2018	2019	Summary	Ambient Air Quality Standards	Over / Under Standard	Notes	Background[1] (ug/m^3)	Standard[1] (ug/m^3)
CO	ppm	1-Hour	Federal	SCAQMD	2.5	2.0	1.9	2.5	35	Equal or Under	3-Year Max	2,862.99	40,000
CO	ppm	1-Hour	California	SCAQMD	2.5	2.0	1.9	2.5	20	Equal or Under	3-Year Max	2,862.99	23,000
CO	ppm	8-Hour	Federal	SCAQMD	2.2	1.8	1.5	2.2	9	Equal or Under	3-Year Max	2,519.43	10,000
CO	ppm	8-Hour	California	SCAQMD	2.2	1.8	1.5	2.2	9	Equal or Under	3-Year Max	2,519.43	10,000
PM10	ug/m^3	24-Hour	Federal	SCAQMD	140	101	97	140	150	Equal or Under	3-Year Max	140.00	150
PM10	ug/m^3	24-Hour	California	SCAQMD	140	101	97	140	50	Over	3-Year Max	140.00	50
PM10	ug/m^3	Annual	Federal	--	--	--	--	--	No Standard Exists	--	--	--	--
PM10	ug/m^3	Annual	California	SCAQMD	31.7	27.1	20.8	31.7	20	Over	3-Year Max	31.70	20
SO2	ppb	1-Hour	Federal	SCAQMD	2.6	2.8	2.3	3	75	Equal or Under	3-Yr Avg ; 99th%	7.85	196
SO2	ppb	1-Hour	California	SCAQMD	5.7	17.9	10.0	17.9	250	Equal or Under	3-Year Max	46.85	655
SO2	ppb	24-Hour	Federal	EPA	1.5	1.3	1.4	1.5	140	Equal or Under	3-Year Max	3.93	366
SO2	ppb	24-Hour	California	EPA	1.5	1.3	1.4	1.5	40	Equal or Under	3-Year Max	3.93	105
SO2	ppb	Annual	Federal	EPA	0.36	0.34	0.33	0.36	30	Equal or Under	3-Year Max	0.94	79
SO2	ppb	Annual	California	--	--	--	--	--	No Standard Exists	--	--	--	--

[1] C (ug/m3) = C (ppb) x MW / 24.45
C (ug/m3) = C (ppm) x MW / 0.02445

MW CO	28
MW SO2	64

'SCAQMD' data from the District's historical Air Quality Data Tables. Station 085 for CO, 087 for SOx, and 591 for PM10.
http://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year
'EPA' data from EPA's Monitor Values Report. Site ID 060371103.
https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

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Facility ID: 146536

Walnut Creek Energy, LLC
Application for Increase to Heat Input Rating

Appendix C - HRA & AQIA

Table C.10 - Air Quality Impact Analysis (Project)

						Federal				State			
Pollutant	**Averaging Period**	**Increase (per Turbine) (g/s)**	**Increase (Project)[1] (g/s)**	**Unitized Ground-Level Concentration (ug/m^3)**	**Ground-Level Impact (Project)[2] (ug/m^3)**	**Background (ug/m^3)**	**Project + Background (ug/m^3)**	**Standard (ug/m^3)**	**Exceeds Standard?**	**Background (ug/m^3)**	**Project + Background (ug/m^3)**	**Standard (ug/m^3)**	**Exceeds Standard?**
CO	1-Hr	6.71E-02	3.35E-01	1.924E+00	0.6453	2,862.99	2,863.63	40,000	No	2,862.99	2,863.63	23,000	No
CO	8-Hr	5.03E-02	2.52E-01	1.731E+00	0.4356	2,519.43	2,519.86	10,000	No	2,519.43	2,519.86	10,000	No
PM10	24-Hr	3.07E-02	1.54E-01	1.154E+00	0.1774	140.00	140.18	150	No	140.00	140.18	50	See SIL Analysis
PM10	Annual	No Increase	No Increase	--	No Increase	--	--	No Standard Exists	--	31.70	No Increase	20	No Increase
SO2	1-Hr	4.77E-03	2.39E-02	1.924E+00	0.0459	7.85	7.90	196	No	46.85	46.90	655	No
SO2	24-Hr	3.18E-03	1.59E-02	1.154E+00	0.0184	3.93	3.94	366	No	3.93	3.94	105	No
SO2	Annual	No Increase	No Increase	--	No Increase	0.94	No Increase	79	No Increase	--	--	No Standard Exists	--

[1] Increase (Project) = Increase (per Turbine) x Number of Turbines
Number of Turbines 5

[2] Ground-Level Impact (ug/m^3) = Increase (Project) (g/s) x Unitized Ground-Level Concentration (ug/m^3)

Table C.11 - Significant Impact Level Analysis (Project)

Pollutant	**Averaging Period**	**Project Impact (ug/m^3)**	**Significant Impact Level (ug/m^3)**	**Exceeds Standard?**
PM10	24-Hr	0.1774	5	No

ATTACHMENT 2 - REFERENCES

Page Nos.	Contains	Used For
1-10 of 57	2019 Triennial Test Data	Stack Parameters Table C.1
11 of 57	Surface Characteristics for Pico Rivera Station Population of County of Los Angeles	AERSCREEN
12 of 57	Temperature Data for Pico Rivera Station	AERSCREEN
13-28 of 57	OEHHA's Consolidated Table	Table C.3
29-47 of 57	OEHHA's Target Organ Tables	Table C.3
48-57 of 57	Background Data for AQIA	Table C.9/C.10

SCAQMD METHOD 5.1 PARTICULATE TEST DATA SUMMARY

Client/Location.	WCEP			Reference Temp (F).	60
				Fuel	Nat. Gas
Sample Location	Unit 1			Data By	AA
Test No.	1-PM-WCEP Unit 1	2-PM-WCEP Unit 1	3-PM-WCEP Unit 1	**Average**	**Limits**
Test Method	SCAQMD 5.1	SCAQMD 5.1	SCAQMD 5.1		
Date	5/22/2019	5/23/2019	5/23/2019	*	
Start Time	4:58	4:50	9:20		
Stop Time	9:04	9:02	13:26		
Sample Train	14-WCS	14-WCS	14-WCS	*	
Pilot Factor	0.84	0.84	0.84	*	
Meter Cal Factor	0.991	0.991	0.991	*	
Stack Area (sq ft)	143.14	143.14	143.14	*	
Sample Time (Min)	240	240	240	*	
Bar Press (in Hg)	29.32	29.47	29.47	*	
Nozzle Diam (in)	0.204	0.204	0.204	*	
Stack Press (iwg)	-0.78	-0.78	-0.78	-0.78	
Stack Temp (F)	753.7	751.0	751.0	751.9	
Vel Head (iwg)	1.6606	1.7686	1.7901	1.7398	
Stack O2 (%)	13.41	13.53	13.48	13.47	
Stack CO2 (%)	4.24	4.17	4.19	4.20	
Meter Vol (acf)	147.970	148.835	149.480	148.762	
Meter Temp (F)	60.1	53.0	57.3	56.8	
Meter Press (iwg)	0.99	1.02	1.04	1.02	
Liquid Vol (ml)	347.4	324.9	351.2	341.2	
Std Sample Vol (SCF)	144.022	147.612	147.040	146.225	
Moisture Fraction	0.101	0.093	0.100	0.098	
Stack Gas Mol Wt	28.08	28.17	28.09	28.11	
Stack Gas Velocity (ft/sec)	112.29	115.29	116.14	114.57	
Stack Flow Rate (wacfm)	964,417	990,111	997,469	983,999	
Stack Flow Rate (dscfm)	363,306	379,054	378,902	373,754	
Isokinetic Ratio (%)	**104.1**	**102.3**	**101.9**	**102.8**	
Facility Average Gas Flow (hscfh).....	8,350.8	8,165.0	8,294.4	8,279.4	
Facility Average Gas Flow (MMscfh).....	0.838	0.816	0.829	0.828	
Total Weight Gain, mg.....	2.9	1.9	4.0		
Particulate Emissions					
Grain Loading, gr/dscf.....	0.0003	0.0002	0.0004	0.0003	Limits
Grain Loading @ 3% O2.....	0.0007	0.0005	0.0010	0.0007	0.01
Grain Loading @ 15% O2.....	0.0002	0.0002	0.0003	0.0002	
Grain Loading @ 12% CO2.....	0.0009	0.0006	0.0012	0.0009	0.1
Mass Emissions, lb/hr[1].....	0.97	0.65	1.36	0.99	11
Emission Rate, lb/MMSCF	1.15	0.79	1.64	1.20	7.04

1) 11 lb/hr per Rule 475 PM Limit

SO_x Data and Calculations
WCEP
Unit 1

MONTROSE AIR QUALITY SERVICES

		Test 1	Test 2	100%	75%	50%
TRS as H_2S	ppm	2.31	1.11	1.71	1.71	1.71
Load	nMW			103.5	78.3	55.7
Oxygen	%			13.37	13.95	14.50
Stack Flow	kscfh			21,372	18,632	15,862
Stack Flow	dscfm			356,200	310,533	264,367
H_2S MW	lb/lb-mole			34	34	34
SV	SCF/lb-mole			379.5	379.5	379.5
F-Factor	dscf/MMBtu			8,710	8,710	8,710
HHV	Btu/SCF			1,050	1,050	1,050
Fuel Flow	scfm			14,032	11,282	8,843
Fuel Flow	kscfh			841.9	676.9	530.6
SO_2	MW			64	64	64
H_2S	lb/hr			0.13	0.10	0.08
H_2S	gr/100 scf			0.107	0.107	0.107
SO_2	lb/hr			0.24	0.20	0.15
SO_2	ppm			0.07	0.06	0.06
SO_2	ppmc			0.05	0.05	0.05
SO_2	lb/MMBtu			0.00027	0.00027	0.00027
SO_2	lb/MMSCF			0.29	0.29	0.29
SO_2	lb/nMW-hr			0.0023	0.0025	0.0027

SCAQMD METHOD 5.1 PARTICULATE TEST DATA SUMMARY

Client/Location.	WCEP			**Reference Temp (F).**	60
				Fuel	Nat. Gas
Sample Location	Unit 2			**Data By**	AA
Test No.	1-PM-WCEP Unit 2	2-PM-WCEP Unit 2	3-PM-WCEP Unit 2	**Average**	**Limits**
Test Method	SCAQMD 5.1	SCAQMD 5.1	SCAQMD 5.1		
Date	5/28/2019	5/28/2019	5/29/2019	*	
Start Time	7:25	6:10	10:30		
Stop Time	11:31	10:16	14:36		
Sample Train	14-WCS	14-WCS	14-WCS	*	
Pitot Factor	0.84	0.84	0.84	*	
Meter Cal Factor	0.991	0.991	0.991	*	
Stack Area (sq ft)	143.14	143.14	143.14	*	
Sample Time (Min)	240	240	240	*	
Bar Press (in Hg)	29.54	29.47	29.47	*	
Nozzle Diam (in)	0.204	0.204	0.204	*	
Stack Press (iwg)	-0.82	-0.82	-0.82	-0.82	
Stack Temp (F)	749.6	757.7	769.1	758.8	
Vel Head (iwg)	1.6534	1.6922	1.7270	1.6909	
Stack O2 (%)	13.30	13.31	13.19	13.27	
Stack CO2 (%)	4.28	4.29	4.35	4.31	
Meter Vol (acf)	147.550	148.875	150.095	148.840	
Meter Temp (F)	79.9	75.8	79.3	78.3	
Meter Press (iwg)	0.97	0.99	1.00	0.99	
Liquid Vol (ml)	334.2	347.8	348.3	343.4	
Std Sample Vol (SCF)	139.375	141.381	141.598	140.785	
Moisture Fraction	0.100	0.103	0.103	0.102	
Stack Gas Mol Wt	28.09	28.07	28.07	28.08	
Stack Gas Velocity (ft/sec)	111.43	113.29	114.97	113.23	
Stack Flow Rate (wacfm)	956,067	972,930	987,408	972,435	
Stack Flow Rate (dscfm)	384,804	366,411	368,401	366,472	
Isokinetic Ratio (%)	**100.4**	**101.4**	**101.0**	**100.9**	
Facility Average Gas Flow (hscfh).....	8,445.6	8,439.6	8,552.4	8,479.2	
Facility Average Gas Flow (MMscfh).....	0.845	0.844	0.855	0.848	
Total Weight Gain, mg.....	4.6	3.4	2.9		
Particulate Emissions					
Grain Loading, gr/dscf.....	0.0005	0.0004	0.0003	0.0004	Limits
Grain Loading @ 3% O2.....	0.0012	0.0009	0.0007	0.0009	0.01
Grain Loading @ 15% O2.....	0.0004	0.0003	0.0002	0.0003	
Grain Loading @ 12% CO2.....	0.0014	0.0010	0.0009	0.0011	0.1
Mass Emissions, lb/hr[1].....	1.59	1.17	1.00	1.25	11
Emission Rate, lb/MMSCF	1.88	1.38	1.17	1.48	7.04

1) 11 lb/hr per Rule 475 PM Limit

SO_x Data and Calculations
WCEP
Unit 2

MONTROSE AIR QUALITY SERVICES

		Test 1	Test 2	100%	75%	50%
TRS as H_2S	ppm	2.49	1.06	1.78	1.78	1.78
Load	nMW			102.8	79.1	53.8
Oxygen	%			13.30	13.77	14.28
Stack Flow	kscfh			21,268	18,478	18,250
Stack Flow	dscfm			354,467	307,967	304,167
H_2S MW	lb/lb-mole			34	34	34
SV	SCF/lb-mole			379.5	379.5	379.5
F-Factor	dscf/MMBtu			8,710	8,710	8,710
HHV	Btu/SCF			1,050	1,050	1,050
Fuel Flow	scfm			14,076	11,482	8,786
Fuel Flow	kscfh			844.6	688.9	527.2
SO_2	MW			64	64	64
H_2S	lb/hr			0.13	0.11	0.08
H_2S	gr/100 scf			0.111	0.111	0.111
SO_2	lb/hr			0.25	0.21	0.16
SO_2	ppm			0.07	0.07	0.05
SO_2	ppmc			0.05	0.05	0.05
SO_2	lb/MMBtu			0.00028	0.00028	0.00024
SO_2	lb/MMSCF			0.30	0.30	0.25
SO_2	lb/nMW-hr			0.0025	0.0026	0.0029

SCAQMD METHOD 5.1 PARTICULATE TEST DATA SUMMARY

Client/Location.	WCEP			**Reference Temp (F).**	60
				Fuel	Nat. Gas
Sample Location	Unit 3			**Data By**	AA
Test No.	1-PM-WCEP Unit 3	2-PM-WCEP Unit 3	3-PM-WCEP Unit 3	**Average**	**Limits**
Test Method	SCAQMD 5.1	SCAQMD 5.1	SCAQMD 5.1		
Date	4/16/2019	4/17/2019	4/17/2019	*	
Start Time	5:08	5:00	9:20		
Stop Time	9:14	9:06	13:26		
Sample Train	18-WCS	18-WCS	18-WCS	*	
Pitot Factor	0.84	0.84	0.84	*	
Meter Cal Factor	1.013	1.013	1.013	*	
Stack Area (sq ft)	143.14	143.14	143.14	*	
Sample Time (Min)	240	240	240	*	
Bar Press (in Hg)	29.52	29.71	29.71	*	
Nozzle Diam (in)	0.204	0.204	0.204	*	
Stack Press (iwg)	-2.60	-2.60	-2.60	-2.60	
Stack Temp (F)	751.9	752.3	757.9	754.0	
Vel Head (iwg)	1.7659	1.8632	1.9280	1.8524	
Stack O2 (%)	13.48	13.48	13.37	13.44	
Stack CO2 (%)	4.19	4.19	4.25	4.21	
Meter Vol (acf)	144.445	147.080	150.575	147.367	
Meter Temp (F)	64.0	65.5	79.8	69.8	
Meter Press (iwg)	1.01	1.07	1.10	1.06	
Liquid Vol (ml)	353.2	384.2	358.9	365.4	
Std Sample Vol (SCF)	143.604	146.775	146.308	145.562	
Moisture Fraction	0.103	0.108	0.102	0.104	
Stack Gas Mol Wt	28.06	27.99	28.07	28.04	
Stack Gas Velocity (ft/sec)	115.83	118.55	120.71	118.29	
Stack Flow Rate (wacfm)	993,034	1,018,140	1,036,893	1,015,956	
Stack Flow Rate (dscfm)	374,744	384,029	391,907	383,560	
Isokinetic Ratio (%)	**100.7**	**100.4**	**98.1**	**99.7**	
Facility Average Gas Flow (hscfh).....	8,274.6	8,371.8	8,437.8	8,361.4	
Facility Average Gas Flow (MMscfh).....	0.827	0.837	0.844	0.836	
Total Weight Gain, mg	2.5	2.5	2.4		
Particulate Emissions					
Grain Loading, gr/dscf.....	0.0003	0.0003	0.0003	0.0003	Limits
Grain Loading @ 3% O2.....	0.0006	0.0006	0.0006	0.0006	0.01
Grain Loading @ 15% O2.....	0.0002	0.0002	0.0002	0.0002	
Grain Loading @ 12% CO2.....	0.0008	0.0008	0.0007	0.0007	0.1
Mass Emissions, lb/hr[1].....	0.86	0.87	0.85	0.86	11
Emission Rate, lb/MMSCF	1.04	1.03	1.01	1.03	7.04

1) 11 lb/hr per Rule 475 PM Limit

SO_x Data and Calculations
WCEP
Unit 3

		Test 1	Test 2	100%	75%	50%
TRS as H_2S	ppm	0.89	0.86	0.88	0.88	0.88
Load	nMW			102.9	78.0	54.7
Oxygen	%			13.40	13.94	14.45
Stack Flow	kscfh			21,214	18,415	15,484
Stack Flow	dscfm			353,567	306,917	258,067
H_2S MW	lb/lb-mole			34	34	34
SV	SCF/lb-mole			379.5	379.5	379.5
F-Factor	dscf/MMBtu			8,710	8,710	8,710
HHV	Btu/SCF			1,050	1,050	1,050
Fuel Flow	scfm			13,858	11,163	8,694
Fuel Flow	kscfh			831.5	669.8	521.6
SO_2	MW			64	64	64
H_2S	lb/hr			0.07	0.05	0.04
H_2S	gr/100 scf			0.055	0.055	0.055
SO_2	lb/hr			0.12	0.10	0.08
SO_2	ppm			0.03	0.03	0.03
SO_2	ppmc			0.03	0.03	0.03
SO_2	lb/MMBtu			0.00014	0.00014	0.00014
SO_2	lb/MMSCF			0.15	0.15	0.15
SO_2	lb/nMW-hr			0.0012	0.0013	0.0014

SCAQMD METHOD 5.1 PARTICULATE TEST DATA SUMMARY

Client/Location.	WCEP			**Reference Temp (F).**	60
				Fuel	Nat. Gas
Sample Location	Unit 4			**Data By**	AA
Test No.	1-PM-WCEP Unit 4	2-PM-WCEP Unit 4	3-PM-WCEP Unit 4	**Average**	**Limits**
Test Method	SCAQMD 5.1	SCAQMD 5.1	SCAQMD 5.1		
Date	4/18/2019	4/22/2019	4/22/2019	*	
Start Time	5:02	4:58	9:16		
Stop Time	9:08	9:04	13:22		
Sample Train	18-WCS	18-WCS	18-WCS	*	
Pitot Factor	0.84	0.84	0.84	*	
Meter Cal Factor	1.013	1.013	1.013	*	
Stack Area (sq ft)	143.14	143.14	143.14	*	
Sample Time (Min)	240	240	240	*	
Bar Press (in Hg)	29.58	29.59	29.59	*	
Nozzle Diam (in)	0.204	0.204	0.204	*	
Stack Press (iwg)	-2.50	-2.50	-2.50	-2.50	
Stack Temp (F)	775.2	772.3	777.6	775.0	
Vel Head (iwg)	1.7836	1.8685	1.9593	1.8698	
Stack O2 (%)	13.19	13.26	13.17	13.21	
Stack CO2 (%)	4.37	4.34	4.37	4.36	
Meter Vol (acf)	148.920	148.435	152.475	149.943	
Meter Temp (F)	75.5	69.7	81.4	75.6	
Meter Press (iwg)	1.06	1.07	1.12	1.08	
Liquid Vol (ml	379.6	369.6	380.5	376.6	
Std Sample Vol (SCF)	145.155	146.358	147.108	146.207	
Moisture Fraction	0.108	0.105	0.107	0.107	
Stack Gas Mol Wt	28.01	28.04	28.02	28.03	
Stack Gas Velocity (ft/sec)	117.29	119.75	123.00	120.01	
Stack Flow Rate (wacfm)	1,007,293	1,028,414	1,056,375	1,030,694	
Stack Flow Rate (dscfm)	371,403	381,625	389,320	380,782	
Isokinetic Ratio (%)	**102.7**	**100.7**	**99.3**	**100.9**	
Facility Average Gas Flow (hscfh).....	8,328.6	8,353.2	8,481.6	8,387.8	
Facility Average Gas Flow (MMscfh).....	0.833	0.835	0.848	0.839	
Total Weight Gain, mg.....	1.8	2.5	2.5		
Particulate Emissions					
Grain Loading, gr/dscf.....	0.0002	0.0003	0.0003	0.0002	Limits
Grain Loading @ 3% O2.....	0.0004	0.0006	0.0006	0.0006	0.01
Grain Loading @ 15% O2.....	0.0001	0.0002	0.0002	0.0002	
Grain Loading @ 12% CO2.....	0.0005	0.0007	0.0007	0.0007	0.1
Mass Emissions, lb/hr[1].....	0.61	0.86	0.88	0.78	11
Emission Rate, lb/MMSCF	0.73	1.03	1.03	0.93	7.04

1) 11 lb/hr per Rule 475 PM Limit

SO_x Data and Calculations
WCEP
Unit 4

		Test 1	Test 2	100%	75%	50%
TRS as H_2S	ppm	0.99	0.94	0.97	0.97	0.97
Load	nMW			101.7	77.6	53.9
Oxygen	%			13.11	13.51	13.94
Stack Flow	kscfh			20,494	17,501	14,415
Stack Flow	dscfm			341,567	291,683	240,250
H_2S MW	lb/lb-mole			34	34	34
SV	SCF/lb-mole			379.5	379.5	379.5
F-Factor	dscf/MMBtu			8,710	8,710	8,710
HHV	Btu/SCF			1,050	1,050	1,050
Fuel Flow	scfm			13,911	11,266	8,741
Fuel Flow	kscfh			834.7	676.0	524.5
SO_2	MW			64	64	64
H_2S	lb/hr			0.07	0.06	0.05
H_2S	gr/100 scf			0.061	0.061	0.061
SO_2	lb/hr			0.14	0.11	0.09
SO_2	ppm			0.04	0.04	0.04
SO_2	ppmc			0.03	0.03	0.03
SO_2	lb/MMBtu			0.00015	0.00015	0.00015
SO_2	lb/MMSCF			0.16	0.16	0.16
SO_2	lb/nMW-hr			0.0013	0.0014	0.0016

SCAQMD METHOD 5.1 PARTICULATE TEST DATA SUMMARY

Client/Location.	WCEP			Reference Temp (F).	60
				Fuel	Nat. Gas
Sample Location	Unit 5			Data By	AA
Test No.	1-PM-WCEP Unit 5	2-PM-WCEP Unit 5	3-PM-WCEP Unit 5	**Average**	**Limits**
Test Method	SCAQMD 5.1	SCAQMD 5.1	SCAQMD 5.1		
Date	4/24/2019	4/25/2019	4/25/2019	*	
Start Time	4:58	4:42	9:00		
Stop Time	9:04	8:48	13:06		
Sample Train	18-WCS	18-WCS	18-WCS	*	
Pitot Factor	0.84	0.84	0.84	*	
Meter Cal Factor	1.013	1.013	1.013	*	
Stack Area (sq ft)	143.14	143.14	143.14	*	
Sample Time (Min)	240	240	240	*	
Bar Press (in Hg)	29.58	29.56	29.56	*	
Nozzle Diam (in)	0.204	0.204	0.204	*	
Stack Press (iwg)	-2.60	-2.60	-2.60	-2.60	
Stack Temp (F)	773.5	778.7	787.0	779.7	
Vel Head (iwg)	1.7682	1.7268	1.8242	1.7731	
Stack O2 (%)	13.18	13.17	13.07	13.14	
Stack CO2 (%)	4.36	4.37	4.43	4.39	
Meter Vol (acf)	143,855	144,495	149,590	145,980	
Meter Temp (F)	74.8	67.5	93.6	78.7	
Meter Press (iwg)	1.02	0.98	1.03	1.01	
Liquid Vol (ml)	363.0	370.1	402.7	378.6	
Std Sample Vol (SCF)	140.424	142.887	140.970	141.427	
Moisture Fraction	0.107	0.107	0.117	0.111	
Stack Gas Mol Wt	28.02	28.02	27.91	27.99	
	116.69	115.60	119.44	117.24	
Stack Flow Rate (wacfm)	1,002,183	992,799	1,025,751	1,006,911	
Stack Flow Rate (dscfm)	370,375	365,062	370,574	368,670	
Isokinetic Ratio (%)	**99.6**	**102.8**	**99.9**	**100.8**	
Facility Average Gas Flow (ftscfh).....	8,406.6	8,380.8	8,472.6	8,420.0	
Facility Average Gas Flow (MMscfh).....	0.841	0.838	0.847	0.842	
Total Weight Gain, mg.....	2.4	3.3	4.2		
Particulate Emissions					
Grain Loading, gr/dscf.....	0.0003	0.0004	0.0005	0.0004	Limits
Grain Loading @ 3% O2.....	0.0006	0.0008	0.0011	0.0008	0.01
Grain Loading @ 15% O2.....	0.0002	0.0003	0.0003	0.0003	
Grain Loading @ 12% CO2.....	0.0007	0.0010	0.0012	0.0010	0.1
Mass Emissions, lb/hr[1].....	0.84	1.12	1.46	1.14	11
Emission Rate, lb/MMSCF	1.00	1.33	1.72	1.35	7.04

1) 11 lb/hr per Rule 475 PM Limit

SO_x Data and Calculations
WCEP
Unit 5

MONTROSE AIR QUALITY SERVICES

		Test 1	Test 2	100%	75%	50%
TRS as H_2S	ppm	1.19	1.19	1.19	1.19	1.19
Load	nMW			101.6	78.8	53.1
Oxygen	%			13.11	13.55	14.12
Stack Flow	kscfh			20,725	17,915	14,741
Stack Flow	dscfm			345,417	298,583	245,683
H_2S MW	lb/lb-mole			34	34	34
SV	SCF/lb-mole			379.5	379.5	379.5
F-Factor	dscf/MMBtu			8,710	8,710	8,710
HHV	Btu/SCF			1,050	1,050	1,050
Fuel Flow	scfm			14,076	11,468	8,704
Fuel Flow	kscfh			844.6	688.1	522.2
SO_2	MW			64	64	64
H_2S	lb/hr			0.09	0.07	0.06
H_2S	gr/100 scf			0.075	0.075	0.075
SO_2	lb/hr			0.17	0.14	0.10
SO_2	ppm			0.05	0.05	0.04
SO_2	ppmc			0.04	0.04	0.04
SO_2	lb/MMBtu			0.00019	0.00019	0.00019
SO_2	lb/MMSCF			0.20	0.20	0.20
SO_2	lb/nMW-hr			0.0017	0.0018	0.0020

Station Abbr.	Station Name	Station Type	Year Availability							Surface Location				Ave. Surface Characteristics		
			2016	2015	2014	2013	2012	2011	2010	Lat.	Long.	Elev (m)	WBAN ID	Albedo	Bowen	Sfc. Rough.
KBUR	Burbank Arpt.	ASOS	X	X	X	X	X			34.1997	-118.3654	236	23152	0.18	1.43	0.156
KCNO	Chino Arpt.	ASOS	X	X	X	X	X			33.9756	-117.6249	198	03179	0.18	0.74	0.093
KCQT	USC/Downtown L.A.	ASOS	X	X	X	X	X			34.0236	-118.2912	55	93134	0.18	1.33	0.268
KFUL	Fullerton Arpt.	ASOS	X	X	X	X	X			33.8715	-117.9856	29	03166	0.18	1.18	0.262
KHHR	Hawthorne Arpt.	ASOS	X	X	X	X	X			33.9235	-118.3329	19	03167	0.18	1.29	0.238
KLAX	Los Angeles Int'l Arpt.	ASOS	X	X	X	X	X			33.9382	-118.3866	30	23174	0.18	1.25	0.099
KLGB	Long Beach Arpt.	ASOS	X	X	X	X	X			33.8118	-118.1472	10	23129	0.18	1.24	0.104
KONT	Ontario Arpt.	ASOS	X	X	X	X	X			34.0531	-117.5769	289	03102	0.19	1.12	0.092
KPSP	Palm Springs Arpt.	ASOS	X	X	X	X	X			33.8222	-116.5043	125	93138	0.20	2.08	0.130
KRAL	Riverside Arpt.	ASOS	X	X	X	X	X			33.9528	-117.4352	245	03171	0.18	1.07	0.148
KSMO	Santa Monica Arpt.	ASOS	X	X	X	X	X			34.0210	-118.4471	53	93197	0.17	1.08	0.173
KSNA	John Wayne Int'l Arpt.	ASOS	X	X	X	X	X			33.6798	-117.8675	17	93184	0.18	1.24	0.117
KTRM	Desert Hot Springs Arpt.	ASOS	X	X	X	X	X			33.6317	-116.1641	-36	03104	0.18	0.70	0.079
KVNY	Van Nuys Arpt.	ASOS	X	X	X	X	X			34.2123	-118.4915	235	23130	0.18	1.18	0.113
AZUS	Azusa	SCAQMD	X	X	X	X	X			34.1365	-117.9239	182	99999	0.19	1.68	0.362
BNAP	Banning	SCAQMD		X	X	X	X	X		33.9208	-116.8584	660	99999	0.22	2.26	0.148
CELA	Central L.A.	SCAQMD	X	X	X			X	X	34.0664	-118.2267	87	99999	0.18	1.42	0.559
ELSI	Lake Elsinore	SCAQMD	X	X	X	X	X			33.6765	-117.3310	406	99999	0.20	1.50	0.232
FONT	Fontana	SCAQMD	X	X		X	X	X		34.1001	-117.4920	367	99999	0.19	1.30	0.250
MSVJ	Mission Viejo	SCAQMD	X		X	X	X	X		33.6300	-117.6756	170	99999	0.18	1.32	0.293
PERI	Perris	SCAQMD	X	X	X			X	X	33.7889	-117.2278	442	99999	0.20	1.24	0.192
PICO	Pico Rivera	SCAQMD	X	X			X	X	X	34.0103	-118.0686	58	99999	0.18	1.28	0.339
RDLD	Redlands	SCAQMD	X	X	X	X	X			34.0597	-117.1472	481	99999	0.20	1.54	0.316
UPLA	Upland	SCAQMD	X	X	X	X	X			34.1036	-117.6292	379	99999	0.18	1.15	0.341

County	2010 Population
Los Angeles	9,818,605
Orange	3,010,232
Riverside	2,189,641
San Bernardino	2,035,210

Upper Air Location (Abbr: NKX)			
Lat.	Long.	Elev (m)	WBAN ID
32.8700	-117.1500	134	03190

34.010N 118.069W UA_ID: 3190 SF_ID: 3166 OS_ID: 00099999 VERSION: 16216 THRESH_1MIN = 0.50 m/s; ADJ_U* TEMP_Sub 316.4 Max, K 109.85 Max, degF
274.2 Min, K 33.89 Min, degF

																	Temp (K)							
10	9	27	270	13	153.5	0.291	1.981	0.005	1809	377	-14.2	0.339	0.73	0.18	1.8	181	9.1	316.4	5.5	0	0	11	999	7 NAD-OS NoSubs
10	9	27	270	14	139.6	0.386	2.047	0.005	2191	576	-36.8	0.339	0.73	0.19	2.7	220	9.1	316.4	5.5	0	0	12	998	8 NAD-OS NoSubs
10	12	31	365	5	-22.4	0.218	-9	-9	-999	244	52.1	0.339	0.73	1	1.8	107	9.1	274.2	5.5	0	0	75	1007	0 NAD-OS NoSubs
10	12	31	365	6	-27.6	0.269	-9	-9	-999	334	79.4	0.339	0.73	1	2.2	344	9.1	274.2	5.5	0	0	81	1008	0 NAD-OS NoSubs
10	12	31	365	7	-22.4	0.218	-9	-9	-999	244	52.1	0.339	0.73	1	1.8	172	9.1	274.2	5.5	0	0	81	1008	0 NAD-OS NoSubs
11	2	27	58	7	-5.6	0.104	-9	-9	-999	81	18.1	0.339	2.73	0.76	0.9	183	9.1	274.2	5.5	0	0	85	1009	0 NAD-OS NoSubs
11	12	23	357	7	-28.1	0.269	-9	-9	-999	361	79.4	0.339	2.73	1	2.2	28	9.1	274.2	5.5	0	0	56	1023	0 NAD-OS NoSubs

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	MeWAF
ACETALDEHYDE	75-07-0	4.7E+02	12/08	3.0E+02	12/08	1.4E+02	12/08			2.7E-06	1.0E-02	4/99 [5/93]			1
ACETAMIDE	60-35-5									2.0E-05	7.0E-02	4/99			1
ACROLEIN	107-02-8	2.5E+00	12/08	7.0E-01	12/08	3.5E-01	12/08								1
ACRYLAMIDE	79-06-1									1.3E-03	4.5E+00	4/99 [7/90]			1
ACRYLIC ACID	79-10-7	6.0E+03	4/99												1
ACRYLONITRILE	107-13-1					5.0E+00	12/01			2.9E-04	1.0E+00	4/99 [1/91]			1
ALLYL CHLORIDE	107-05-1									6.0E-06	2.1E-02	4/99			1
2-AMINOANTHRAQUINONE	117-79-3									9.4E-06	3.3E-02	4/99			1
AMMONIA	7664-41-7	3.2E+03	4/99			2.0E+02	2/00								1
ANILINE	62-53-3									1.6E-06	5.7E-03	4/99			1
ARSENIC AND COMPOUNDS (INORGANIC)[TAC]	7440-38-2 1016 [1015]	2.0E-01	12/08	1.5E-02	12/08	1.5E-02	12/08	3.5E-06	12/08	3.3E-03 TAC	1.2E+01	7/90	1.5E+00	10/00	1
ARSINE	7784-42-1	2.0E-01	12/08	1.5E-02	12/08	1.5E-02	12/08								1
ASBESTOS[TAC, f]	1332-21-4									1.9E-04 TACf	2.2E+02	3/86			333.33
BENZENE[TAC]	71-43-2	2.7E+01	6/14	3.0E+00	6/14	3.0E+00	6/14			2.9E-05[TAC]	1.0E-01	1/85			1
BENZIDINE (AND ITS SALTS) *values also apply to:*	92-87-5									1.4E-01	5.0E+02	4/99 [1/91]			1
Benzidine based dyes	*1020*									*1.4E-01*	*5.0E+02*	*4/99 [1/91]*			*1*
Direct Black 38	*1937-37-7*									*1.4E-01*	*5.0E+02*	*4/99 [1/91]*			*1*
Direct Blue 6	*2602-46-2*									*1.4E-01*	*5.0E+02*	*4/99 [1/91]*			*1*
Direct Brown 95 (technical grade)	*16071-86-6*									*1.4E-01*	*5.0E+02*	*4/99 [1/91]*			*1*
BENZYL CHLORIDE	100-44-7	2.4E+02	4/99							4.9E-05	1.7E-01	4/99			1
BERYLLIUM AND COMPOUNDS	7440-41-7 [1021]					7.0E-03	12/01	2.0E-03	12/01	2.4E-03	8.4E+00	4/99 [7/90]			1
BIS(2-CHLOROETHYL)ETHER (Dichloroethyl ether)	111-44-4									7.1E-04	2.5E+00	4/99			1
BIS(CHLOROMETHYL)ETHER	542-88-1									1.3E-02	4.6E+01	4/99 [1/91]			1
BROMINE AND COMPOUNDS	7726-95-6 [1040]														1
POTASSIUM BROMATE	7758-01-2									1.4E-04	4.9E-01	4/99 [10/93]			1

Table last updated: October 2, 2020

Table 1
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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	MeWAF
1,3-BUTADIENE[TAC]	106-99-0	6.6E+02	7/13	9.0E+00	7/13	2.0E+00	7/13			1.7E-04 TAC	6.0E-01	7/92			1
CADMIUM AND COMPOUNDS[TAC]	7440-43-9 [1045]					2.0E-02	1/01	5.0E-04	10/00	4.2E-03 TAC	1.5E+01	1/87			1
CAPROLACTAM	105-60-2	5.0E+01	10/13	7.0E+00	10/13	2.2E+00	10/13								
CARBON DISULFIDE	75-15-0	6.2E+03	4/99			8.0E+02	5/02								1
CARBON MONOXIDE	630-08-0	2.3E+04	4/99												1
CARBON TETRACHLORIDE[TAC] (Tetrachloromethane)	56-23-5	1.9E+03	4/99			4.0E+01	1/01			4.2E-05 TAC	1.5E-01	9/87			1
CARBONYL SULFIDE	463-58-1	6.6E+02	2/17	1.0E+01	2/17	1.0E+01	2/17								
CHLORINATED PARAFFINS	108171-26-2									2.5E-05	8.9E-02	4/99			1
CHLORINE	7782-50-5	2.1E+02	4/99			2.0E-01	2/00								1
CHLORINE DIOXIDE	10049-04-4					6.0E-01	1/01								1
4-CHLORO-O-PHENYLENEDIAMINE	95-83-0									4.6E-06	1.6E-02	4/99			1
CHLOROBENZENE	108-90-7					1.0E+03	1/01								1
CHLOROFORM[TAC]	67-66-3	1.5E+02	4/99			3.0E+02	4/00			5.3E-06 TAC	1.9E-02	12/90			1
Chlorophenols	*1060*														*1*
PENTACHLOROPHENOL	87-86-5									5.1E-06	1.8E-02	4/99			1
2,4,6-TRICHLOROPHENOL	88-06-2									2.0E-05	7.0E-02	4/99 [1/91]			1
CHLOROPICRIN	76-06-2	2.9E+01	4/99			4.0E-01	12/01								1
p-CHLORO-o-TOLUIDINE	95-69-2									7.7E-05	2.7E-01	4/99			1
CHROMIUM 6+[TAC] *values also apply to:*[g]	18540-29-9					2.0E-01	1/01	2.0E-02	10/00	1.5E-01 TAC	5.1E+02	1/86	5.0E-01	*1/14*	1
Barium chromate	*10294-40-3*					*2.0E-01*	*1/01*	*2.0E-02*	*10/00*	*1.5E-01 TAC*	*5.1E+02*	*1/86*	*5.0E-01*	*1/14*	*0.2053*
Calcium chromate	*13765-19-0*					*2.0E-01*	*1/01*	*2.0E-02*	*10/00*	*1.5E-01 TAC*	*5.1E+02*	*1/86*	*5.0E-01*	*1/14*	*0.3332*
Lead chromate	*7758-97-6*					*2.0E-01*	*1/01*	*2.0E-02*	*10/00*	*1.5E-01 TAC*	*5.1E+02*	*1/86*	*5.0E-01*	*1/14*	*0.1609*
Sodium dichromate	*10588-01-9*					*2.0E-01*	*1/01*	*2.0E-02*	*10/00*	*1.5E-01 TAC*	*5.1E+02*	*1/86*	*5.0E-01*	*1/14*	*0.397*
Strontium chromate	*7789-06-2*					*2.0E-01*	*1/01*	*2.0E-02*	*10/00*	*1.5E-01 TAC*	*5.1E+02*	*1/86*	*5.0E-01*	*1/14*	*0.2554*
CHROMIUM TRIOXIDE (as chromic acid mist)	1333-82-0					2.0E-03	1/01	2.0E-02	10/00	1.5E-01 TAC	5.1E+02	1/86	5.0E-01	*1/14*	0.52
COBALT	7440-48-4									7.7E-3	2.7E+01	10/20			1
COPPER AND COMPOUNDS	7440-50-8 [1067]	1.0E+02	4/99												1
p-CRESIDINE	120-71-8									4.3E-05	1.5E-01	4/99			1

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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	M[e] W A F
CRESOLS (mixtures of)	1319-77-3					6.0E+02	1/01								1
m-CRESOL	108-39-4					6.0E+02	1/01								1
o-CRESOL	95-48-7					6.0E+02	1/01								1
p-CRESOL	106-44-5					6.0E+02	1/01								1
CUPFERRON	135-20-6									6.3E-05	2.2E-01	4/99			1
Cyanide Compounds (inorganic)	*57-12-5 1073*	*3.4E+02*	*4/99*			*9.0E+00*	*4/00*								*1*
HYDROGEN CYANIDE (Hydrocyanic acid)	74-90-8	3.4E+02	4/99			9.0E+00	4/00								1
2,4-DIAMINOANISOLE	615-05-4									6.6E-06	2.3E-02	4/99			1
2,4-DIAMINOTOLUENE	95-80-7									1.1E-03	4.0E+00	4/99			1
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	96-12-8									2.0E-03	7.0E+00	4/99 [1/92]			1
p-DICHLOROBENZENE	106-46-7					8.0E+02	1/01			1.1E-05	4.0E-02	4/99 [1/91]			1
3,3-DICHLOROBENZIDINE	91-94-1									3.4E-04	1.2E+00	4/99 [1/91]			1
1,1,-DICHLOROETHANE (Ethylidene dichloride)	75-34-3									1.6E-06	5.7E-03	4/99			1
1,1-DICHLOROETHYLENE … (see Vinylidene Chloride)															
DI(2-ETHYLHEXYL)PHTHALATE (DEHP)	117-81-7									2.4E-06	8.4E-03	4/99 [1/92]	8.4E-03	10/00	1
DIESEL EXHAUST … (see Particulate Emissions from Diesel-Fueled Engines)															
DIETHANOLAMINE	111-42-2					3.0E+00	12/01								
p-DIMETHYLAMINOAZOBENZENE	60-11-7									1.3E-03	4.6E+00	4/99			1
N,N-DIMETHYL FORMAMIDE	68-12-2					8.0E+01	1/01								1
2,4-DINITROTOLUENE	121-14-2									8.9E-05	3.1E-01	4/99			1
1,4-DIOXANE: (1,4-Diethylene dioxide)	123-91-1	3.0E+03	4/99			3.0E+03	4/00			7.7E-06	2.7E-02	4/99 [1/91]			1
EPICHLOROHYDRIN (1-Chloro-2,3-epoxypropane)	106-89-8	1.3E+03	4/99			3.0E+00	1/01			2.3E-05	8.0E-02	4/99 [1/92]			1
1,2-EPOXYBUTANE	106-88-7					2.0E+01	1/01								1
ETHYL BENZENE	100-41-4					2.0E+03	2/00			2.5E-06	8.7E-3	11/07			1
ETHYL CHLORIDE (Chloroethane)	75-00-3					3.0E+04	4/00								1
ETHYLENE DIBROMIDE[TAC] (1,2-Dibromoethane)	106-93-4					8.0E-01	12/01			7.1E-05 TAC	2.5E-01	7/85			1
ETHYLENE DICHLORIDE[TAC] (1,2-Dichloroethane)	107-06-2					4.0E+02	1/01			2.1E-05 TAC	7.2E-02	9/85			1

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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	M[e] W A F
ETHYLENE GLYCOL	107-21-1					4.0E+02	4/00								1
ETHYLENE GLYCOL BUTYL ETHER … (see Glycol ethers)															
ETHYLENE OXIDE[TAC] (1,2-Epoxyethane)	75-21-8					3.0E+01	1/01			8.8E-05 TAC	3.1E-01	11/87			1
ETHYLENE THIOUREA	96-45-7									1.3E-05	4.5E-02	4/99			1
Fluorides and compounds	1101	*2.4E+02*	*4/99*			1.3E+01	8/03	4.0E-02	8/03						*1*
HYDROGEN FLUORIDE (Hydrofluoric acid)	7664-39-3	2.4E+02	4/99			1.4E+01	8/03	4.0E-02	8/03						1
FORMALDEHYDE[TAC]	50-00-0	5.5E+01	12/08	9.0E+00	12/08	9.0E+00	12/08			6.0E-06 TAC	2.1E-02	3/92			1
GLUTARALDEHYDE	111-30-8					8.0E-02	1/01								1
GLYCOL ETHERS	1115														1
ETHYLENE GLYCOL BUTYL ETHER – EGBE	111-76-2	4.7E+03	5/18	1.64E+02	5/18	8.2E+01	5/18								1
ETHYLENE GLYCOL ETHYL ETHER – EGEE	110-80-5	3.7E+02	4/99[1/92]			7.0E+01	2/00								1
ETHYLENE GLYCOL ETHYL ETHER ACETATE – EGEEA	111-15-9	1.4E+02	4/99			3.0E+02	2/00								1
ETHYLENE GLYCOL METHYL ETHER – EGME	109-86-4	9.3E+01	4/99			6.0E+01	2/00								1
ETHYLENE GLYCOL METHYL ETHER ACETATE – EGMEA	110-49-6					9.0E+01	2/00								1
HEXACHLOROBENZENE	118-74-1									5.1E-04	1.8E+00	4/99 [1/91]			1
HEXACHLOROCYCLOHEXANES (mixed or technical grade)	608-73-1									1.1E-03	4.0E+00	4/99 [1/91]	4.0E+00	10/00 [1/92]	1
alpha-HEXACHLOROCYCLOHEXANE	319-84-6									1.1E-03	4.0E+00	4/99 [1/91]	4.0E+00	10/00 [1/92]	1
beta-HEXACHLOROCYCLOHEXANE	319-85-7									1.1E-03	4.0E+00	4/99 [1/91]	4.0E+00	10/00 [1/92]	1
gamma-HEXACHLOROCYCLOHEXANE (Lindane)	58-89-9									3.1E-04	1.1E+00	4/99	1.1E+00	10/00	1
1,6-HEXAMETHYLENE DIISOCYANATE (monomer)[n]	822-06-0	0.3	9/19	0.06	9/19	0.03	9/19								1
n-HEXANE	110-54-3					7.0E+03	4/00								1
HYDRAZINE	302-01-2					2.0E-01	1/01			4.9E-03	1.7E+01	4/99 [7/90]			1
HYDROCHLORIC ACID (Hydrogen chloride)	7647-01-0	2.1E+03	4/99			9.0E+00	2/00								1

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HYDROGEN BROMIDE … (see Bromine & Compounds)															
HYDROGEN CYANIDE … (see Cyanide & Compounds)															
HYDROGEN FLUORIDE … (see Fluorides & Compounds)															
HYDROGEN SELENIDE … (see Selenium & Compounds)															
HYDROGEN SULFIDE	7783-06-4	4.2E+01	4/99[7/90]			1.0E+01	4/00								1
ISOPHORONE	78-59-1					2.0E+03	12/01								
ISOPROPYL ALCOHOL (Isopropanol)	67-63-0	3.2E+03	4/99			7.0E+03	2/00								1
LEAD AND COMPOUNDS[TAC, h] (inorganic) *values also apply to:*	7439-92-1 1128 [1130]									1.2E-05 TAC	4.2E-02	4/97	8.5E-03	10/00	1
Lead acetate	*301-04-2*									*1.2E-05 TAC*	*4.2E-02*	*4/97*	*8.5E-03*	*10/00*	*0.637*
Lead phosphate	*7446-27-7*									*1.2E-05 TAC*	*4.2E-02*	*4/97*	*8.5E-03*	*10/00*	*0.7659*
Lead subacetate	*1335-32-6*									*1.2E-05 TAC*	*4.2E-02*	*4/97*	*8.5E-03*	*10/00*	*0.7696*
LINDANE ... (see gamma-Hexachlorocyclohexane)															
MALEIC ANHYDRIDE	108-31-6					7.0E-01	12/01								1
MANGANESE AND COMPOUNDS	7439-96-5 [1132]			1.7E-01	12/08	9.0E-02	12/08								1
MERCURY AND COMPOUNDS (INORGANIC)	7439-97-6 [1133]	6.0E-01	12/08	6.0E-02	12/08	3.0E-02	12/08	1.6E-04	12/08						1
Mercuric chloride	*7487-94-7*	*6.0E-01*	*12/08*	*6.0E-02*	*12/08*	*3.0E-02*	*12/08*	*1.6E-04*	*12/08*						*1*
METHANOL	67-56-1	2.8E+04	4/99			4.0E+03	4/00								1
METHYL BROMIDE (Bromomethane)	74-83-9	3.9E+03	4/99			5.0E+00	2/00								1
METHYL tertiary-BUTYL ETHER	1634-04-4					8.0E+03	2/00			2.6E-07	1.8E-03	11/99			1
METHYL CHLOROFORM (1,1,1-Trichloroethane)	71-55-6	6.8E+04	4/99			1.0E+03	2/00								1
METHYL ETHYL KETONE (2-Butanone)	78-93-3	1.3E+04	4/99												1
METHYL ISOCYANATE	624-83-9					1.0E+00	12/01								1
4,4'-METHYLENE BIS (2-CHLOROANILINE) (MOCA)	101-14-4									4.3E-04	1.5E+00	4/99			1
METHYLENE CHLORIDE[TAC] (Dichloromethane)	75-09-2	1.4E+04	4/99			4.0E+02	2/00			1.0E-06 TAC	3.5E-03	7/89			1
4,4'-METHYLENE DIANILINE (AND ITS DICHLORIDE)	101-77-9					2.0E+01	12/01			4.6E-04	1.6E+00	4/99	1.6E+00	10/00	1

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METHYLENE DIPHENYL DIISOCYANATE	101-68-8	1.2E+01	3/16	1.6E-01	3/16	8.0E-02	3/16								1
MICHLER'S KETONE (4,4'-Bis(dimethylamino)benzophenone)	90-94-8									2.5E-04	8.6E-01	4/99			1
N-NITROSODI-n-BUTYLAMINE	924-16-3									3.1E-03	1.1E+01	4/99 [1/92]			1
N-NITROSODI-n-PROPYLAMINE	621-64-7									2.0E-03	7.0E+00	4/99 [1/91]			1
N-NITROSODIETHYLAMINE	55-18-5									1.0E-02	3.6E+01	4/99 [1/91]			1
N-NITROSODIMETHYLAMINE	62-75-9									4.6E-03	1.6E+01	4/99 [1/91]			1
N-NITROSODIPHENYLAMINE	86-30-6									2.6E-06	9.0E-03	4/99			1
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6									6.3E-03	2.2E+01	4/99 [7/90]			1
N-NITROSOMORPHOLINE	59-89-2									1.9E-03	6.7E+00	4/99 [7/92]			1
N-NITROSOPIPERIDINE	100-75-4									2.7E-03	9.4E+00	4/99 [7/92]			1
N-NITROSOPYRROLIDINE	930-55-2									6.0E-04	2.1E+00	4/99 [7/90]			1
NAPHTHALENE ... (see Polycyclic aromatic hydrocarbons)															
NICKEL AND COMPOUNDS[TAC] *values also apply to:*	7440-02-0 [1145]	2.0E-01	3/12	6.0E-02	3/12	1.4E-02	3/12	1.1E-02	3/12	2.6E-04 TAC	9.1E-01	8/91			1
Nickel acetate	*373-02-4*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.3321*
Nickel carbonate	*3333-67-3*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.4945*
Nickel carbonyl	*13463-39-3*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.3438*
Nickel hydroxide	*12054-48-7*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.6332*
Nickelocene	*1271-28-9*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.4937*
NICKEL OXIDE	1313-99-1	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	2.0E-02	3/12	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			0.7859
Nickel refinery dust from the pyrometallurgical process	*1146*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*1*
Nickel subsulfide	*12035-72-2*	*2.0E-01*	*3/12*	*6.0E-02*	*3/12*	*1.4E-02*	*3/12*	*1.1E-02*	*3/12*	*2.6E-04 TAC*	*9.1E-01*	*8/91*			*0.2443*
NITRIC ACID	7697-37-2	8.6E+01	4/99												1
NITROGEN DIOXIDE	10102-44-0	4.7E+02	4/99[1/92]												1
p-NITROSODIPHENYLAMINE	156-10-5									6.3E-06	2.2E-02	4/99			1
OZONE	10028-15-6	1.8E+02	4/99[1/92]												1

Table last updated: October 2, 2020

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	8-Hour Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk (µg/m³)⁻¹	Inhalation[d] Cancer Potency Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	Oral Slope Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	MeWAF
PARTICULATE EMISSIONS FROM DIESEL-FUELED ENGINES[TAC, i]	9901					5.0E+00 TAC	8/98			3.0E-04 TAC	1.1E+00	8/98			1
PENTACHLOROPHENOL ... (see Chlorophenols)															
PERCHLOROETHYLENE[TAC] (Tetrachloroethylene)	127-18-4	2.0E+04	4/99			3.5E+01 TAC	10/91			6.1E-06 TAC	2.1E-02	10/91			1
PHENOL	108-95-2	5.8E+03	4/99			2.0E+02	4/00								1
PHOSGENE	75-44-5	4.0E+00	4/99												1
PHOSPHINE	7803-51-2					8.0E-01	9/02								1
PHOSPHORIC ACID	7664-38-2					7.0E+00	2/00								1
PHTHALIC ANHYDRIDE	85-44-9					2.0E+01	1/01								1
PCB (POLYCHLORINATED BIPHENYLS) (unspeciated mixture) [j]	1336-36-3									2.0E-05 [lowest risk] 1.1E-04 [low risk] 5.7E-04 [high risk]	7.0E-02 [lowest risk] 4.0E-01 [low risk] 2.0E+00 [high risk]	4/99	7.0E-02 [lowest risk] 4.0E-01 [low risk] 2.0E+00 [high risk]	10/00	1
PCB (POLYCHLORINATED BIPHENYLS (speciated)[k]															
3,3',4,4'-TETRACHLOROBIPHENYL (PCB 77)	32598-13-3					4.0E-01	8/03	1.0E-04	8/03	3.8E-03	1.3E+01	8/03	1.3E+01	8/03	1
3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)	70362-50-4					1.3E-01	1/11	3.3E-05	1/11	1.1E-02	3.9E+01	1/11	3.9E+01	1/11	1
2,3,3',4,4'-PENTACHLOROBIPHENYL (PCB 105)	32598-14-4					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
2,3,4,4',5-PENTACHLOROBIPHENYL (PCB 114)	74472-37-0					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)	31508-00-6					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
2,3',4,4',5'-PENTACHLOROBIPHENYL (PCB 123)	65510-44-3					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)	57465-28-8					4.0E-04	8/03	1.0E-07	8/03	3.8E+00	1.3E+04	8/03	1.3E+04	8/03	1
2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)	38380-08-4					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	MWAF[e]
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)	69782-90-7					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)	52663-72-6					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)	32774-16-6					1.3E-03	1/11	3.3E-07	1/11	1.1E+00	3.9E+03	1/11	3.9E+03	1/11	1
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (PCB 189)	39635-31-9					1.3E+00	1/11	3.3E-04	1/11	1.1E-03	3.9E+00	1/11	3.9E+00	1/11	1
POLYCHLORINATED DIBENZO-*P*-DIOXINS (PCDD) (Treated as 2,3,7,8-TCDD for HRA)[TAC, k]	1085 1086					4.0E-05	2/00	1.0E-08	10/00	3.8E+01 TAC	1.3E+05	8/86	1.3E+05 TAC	8/86	1
2,3,7,8-TETRACHLORODIBENZO-*P*-DIOXIN[TAC]	1746-01-6					4.0E-05	2/00	1.0E-08	10/00	3.8E+01 TAC	1.3E+05	8/86	1.3E+05 TAC	8/86	1
1,2,3,7,8-PENTACHLORODIBENZO-*P*-DIOXIN	40321-76-4					4.0E-05	8/03	1.0E-08	8/03	3.8E+01	1.3E+05	8/03	1.3E+05	8/03	1
1,2,3,4,7,8-HEXACHLORODIBENZO-*P*-DIOXIN	39227-28-6					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,6,7,8-HEXACHLORODIBENZO-*P*-DIOXIN	57653-85-7					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,7,8,9-HEXACHLORODIBENZO-*P*-DIOXIN	19408-74-3					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,4,6,7,8-HEPTACHLORODIBENZO-*P*-DIOXIN	35822-46-9					4.0E-03	2/00	1.0E-06	10/00	3.8E-01	1.3E+03	4/99	1.3E+03	10/00	1
1,2,3,4,6,7,8,9-OCTACHLORODIBENZO-*P*-DIOXIN	3268-87-9					1.3E-01	1/11	3.3E-05	1/11	1.1E-02	3.9E+01	1/11	3.9E+01	1/11	1
POLYCHLORINATED DIBENZOFURANS (PCDF)[TAC, k] (Treated as 2,3,7,8-TCDD for HRA)	1080					4.0E-05	2/00	1.0E-08	10/00	3.8E+01 TAC	1.3E+05	8/86	1.3E+05 TAC	8/86	1
2,3,7,8-TETRACHLORODIBENZOFURAN	5120-73-19					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,7,8-PENTACHLORODIBENZOFURAN	57117-41-6					1.3E-03	1/11	3.3E-07	1/11	1.1E+00	3.9E +03	1/11	3.9E +03	1/11	1
2,3,4,7,8-PENTACHLORODIBENZOFURAN	57117-31-4					1.3E-04	1/11	3.3E-08	1/11	1.1E+01	3.9E +04	1/11	3.9E +04	1/11	1
1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	70648-26-9					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	57117-44-9					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1

Table last updated: October 2, 2020

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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	8-Hour Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk (µg/m³)⁻¹	Inhalation[d] Cancer Potency Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	Oral Slope Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	MWAF[e]
1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	72918-21-9					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	60851-34-5					4.0E-04	2/00	1.0E-07	10/00	3.8E+00	1.3E+04	4/99	1.3E+04	10/00	1
1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	67562-39-4					4.0E-03	2/00	1.0E-06	10/00	3.8E-01	1.3E+03	4/99	1.3E+03	10/00	1
1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	55673-89-7					4.0E-03	2/00	1.0E-06	10/00	3.8E-01	1.3E+03	4/99	1.3E+03	10/00	1
1,2,3,4,6,7,8,9-OCTACHLORODIBENZOFURAN	39001-02-0					1.3E-01	1/11	3.3E-05	1/11	1.1E-02	3.9E +01	1/11	3.9E +01	1/11	1
POLYCYCLIC AROMATIC HYDROCARBON (PAH)[l] [Treated as B(a)P for HRA][l]	1150 1151									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
BENZ(A)ANTHRACENE[l]	56-55-3									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
BENZO(A)PYRENE[l]	50-32-8									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
BENZO(B)FLUORANTHENE[l]	205-99-2									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
BENZO(J)FLUORANTHENE[l]	205-82-3									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
BENZO(K)FLUORANTHENE[l]	207-08-9									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
CHRYSENE[l]	218-01-9									1.1E-05	3.9E-02	4/99 [4/94]	1.2E-01	10/00 [4/94]	1
DIBENZ(A,H)ACRIDINE[l]	226-36-8									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
DIBENZ(A,H)ANTHRACENE[l]	53-70-3									1.2E-03	4.1E+00	4/99 [4/94]	4.1E+00	10/00 [4/94]	1
DIBENZ(A,J)ACRIDINE[l]	224-42-0									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
DIBENZO(A,E)PYRENE[l]	192-65-4									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
DIBENZO(A,H)PYRENE[l]	189-64-0									1.1E-02	3.9E+01	4/99 [4/94]	1.2E+02	10/00 [4/94]	1

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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	8-Hour Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Inhalation (µg/m³)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk (µg/m³)⁻¹	Inhalation[d] Cancer Potency Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	Oral Slope Factor (mg/kg-d)⁻¹	Date[c] Value Reviewed [Added]	MeWAF
DIBENZO(A,I)PYRENE[l]	189-55-9									1.1E-02	3.9E+01	4/99 [4/94]	1.2E+02	10/00 [4/94]	1
DIBENZO(A,L)PYRENE[l]	191-30-0									1.1E-02	3.9E+01	4/99 [4/94]	1.2E+02	10/00 [4/94]	1
7H-DIBENZO(C,G)CARBAZOLE[l]	194-59-2									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
7,12-DIMETHYLBENZ(A)ANTHRACENE[l]	57-97-6									7.1E-02	2.5E+02	4/99 [4/94]	2.5E+02	10/00 [4/94]	1
1,6-DINITROPYRENE[l]	42397-64-8									1.1E-02	3.9E+01	4/99 [4/94]	1.2E+02	10/00 [4/94]	1
1,8-DINITROPYRENE[l]	42397-65-9									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
INDENO(1,2,3-C,D)PYRENE[l]	193-39-5									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
3-METHYLCHOLANTHRENE[l]	56-49-5									6.3E-03	2.2E+01	4/99 [4/94]	2.2E+01	10/00 [4/94]	1
5-METHYLCHRYSENE[l]	3697-24-3									1.1E-03	3.9E+00	4/99 [4/94]	1.2E+01	10/00 [4/94]	1
NAPHTHALENE	91-20-3					9.0E+00	4/00			3.4E-05	1.2E-01	8/04			1
5-NITROACENAPHTHENE[l]	602-87-9									3.7E-05	1.3E-01	4/99 [4/94]	1.3E-01	10/00 [4/94]	1
6-NITROCHRYSENE[l]	7496-02-8									1.1E-02	3.9E+01	4/99 [4/94]	1.2E+02	10/00 [4/94]	1
2-NITROFLUORENE[l]	607-57-8									1.1E-05	3.9E-02	4/99 [4/94]	1.2E-01	10/00 [4/94]	1
1-NITROPYRENE[l]	5522-43-0									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
4-NITROPYRENE[l]	57835-92-4									1.1E-04	3.9E-01	4/99 [4/94]	1.2E+00	10/00 [4/94]	1
POTASSIUM BROMATE.... ... (see Bromine & Compounds)															
1,3-PROPANE SULTONE	1120-71-4									6.9E-04	2.4E+00	4/99			1
PROPYLENE (PROPENE)	115-07-1					3.0E+03	4/00								1
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2					7.0E+03	2/00								1
PROPYLENE OXIDE	75-56-9	3.1E+03	4/99			3.0E+01	2/00			3.7E-06	1.3E-02	4/99 [7/90]			1
SELENIUM AND COMPOUNDS[m]	7782-49-2 [1170]					2.0E+01	12/01	5.0E-03	12/01						1
HYDROGEN SELENIDE	7783-07-5	5.0E+00	4/99												1
Selenium sulfide	*7446-34-6*					*2.0E+01*	*12/01*	*5.0E-03*	*12/01*						*1*

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Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	MWAF[e]
SILICA [CRYSTALLINE, RESPIRABLE]	1175					3.0E+00	2/05								1
SODIUM HYDROXIDE	1310-73-2	8.0E+00	4/99												1
STYRENE	100-42-5	2.1E+04	4/99			9.0E+02	4/00								1
SULFATES	9960	1.2E+02	4/99												1
SULFUR DIOXIDE	7446-09-5	6.6E+02	4/99[1/92]												1
SULFURIC ACID	7664-93-9	1.2E+02	4/99			1.0E+00	12/01								1
SULFUR TRIOXIDE	*7446-71-9*	*1.2E+02*	*4/99*			*1.0E+00*	*12/01*								*1*
OLEUM	8014-95-7	1.2E+02	4/99												1
TERTIARY BUTYL-ACETATE (TBAc)	540-88-5									1.3E-06	4.7E-03	8/18	5.0E-03	8/18	1
1,1,2,2-TETRACHLOROETHANE	79-34-5									5.8E-05	2.0E-01	4/99			1
TETRACHLOROPHENOLS ... (see Chlorophenols)															
2,4,5-TRICHLOROPHENOL ... (see Chlorophenols)															
2,4,6-TRICHLOROPHENOL ... (see Chlorophenols)															
THIOACETAMIDE	62-55-5									1.7E-03	6.1E+00	4/99			1
TOLUENE	108-88-3	5.0E+03	8/20	8.3E+02	8/20	4.2E+02	8/20								1
Toluene diisocyantates	*26471-62-5*	*2.0E+00*	*3/16*	*1.5E-02*	*3/16*	*8.0E-03*	*3/16*			*1.1E-05*	*3.9E-02*	*4/99*			*1*
TOLUENE-2,4-DIISOCYANATE	584-84-9	*2.0E+00*	3/16	1.5E-02	3/16	8.0E-03	3/16			1.1E-05	3.9E-02	4/99			1
TOLUENE-2,6-DIISOCYANATE	91-08-7	*2.0E+00*	3/16	1.5E-02	3/16	8.0E-03	3/16			1.1E-05	3.9E-02	4/99			1
1,1,2-TRICHLOROETHANE (Vinyl trichloride)	79-00-5									1.6E-05	5.7E-02	4/99			1
TRICHLOROETHYLENE[TAC]	79-01-6					6.0E+02	4/00			2.0E-06 TAC	7.0E-03	10/90			1
TRIETHYLAMINE	121-44-8	2.8E+03	4/99			2.0E+02	9/02								1
URETHANE (Ethyl carbamate)	51-79-6									2.9E-04	1.0E+00	4/99 [7/90]			1
Vanadium Compounds	*N/A*														*1*
Vanadium (fume or dust)	*7440-62-2*	*3.0E+01*	*4/99*												*1*
VANADIUM PENTOXIDE	1314-62-1	3.0E+01	4/99												1
VINYL ACETATE	108-05-4					2.0E+02	12/01								1
VINYL CHLORIDE[TAC] (Chloroethylene)	75-01-4	1.8E+05	4/99							7.8E-05 TAC	2.7E-01	12/90			1
VINYLIDENE CHLORIDE (1,1-Dichloroethylene)	75-35-4					7.0E+01	1/01								1

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

Substance	Chemical[b] Abstract Number	Noncancer Effects								Cancer Risk					
		Acute Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	8-Hour Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Inhalation ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Chronic Oral (mg/kg-d)	Date[c] Value Reviewed [Added]	Inhalation[d] Unit Risk $(\mu g/m^3)^{-1}$	Inhalation[d] Cancer Potency Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	Oral Slope Factor $(mg/kg\text{-}d)^{-1}$	Date[c] Value Reviewed [Added]	MWAF[e]
XYLENES (mixed isomers)	1330-20-7	2.2E+04	4/99			7.0E+02	4/00								1
m-XYLENE	108-38-3	2.2E+04	4/99			7.0E+02	4/00								1
o-XYLENE	95-47-6	2.2E+04	4/99			7.0E+02	4/00								1
p-XYLENE	106-42-3	2.2E+04	4/99			7.0E+02	4/00								1

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

Purpose:	The purpose of this reference table is to provide a quick list of all health values that have been approved by the Office of Environmental Health Hazard Assessment (OEHHA) and the Air Resources Board (ARB) for use in facility health risk assessments conducted for the AB 2588 Air Toxics Hot Spots Program. The OEHHA has developed and adopted new risk assessment guidelines that update and replace the California Air Pollution Control Officers Association's (CAPCOA) *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993*. The OEHHA has adopted three technical support documents for these guidelines, which can be found on their website (http://www.oehha.ca.gov/air/hot_spots/index.html). This table lists the OEHHA adopted inhalation and oral cancer slope factors, noncancer acute Reference Exposure Levels (RELs), and inhalation and oral noncancer chronic RELs. OEHHA is still in the process of adopting new health values. Therefore, new health values will periodically be added to, or deleted from, this table. Users of this table are advised to monitor the OEHHA website (*www.oehha.ca.gov*) for any updates to the health values. May 2008 update: The Air Resources Board adopted amendments to the AB 2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation (Title 17, California Code of Regulations, Section 93300.5) on November 16, 2006. The amendments became effective on September 26, 2007, after approval from the Office of Administrative Law. Under the new amendments, the substances previously listed in Appendix A-I *(Substances For Which Emissions Must Be Quantified*) and Appendix F (*Criteria For Inputs For Risk Assessment Using Screening Air Dispersion Modeling*) of the ARB's *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) (July 1997)* have been removed from this table.
a	The *italic* font used in this table clarify applicability of OEHHA adopted health effects values to individual or grouped substances listed in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines*, Appendix A-I list of *"Substances For Which Emissions Must Be Quantified"*.
b	Chemical Abstract Service Number (CAS): For chemical groupings and mixtures where a CAS number is not applicable, the 4-digit code used in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) Report* is listed. The 4-digit codes enclosed in brackets [ ] are codes that have been phased out, but may still appear on previously reported Hot Spots emissions. For information on the origin and use of the 4-digit code, see the EICG report.

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

c Date Value Reviewed [Added]: These columns list the date that the health value was last reviewed by OEHHA, and/or the Scientific Review Panel, and/or approved for use in the AB 2588 Air Toxics Hot Spots Program. If the health value is unchanged since it was first approved for use in the Hot Spots Program, then the date that the value was first approved for use by CAPCOA is listed within the brackets [ ].

- April 1999 is listed for the cancer potency values and noncancer acute RELs, which have been adopted by the OEHHA as part of the AB 2588 Hot Spot Risk Assessment Guidelines.
- February 2000, April 2000, January 2001, and December 2001 are listed for the first set of 22, the second set of 16, the third set of 22, and the fourth set of 12 noncancer chronic RELs, respectively. The chronic REL for carbon disulfide was adopted in May 2002. Chronic RELs for phosphine and triethylamine were adopted in September 2002. Chronic RELs for fluorides including hydrogen fluoride were adopted August 2003. Chronic REL for silica [crystalline respirable] was adopted February 2005.
- October 2000 is listed for the oral chronic RELs and oral cancer slope factors.
- Cancer potency value adopted for naphthalene in August 2004. The inhalation and oral cancer potency values for ethyl benzene were adopted in November 2007.
- For the substances identified as Toxic Air Contaminants, the Air Resources Board hearing date is listed. The dates for acetaldehyde, benzo[a]pyrene, and methyl tertiary-butyl ether represent the dates the values were approved by the Scientific Review Panel.
- On December 19, 2008, OEHHA adopted new acute, 8-hour, and chronic RELs for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury. The most current health values can be found at: http://www.oehha.ca.gov/air/allrels.html.

  Note: 1. We present the new oral RELs only in milligrams (mg/kg-d), although OEHHA has presented them in other tables in either micrograms (μg/kg-d) or milligrams.

  2. All acute RELs use a 1-hour averaging period (OEHHA, 2008). RELs which were developed using earlier guidelines and specified a different averaging time are unchanged in concentration value, but now refer to the 1-hour averaging period. As of 8/1/2013, the affected chemicals are: benzene, carbon disulfide, carbon tetrachloride, chloroform, ethylene glycol monoethyl ether, ethylene glycol monoethyl ether acetate, and ethylene glycol monomethyl ether: These may be replaced by updated RELs following the OEHHA (2008) guidelines in due course.

  3. At OEHHA's direction, the chronic oral REL for arsenic does not apply to arsine because arsine is a gas and not particle associated.
- OEHHA's adoption of the World Health Organization's 2005 Toxicity Equivalency Factors for polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs), and dioxin-like polychlorinated biphenyls (PCBs) occurred in January 2011. See Appendix C of OEHHA's *Air Toxics Hot Spots Program Technical Support Document for Cancer Potencies* at http://www.oehha.ca.gov/air/hot_spots/pdf/AppCdioxinTEFs013111.pdf for more information.
- On March 23, 2012, OEHHA adopted revised acute, 8-hour and chronic RELs for nickel and nickel compounds. The values of the RELs are listed in the table at: http://www.oehha.ca.gov/air/chronic_rels/032312CREL.html.
- On July 29, 2013, OEHHA adopted an acute and 8-hour REL, and a revised chronic REL for 1,3-butadiene. The REL values and summary can be found online at: http://www.oehha.ca.gov/air/hot_spots/index.html.
- On October 18, 2013 (February 2014 table update), OEHHA adopted acute, 8-hour, and chronic RELs for caprolactam. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/pdf/Caprolactam2013.pdf. Changes have been made to target organs to the following substances with no change to health factors: Chloroform, Diethanolamine, Fluorides and Hydrogen Fluoride, Methylene Chloride, Styrene, Xylenes. The "date added" in this table reflects the date of the health factor only.
- On June 27, 2014, OEHHA adopted a new 8-hour REL and revised acute and chronic RELs for benzene. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/BenzeneJune2014.html.
- On March 28, 2016, OEHHA adopted new and revised RELs for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI). The REL values and summaries can be found at: http://www.oehha.ca.gov/air/chronic_rels/032816TDI_MDI_RELs.html. On March 30, 2016, the name of MDI was changed from methylene diphenyl isocyanate to a more accurate name: methylene diphenyl diisocyanate.
- On September 8, 2016, OEHHA adopted an updated inhalation cancer unit risk factor (URF) for perchloroethylene (PCE or tetrachloroethylene). The updated URF and summary can be found at: http://oehha.ca.gov/air/crnr/notice-adoption-inhalation-cancer-unit-risk-factor-perchloroethylene.
- On February 21, 2017, OEHHA adopted new acute, 8-hour, and chronic inhalation RELs for carbonyl sulfide. The REL values and summary can be found at: http://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-carbonyl-sulfide.
- On May 4 2018, OEHHA adopted new 8-hour and chronic inhalation REL, and a revised acute REL for ethylene glycol butyl ether. The REL values and summary can be found at: https://oehha.ca.gov/air/chemicals/ethylene-glycol-monobutyl-ether.
- On August 16, 2018 OEHHA adopted an inhalation URF, inhalation cancer potency factor, and oral cancer potency factor for tertiary-butyl acetate (TBAc). Although OEHHA has adopted an oral cancer potency value for tertiary butyl acetate, its chemical/biological properties do not fit the multipathway scheme. Therefore, non-inhalation pathway risks calculated from this value will be zero because the transfer factors are set to zero. Please contact OEHHA for more information. The values can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-cancer-inhalation-unit-risk-and-slope-factors-and-cancer-oral-slope-factor
- On September 6, 2019, OEHHA adopted new RELs for xexamethylene diisocyanate. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-hexamethylene-diisocyanate.
- On August 20, 2020, OEHHA adopted new and revised RELs for toluene. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-toluene.
- On October 2, 2020, OEHHA adopted a new inhalation URF for Cobalt. The updated URF and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-cancer-inhalation-unit-risk-factors-cobalt-and-cobalt-compounds

d Inhalation cancer potency factor: The "unit risk factor" has been replaced in the new risk assessment algorithms by a factor called the "inhalation cancer potency factor". Inhalation cancer potency factors are expressed as units of inverse dose [i.e., $(mg/kg\text{-}day)^{-1}$]. They were derived from unit risk factors [units = $(ug/m^3)^{-1}$] by assuming that a receptor weighs 70 kilograms and breathes 20 cubic meters of air per day. The inhalation potency factor is used to calculate a potential inhalation cancer risk using the new risk assessment algorithms defined in the OEHHA, *Air Toxics Hot Spots Program; Technical Support Document for Exposure Assessment and Stochastic Analysis (August 2012)*.

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

e	Molecular Weight Adjustment Factor: For most of the Hot Spots toxic metals, the OEHHA cancer potency factors and noncancer RELs apply to the weight of the toxic metal atom contained in the overall compound. Some of the Hot Spots compounds contain various elements along with the toxic metal atom (e.g., "Nickel hydroxide", CAS number 12054-48-7, has a formula of H2NiO2). Therefore, an adjustment to the reported pounds of the overall compound is needed before applying the OEHHA cancer potency factor and noncancer RELs for "Nickel and compounds" to such a compound. This ensures that the cancer potency factor and noncancer RELs are applied only to the fraction of the overall weight of the emissions that are associated with health effects of the metal. In other cases, the Hot Spots metals are already reported as the metal atom equivalent (e.g., CAS 7440-02-0, "Nickel"), and these cases do not use any further molecular weight adjustment. (Refer to Note [7] in Appendix A, List of Substances in the EICG Report for further information on how the emissions of various Hot Spots metal compounds are reported.) The appropriate molecular weight adjustment factors (MWAF) to be used along with the OEHHA cancer potency factors and noncancer RELs for Hot Spots metals can be found in the MWAF column of this table. So, for example, assume that 100 pounds of "Nickel hydroxide" emissions are reported under CAS number 12054-48-7. To get the Nickel atom equivalent of these emissions, multiply by the listed MWAF (0.6332) for Nickel hydroxide: • 100 pounds x 0.6332 = 63.32 pounds of Nickel atom equivalent. This step should be completed prior to applying the OEHHA cancer potency factor and noncancer RELs for "Nickel and compounds" in a calculation for a prioritization score or risk assessment calculation. (Note -The HARP software automatically applies the appropriate MWAF for each Hot Spots chemical (by CAS number), so the emissions should not be manually adjusted when using HARP. Therefore, if using HARP, you would use 100 pounds for Nickel hydroxide and HARP will make the MWAF adjustment for you. If not using HARP, you would use 63.32 pounds.) For more information on MWAF please refer to Section 4.2.1.1.1 of OEHHA's document The Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual) (February 2015). Note: The value listed in the MWAF column for Asbestos is not a molecular weight adjustment. This is a conversion factor for adjusting mass and fibers or structures. See Appendix C of OEHHA's Guidance Manual (February 2015) for more information on Asbestos reporting and risk assessment information or see the EICG report for reporting guidance. Also see the Asbestos footnote (designated by the letter f).
TAC	Toxic Air Contaminant: The Air Resources Board has identified this substance as a Toxic Air Contaminant.
f	Asbestos: The units for the Inhalation Cancer Potency factor for asbestos are (100 PCM fibers/m^3)$^{-1}$. A conversion factor of 100 fibers/0.003 µg can be multiplied by a receptor concentration of asbestos expressed in µg/m^3. Unless other information necessary to estimate the concentration (fibers/m^3) of asbestos at receptors of interest is available. A unit risk factor of 1.9 E 10^{-4} (µg/m^3)$^{-1}$ and an inhalation cancer potency factor of 2.2 E 10^{+2} (mg/kg BW * day)$^{-1}$ are available. For more information on asbestos quantity conversion factors, see Appendix F of OEHHA's *The Air Toxics Hot Spots Program Risk Assessment Guidelines; Part II; Technical Support Document for Cancer Potency Factors (May 2009)*, and Appendix C of OEHHA's Guidance Manual (February 2015)
g	Hexavalent Chromium: In July 2011, OEHHA developed the oral cancer slope factor for chromium 6+ and compounds for the California Public Health Goal in drinking water. As of February 2014, OEHHA states it should also be used for the Hot Spots program.
h	Inorganic Lead: Inorganic Lead was identified by the Air Resources Board as a Toxic Air Contaminant in April 1997. Since information on noncancer health effects show no identified threshold, no Reference Exposure Level has been developed. The document, *Risk Management Guidelines for New, Modified, and Existing Sources of Lead, March 2001*, has been developed by ARB and OEHHA staff for assessing noncancer health impacts from sources of lead. See Appendix F of OEHHA's document *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (2003)* for an overview of how to evaluate noncancer impacts from exposure to lead using these risk management guidelines.
i	Particulate Emissions from Diesel-Fueled Engines: The inhalation cancer potency factor was derived from whole diesel exhaust and should be used only for impacts from the inhalation pathway (based on diesel PM measurements). The inhalation impacts from speciated emissions from diesel-fueled engines are already accounted for in the inhalation cancer potency factor. However, at the discretion of the risk assessor, speciated emissions from diesel-fueled engines may be used to estimate acute noncancer health impacts or the contribution to cancer risk or chronic noncancer health impacts for the non-inhalation exposure pathway. See Appendix D of OEHHA's document *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (2003) for more information. The noncancer chronic REL for diesel exhaust is based on assumptions of contributions of diesel PM to ambient PM. It should be used with diesel PM measurement.
j	Cancer Potency Factors (CPFs) for unspeciated mixtures of Polychlorinated Biphenyls: High Risk: For use in cases where congeners with more than four chlorines comprise more than one-half percent of total polychlorinated biphenyls. Use as default CPF for Tier 1 assessments. Low Risk: This number would not ordinarily be used in the Hot Spots program. Lowest Risk: For use in cases where congeners with more than four chlorines comprise less than one-half percent of total polychlorinated biphenyls. As of February, 2014, there is no approved method that can be used to assess the noncancer hazard of an unspeciated PCB mixture. Persons preparing HRAs for the Hot Spots Program should consult with OEHHA and the local Air Pollution Control or Air Quality Management District if an assessment of the noncancer hazard for unspeciated PCB mixtures is needed.
k	Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans (also referred to as chlorinated dioxins and dibenzofurans) and dioxin-like PCB congeners: The OEHHA has adopted the World Health Organization 2005 (WHO-05) Toxicity Equivalency Factor scheme for evaluating the risk due to exposure to samples containing mixtures of polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) and a number of dioxin-like PCB congeners. See Appendix A of OEHHA's Technical Support Document For Describing Available Cancer Potency Factors for more information about the scheme. See Appendix C (revised 01/20/11) of OEHHA's Technical Support Document: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Exposures (2009) online at http://oehha.ca.gov/air/hot_spots/tsd052909.html for more information about the scheme. The two numbers (i.e., 1085 and 1086) in the column listing Chemical Abstracts Numbers are used for reporting and risk assessment purposes. Be sure to input emissions under the proper code when using the HARP software. ID code 1085 has no health values associated with it in the HARP software; therefore, no health impacts will be calculated when using ID 1085. See the Emissions Inventory Criteria and Guidelines for more information on reporting emissions.

Table 1
CONSOLIDATED TABLE OF OEHHA/ARB APPROVED RISK ASSESSMENT HEALTH VALUES[a]

l	Polycyclic Aromatic Hydrocarbons (PAHs): These substances are PAH or PAH-derivatives that have OEHHA-developed Potency Equivalency Factors (PEFs) which were approved by the Scientific Review Panel in April 1994 (see ARB document entitled *Benzo[a]pyrene as a Toxic Air Contaminant*). PAH inhalation slope factors listed here have been adjusted by the PEFs. See OEHHA's Technical Support Document: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Exposures (2009) for more information about the scheme. Section 8.2.3 and Appendix G of OEHHA's *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments (2003)* also contains information on PAHs. The two numbers (i.e., 1150 and 1151) in the column listing Chemical Abstracts Numbers are used for reporting and risk assessment purposes. Be sure to input emissions under the proper code when using the HARP software. ID code 1150 has no health values associated with it in the HARP software; therefore, no health impacts will be calculated when using ID 1150. See the Emissions Inventory Criteria and Guidelines for more information on reporting emissions.
m	SELENIUM AND COMPOUNDS: In February 2014, an oral REL was added to the consolidated table. The REL was adopted in Dec 2001, but could not be used by the Hot Spots Program (or HARP software) until transfer factors for the oral and dermal routes were adopted. Transfer factors are included in the OEHHA's Technical Support Document for Exposure Assessment and Stochastic Analysis (August 2012) and are added to the HARP software in March 2015.
n	1,6-HEXAMETHYLENE DIISOCYANATE (HDI): On September 19, 2019, acute, 8-hour, and chronic RELs were added to the table and HARP for the HDI (monomer). OEHHA adopted these RELs and others for HDI polyisocyanates on September 6, 2019. The Acute, 8-hour, and chronic RELs for HDI polyisocyanates will be added to the consolidated table and HARP when the Air Toxics "Hot Spots" Program Emission Inventory Criteria and Guidelines is updated to include HDI polyisocyanates.
N/A	Not Applicable.

Other Changes:

- 10/18/2010, removed CHLORODIFLUOROMETHANE, which should have been removed in May 2008.

February 2014:

- Removed applicability of oleum to the sulfuric acid chronic inhalation REL because oleum represents only an acute health hazard.
- Removed "METHYL MERCURY (see Mercury & Compounds)" entry because methyl mercury has different chemical properties, potency, and toxicity compared to elemental mercury and mercury salts, and it is not emitted directly from any California facilities.
- 9/1/2017, changed the "1101 Fluorides" entry back to "1101 Fluorides and compounds" to keep the consistency with the Emission Inventory Guidelines. The substance name for CAS# 1101 was changed from "Fluorides and compounds" as in 2002 to "Fluorides" in 2003 without footnotes about the change.

Table 2
OEHHA/ARB APPROVED ACUTE REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Service Number (CAS)	Acute REL ($\mu g/m^3$)	Date[c] Value Reviewed	Target Organs								
				Alimentary	Cardiovascular	Reproductive/[d] Development	Eye	Hematologic	Immune	Nervous	Respiratory	Skin
ACETALDEHYDE	75-07-0	4.7E+02	12/08				X				X	
ACROLEIN	107-02-8	2.5E+00	12/08				X				X	
ACRYLIC ACID	79-10-7	6.0E+03	4/99				X				X	
AMMONIA	7664-41-7	3.2E+03	4/99				X				X	
ARSENIC AND COMPOUNDS (INORGANIC)[TAC]	7440-38-2 1016 [1015]	2.0E-01	12/08		X	X				X		
ARSINE	7784-42-1	2.0E-01	12/08		X	X				X		
BENZENE[TAC]	71-43-2	2.7E+01	6/14			X		X	X			
BENZYL CHLORIDE	100-44-7	2.4E+02	4/99				X				X	
1,3-BUTADIENE[TAC]	106-99-0	6.6E+02	7/13			X						
CAPROLACTAM	105-60-2	5.0E+01	10/13				X					
CARBON DISULFIDE	75-15-0	6.2E+03	4/99			X				X		
CARBON MONOXIDE	630-08-0	2.3E+04	4/99		X							
CARBON TETRACHLORIDE[TAC] (Tetrachloromethane)	56-23-5	1.9E+03	4/99	X		X				X		
CARBONYL SULFIDE	463-58-1	6.6E+02	2/17							X		
CHLORINE	7782-50-5	2.1E+02	4/99				X				X	
CHLOROFORM[TAC]	67-66-3	1.5E+02	4/99			X				X	X	
CHLOROPICRIN	76-06-2	2.9E+01	4/99				X				X	
COPPER AND COMPOUNDS	7440-50-8 [1067]	1.0E+02	4/99								X	
Cyanide Compounds (inorganic)	*57-12-5 1073*	*3.4E+02*	*4/99*							✓		
HYDROGEN CYANIDE (Hydrocyanic acid)	74-90-8	3.4E+02	4/99							X		
1,4-DIOXANE (1,4-Diethylene dioxide)	123-91-1	3.0E+03	4/99				X				X	
EPICHLOROHYDRIN (1-Chloro-2,3-epoxypropane)	106-89-8	1.3E+03	4/99				X				X	
Fluorides and Compounds	*1101*	*2.4E+02*	*4/99*				✓				✓	
HYDROGEN FLUORIDE (Hydrofluoric acid)	7664-39-3	2.4E+02	4/99				X				X	
FORMALDEHYDE[TAC]	50-00-0	5.5E+01	12/08				X					

Last updated: August 21, 2020

Table 2
OEHHA/ARB APPROVED ACUTE REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Service Number (CAS)	Acute REL ($\mu g/m^3$)	Date[c] Value Reviewed	Target Organs								
				Alimentary	Cardiovascular	Reproductive/[d] Development	Eye	Hematologic	Immune	Nervous	Respiratory	Skin
GLYCOL ETHERS	1115											
ETHYLENE GLYCOL BUTYL ETHER – EGBE	111-76-2	4.7E+03	5/18				X				X	
ETHYLENE GLYCOL ETHYL ETHER – EGEE	110-80-5	3.7E+02	4/99 [1/92]			X						
ETHYLENE GLYCOL ETHYL ETHER ACETATE - EGEEA	111-15-9	1.4E+02	4/99			X				X		
ETHYLENE GLYCOL METHYL ETHER – EGME	109-86-4	9.3E+01	4/99			X						
1,6-HEXAMETHYLENE DIISOCYANATE[e] (monomer)	822-06-0	3.0E-01	9/19								X	
HYDROCHLORIC ACID (Hydrogen chloride)	7647-01-0	2.1E+03	4/99				X				X	
HYDROGEN CYANIDE (Hydrocyanic acid) (see Cyanide Compounds)												
HYDROGEN FLUORIDE (Hydrofluoric acid) (see Fluorides & Compounds)												
HYDROGEN SELENIDE (see Selenium & Compounds)												
HYDROGEN SULFIDE	7783-06-4	4.2E+01	4/99 [7/90]							X		
ISOPROPYL ALCOHOL (Isopropanol)	67-63-0	3.2E+03	4/99				X				X	
MERCURY AND COMPOUNDS (INORGANIC)	7439-97-6 [1133]	6.0E-01	12/08			X				X		
Mercuric chloride	*7487-94-7*	*6.0E-01*	*12/08*			✓				✓		
METHANOL	67-56-1	2.8E+04	4/99							X		
METHYL BROMIDE (Bromomethane)	74-83-9	3.9E+03	4/99			X				X	X	
METHYL CHLOROFORM (1,1,1-Trichloroethane)	71-55-6	6.8E+04	4/99							X		
METHYL ETHYL KETONE (2-Butanone)	78-93-3	1.3E+04	4/99				X				X	
METHYLENE CHLORIDE[TAC] (Dichloromethane)	75-09-2	1.4E+04	4/99		X					X		
METHYLENE DIPHENYL DIISOCYANATE	101-68-8	1.2E+01	3/16								X	
NICKEL AND COMPOUNDS[TAC]	7440-02-0 [1145]	2.0E-01	3/12						X			
Nickel acetate	*373-02-4*	*2.0E-01*	*3/12*						✓			
Nickel carbonate	*3333-67-3*	*2.0E-01*	*3/12*						✓			
Nickel carbonyl	*13463-39-3*	*2.0E-01*	*3/12*						✓			
Nickel hydroxide	*12054-48-7*	*2.0E-01*	*3/12*						✓			

Table 2
OEHHA/ARB APPROVED ACUTE REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Service Number (CAS)	Acute REL ($\mu g/m^3$)	Date[c] Value Reviewed	Target Organs								
				Alimentary	Cardiovascular	Reproductive/[d] Development	Eye	Hematologic	Immune	Nervous	Respiratory	Skin
Nickelocene	*1271-28-9*	*2.0E-01*	*3/12*						✓			
NICKEL OXIDE	*1313-99-1*	*2.0E-01*	*3/12*						✓			
Nickel refinery dust from the pyrometallurgical process	*1146*	*2.0E-01*	*3/12*						✓			
Nickel subsulfide	*12035-72-2*	*2.0E-01*	*3/12*						✓			
NITRIC ACID	7697-37-2	8.6E+01	4/99								X	
NITROGEN DIOXIDE	10102-44-0	4.7E+02	4/99 [1/92]								X	
OZONE	10028-15-6	1.8E+02	4/99 [1/92]				X				X	
PERCHLOROETHYLENE[TAC] (Tetrachloroethylene)	127-18-4	2.0E+04	4/99				X			X	X	
PHENOL	108-95-2	5.8E+03	4/99				X				X	
PHOSGENE	75-44-5	4.0E+00	4/99								X	
PROPYLENE OXIDE	75-56-9	3.1E+03	4/99			X	X				X	
Selenium and Compounds	*7782-49-2 [1170]*											
HYDROGEN SELENIDE	7783-07-5	5.0E+00	4/99				X				X	
SODIUM HYDROXIDE	1310-73-2	8.0E+00	4/99				X				X	X
STYRENE	100-42-5	2.1E+04	4/99			X	X				X	
SULFATES	9960	1.2E+02	4/99								X	
SULFUR DIOXIDE	7446-09-5	6.6E+02	4/99 [1/92]								X	
SULFURIC ACID	7664-93-9	1.2E+02	4/99								X	
SULFUR TRIOXIDE	*7446-71-9*	*1.2E+02*	*4/99*								✓	
OLEUM	8014-95-7	1.2E+02	4/99								X	
TOLUENE	108-88-3	5.0E+03	8/20				X			X	X	
Toluene diisocyanates	*26471-62-5*	*2.0E+00*	*3/16*								✓	
TOLUENE-2,4-DIISOCYANATE	584-84-9	2.0E+00	3/16								X	
TOLUENE-2,6-DIISOCYANATE	91-08-7	2.0E+00	3/16								X	
TRIETHYLAMINE	121-44-8	2.8E+03	4/99				X			X		
Vanadium Compounds	*N/A*											

Last updated: August 21, 2020

Table 2
OEHHA/ARB APPROVED ACUTE REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Service Number (CAS)	Acute REL ($\mu g/m^3$)	Date[c] Value Reviewed	Target Organs								
				Alimentary	Cardiovascular	Reproductive/[d] Development	Eye	Hematologic	Immune	Nervous	Respiratory	Skin
Vanadium (fume or dust)	*7440-62-2*	*3.0E+01*	*4/99*				✓				✓	
VANADIUM PENTOXIDE	1314-62-1	3.0E+01	4/99				X				X	
VINYL CHLORIDE[TAC] (Chloroethylene)	75-01-4	1.8E+05	4/99				X			X	X	
XYLENES (mixed isomers)	1330-20-7	2.2E+04	4/99				X			X	X	
m-Xylene	108-38-3	2.2E+04	4/99				X			X	X	
o-Xylene	95-47-6	2.2E+04	4/99				X			X	X	
p-Xylene	106-42-3	2.2E+04	4/99				X			X	X	

Purpose: The purpose of this reference table is to provide a quick list of all health values that have been approved by the Office of Environmental Health Hazard Assessment (OEHHA) and the Air Resources Board (ARB) for use in facility health risk assessments conducted for the AB 2588 Air Toxics "Hot Spots" Program. The OEHHA has developed and adopted new risk assessment guidelines that update and replace the California Air Pollution Control Officers Association's (CAPCOA) *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993.* The OEHHA has adopted three technical support documents for these guidelines, which can be found on their website (http://www.oehha.ca.gov/air/hot_spots/index.html). This table lists the OEHHA adopted noncancer acute Reference Exposure Levels (RELs). OEHHA is still in the process of adopting new health values. Therefore, new health values will periodically be added to, or deleted from, this table. Users of this table are advised to monitor the OEHHA website (*www.oehha.ca.gov*) for any updates to the health values.

May 2008 update: The Air Resources Board adopted amendments to the AB 2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation (Title 17, California Code of Regulations, Section 93300.5) on November 16, 2006. The amendments became effective on September 26, 2007, after approval from the Office of Administrative Law. Under the new amendments, the substances previously listed in Appendix A-I *(Substances For Which Emissions Must Be Quantified*) and Appendix F (*Criteria For Inputs For Risk Assessment Using Screening Air Dispersion Modeling*) of the ARB's *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) (July 1997)* have been removed from this table.

a The checkmarks included in this table clarify applicability of OEHHA adopted health effects values to individual or grouped substances listed in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines*, Appendix A-I list of *"Substances For Which Emissions Must Be Quantified"*.

b Chemical Abstract Service Number (CAS): For chemical groupings and mixtures where a CAS number is not applicable, the 4-digit code used in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) Report* is listed. The 4-digit codes enclosed in brackets [ ] are codes that have been phased out, but may still appear on previously reported Hot Spots emissions. For information on the origin and use of the 4-digit code, see the EICG report.

Table 2
OEHHA/ARB APPROVED ACUTE REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

c	Date Value Reviewed [Added]: This column lists the date that the health value was last reviewed by OEHHA and the Scientific Review Panel, and/or approved for use in the AB 2588 Air Toxics Hot Spots Program. If the health value is unchanged since it was first approved for use in the "Hot Spots" Program, then the date that the value was first approved for use by CAPCOA is listed within the brackets [ ]. • April 1999 is listed for the noncancer acute RELs which have been adopted by the OEHHA as part of the AB 2588 Hot Spot Risk Assessment Guidelines. • On December 19, 2008, OEHHA adopted new acute RELs for acetaldehyde, acrolein, arsenic, formaldehyde, and mercury. The most current health values can be found at: http://www.oehha.ca.gov/air/allrels.html. Note: All acute RELs use a 1-hour averaging period (OEHHA, 2008). RELs which were developed using earlier guidelines and specified a different averaging time are unchanged in concentration value, but now refer to the 1-hour averaging period. As of 8/1/2013, the affected chemicals are: benzene, carbon disulfide, carbon tetrachloride, chloroform, ethylene glycol monoethyl ether, ethylene glycol monoethyl ether acetate, and ethylene glycol monomethyl ether: These may be replaced by updated RELs following the OEHHA (2008) guidelines in due course. • On March 23, 2012, OEHHA adopted revised acute, 8-hour and chronic RELs for nickel and nickel compounds. The values of the RELs are listed in the table at: http://www.oehha.ca.gov/air/chronic_rels/032312CREL.html. • On July 29, 2013, OEHHA adopted an acute and an 8-hour REL and a revised chronic REL for 1,3-butadiene. The REL value and summary can be found online at: http://www.oehha.ca.gov/air/hot_spots/index.html. • On October 18, 2013 (February 2014 table update), OEHHA adopted acute, 8-hour, and chronic RELs for caprolactam. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/pdf/Caprolactam2013.pdf. Changes have been made to target organs to the following substances with no change to health factors: Chloroform, Methylene Chloride, Styrene, and Xylenes. The "date added" in this table reflects the date of the health factor only. See footnotes below that discuss changes to substance target organs only. • On June 27, 2014, OEHHA adopted a new 8-hour REL and revised acute and chronic RELs for benzene. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/BenzeneJune2014.html. • On March 28, 2016, OEHHA adopted new and revised RELs for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI). The REL values and summaries can be found at: http://www.oehha.ca.gov/air/chronic_rels/032816TDI_MDI_RELs.html. • On February 21, 2017, OEHHA adopted new acute, 8-hour, and chronic inhalation RELs for carbonyl sulfide. The REL values and summary can be found at: http://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-carbonyl-sulfide. • On May 4, 2018, OEHHA adopted new 8-hour and chronic inhalation RELs, and a revised acute REL for ethylene glycol butyl ether. The REL values and summary can be found at: https://oehha.ca.gov/air/chemicals/ethylene-glycol-monobutyl-ether. • On September 6, 2019, OEHHA adopted new RELs for xexamethylene diisocyanate. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-hexamethylene-diisocyanate. • On August 20, 2020, OEHHA adopted new and revised RELs for toluene. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-toluene.
d	February 2014. Per OEHHA's current policy, substances with Reproductive System and/or Development as the hazard Index target organ(s) are represented under the single endpoint "Reproductive/Development"
e	1,6-HEXAMETHYLENE DIISOCYANATE (HDI): On September 19, 2019, acute, 8-hour, and chronic RELs were added to the table and HARP for the HDI (monomer). OEHHA adopted these RELs and others for HDI polyisocyanates on September 6, 2019. The Acute, 8-hour, and chronic RELs for HDI polyisocyanates will be added to the consolidated table and HARP when the Air Toxics "Hot Spots" Program Emission Inventory Criteria and Guidelines is updated to include HDI polyisocyanates.
TAC	Toxic Air Contaminant: The Air Resources Board has identified this substance as a Toxic Air Contaminant.
N/A	Not Applicable.

Other Changes:

February 2014 corrections based on original REL summaries:

- Chloroform – added respiratory system as a target organ.
- Methylene chloride – the cardiovascular system was added as a target organ.
- Entry of SULFURIC ACID AND OLEUM is removed to be consistent with Consolidated Table 1. This entry is removed from Table 1 because oleum represents only an acute health hazard.
- Styrene – added reproductive/development as a target organ.
- Xylenes – add nervous system as a target organ.

Table 3
OEHHA/ARB APPROVED 8-HOUR REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	8-Hour Inhalation REL ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Target Organs											
				Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
ACETALDEHYDE	75-07-0	3.0E+02	12/08											X	
ACROLEIN	107-02-8	7.0E-01	12/08											X	
ARSENIC AND COMPOUNDS (INORGANIC)[TAC]	7440-38-2 1016	1.5E-02	12/08			X	X						X	X	X
ARSINE	7784-42-1	1.5E-02	12/08			X	X						X	X	X
BENZENE[TAC]	71-43-2	3.0E+00	6/14							X					
1,3-BUTADIENE[TAC]	106-99-0	9.0E+00	7/13				X								
CAPROLACTAM	105-60-2	7.0E+00	10/13											X	
CARBONYL SULFIDE	463-58-1	1.0E+01	2/17										X		
FORMALDEHYDE[TAC]	50-00-0	9.0E+00	12/08											X	
GLYCOL ETHERS	1115														
ETHYLENE GLYCOL BUTYL ETHER – EGBE	111-76-2	1.64E+02	5/18											X	
1,6-HEXAMETHYLENE DIISOCYANATE[e] (monomer)	822-06-0	6.0E-02	9/19											X	
MANGANESE AND COMPOUNDS	7439-96-5 [1132]	1.7E-01	12/08										X		
MERCURY AND COMPOUNDS (INORGANIC)	7439-97-6 [1133]	6.0E-02	12/08				X					X	X		
Mercuric chloride	*7487-94-7*	*6.0E-02*	*12/08*				✓					✓	✓		
METHYLENE DIPHENYL DIISOCYANATE	101-68-8	1.6E-01	3/16											X	
NICKEL AND COMPOUNDS[TAC]	7440-02-0 [1145]	6.0E-02	3/12								X			X	
Nickel acetate	*373-02-4*	*6.0E-02*	*3/12*								✓			✓	
Nickel carbonate	*3333-67-3*	*6.0E-02*	*3/12*								✓			✓	
Nickel carbonyl	*13463-39-3*	*6.0E-02*	*3/12*								✓			✓	
Nickel hydroxide	*12054-48-7*	*6.0E-02*	*3/12*								✓			✓	
Nickelocene	*1271-28-9*	*6.0E-02*	*3/12*								✓			✓	
NICKEL OXIDE	*1313-99-1*	*6.0E-02*	*3/12*								✓			✓	
Nickel refinery dust from the pyrometallurgical process	*1146*	*6.0E-02*	*3/12*								✓			✓	
Nickel subsulfide	*12035-72-2*	*6.0E-02*	*3/12*								✓			✓	

Table 3
OEHHA/ARB APPROVED 8-HOUR REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	8-Hour Inhalation REL ($\mu g/m^3$)	Date[c] Value Reviewed [Added]	Target Organs											
				Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
TOLUENE	108-88-3	8.3E+02	8/20						X						
Toluene diisocyanates	*26471-62-5*	*1.5E-02*	*3/16*											✓	
TOLUENE-2,4-DIISOCYANATE	584-84-9	1.5E-02	3/16											X	
TOLUENE-2,6-DIISOCYANATE	91-08-7	1.5E-02	3/16											X	

Table 3
OEHHA/ARB APPROVED 8-HOUR REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Purpose:	The purpose of this reference table is to provide a quick list of all health values that have been approved by the Office of Environmental Health Hazard Assessment (OEHHA) and the Air Resources Board (ARB). The OEHHA has developed and adopted new risk assessment guidelines that update and replace the California Air Pollution Control Officers Association's (CAPCOA) *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993*. The OEHHA has adopted three technical support documents for these guidelines, which can be found on their website (http://www.oehha.ca.gov/air/hot_spots/index.html). This table lists the OEHHA adopted 8-hour RELs. The methodology for the development and use of 8-hour RELs in Health Risk Assessments can be found in the OEHHA 2008 document *Air Toxics Hot Spots Program Technical Support Document for the Derivation of Noncancer Reference Exposure Levels* online at: http://oehha.ca.gov/air/hot_spots/rels_dec2008.html. OEHHA is still in the process of adopting new health values. Therefore, new health values will periodically be added to, or deleted from, this table. Users of this table are advised to monitor the OEHHA website (*www.oehha.ca.gov*) for any updates to the health values.
a	The checkmarks included in this table clarify applicability of OEHHA adopted health effects values to individual or grouped substances listed in the *Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines*, Appendix A-I list of *"Substances For Which Emissions Must Be Quantified"*.
b	Chemical Abstract Service Number (CAS): For chemical groupings and mixtures where a CAS number is not applicable, the 4-digit code used in the *Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines (EICG) Report* is listed. The 4-digit codes enclosed in brackets [ ] are codes that have been phased out, but may still appear on previously reported Hot Spots emissions. For information on the origin and use of the 4-digit code, see the EICG report.
c	Date Value Reviewed [Added]: This column lists the date that the health value was last reviewed by OEHHA and the Scientific Review Panel, and/or approved for use in the AB 2588 Air Toxics Hot Spots Program. If the health value is unchanged since it was first approved for use in the "Hot Spots" Program, then the date that the value was first approved for use by CAPCOA is listed within the brackets [ ]. • On December 19, 2008, OEHHA adopted new 8-hour RELs for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury. The most current health values can be found at: http://www.oehha.ca.gov/air/allrels.html. • On March 23, 2012, OEHHA adopted revised acute, 8-hour and chronic RELs for nickel and nickel compounds. The values of the RELs are listed in the table at: http://www.oehha.ca.gov/air/chronic_rels/032312CREL.html. • On July 29, 2013, OEHHA adopted an acute and an 8-hour REL and a revised chronic REL for 1,3-butadiene. The REL value and summary can be found online at: http://www.oehha.ca.gov/air/hot_spots/index.html. • On October 18, 2013, OEHHA adopted acute, 8-hour, and chronic RELs for caprolactam. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/pdf/Caprolactam2013.pdf. • On June 27, 2014, OEHHA adopted a new 8-hour REL and revised acute and chronic RELs for benzene. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/BenzeneJune2014.html. • On March 28, 2016, OEHHA adopted new and revised RELs for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI). The REL values and summaries can be found at: http://www.oehha.ca.gov/air/chronic_rels/032816TDI_MDI_RELs.html. • On February 21, 2017, OEHHA adopted new acute, 8-hour, and chronic inhalation RELs for carbonyl sulfide. The REL values and summary can be found at: http://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-carbonyl-sulfide. • On May 4, 2018, OEHHA adopted new 8-hour and chronic inhalation RELs, and a revised acute REL for ethylene glycol butyl ether. The REL values and summary can be found at: https://oehha.ca.gov/air/chemicals/ethylene-glycol-monobutyl-ether. • On September 6, 2019, OEHHA adopted new RELs for xexamethylene diisocyanate. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-hexamethylene-diisocyanate. • On August 20, 2020, OEHHA adopted new and revised RELs for toluene. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-toluene.
d	February 2014. Per OEHHA's current policy, substances with Reproductive System and/or Development as the hazard Index target organ(s) are represented under the single endpoint "Reproductive/Development".
e	1,6-HEXAMETHYLENE DIISOCYANATE (HDI): On September 19, 2019, acute, 8-hour, and chronic RELs were added to the table and HARP for the HDI (monomer). OEHHA adopted these RELs and others for HDI polyisocyanates on September 6, 2019. The Acute, 8-hour, and chronic RELs for HDI polyisocyanates will be added to the consolidated table and HARP when the Air Toxics "Hot Spots" Program Emission Inventory Criteria and Guidelines is updated to include HDI polyisocyanates.
TAC	Toxic Air Contaminant: The Air Resources Board has identified this substance as a Toxic Air Contaminant.

Last updated: August 21, 2020

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
ACETALDEHYDE	75-07-0	1.4E+02		12/08											X	
ACROLEIN	107-02-8	3.5E-01		12/08											X	
ACRYLONITRILE	107-13-1	5.0E+00		12/01											X	
AMMONIA	7664-41-7	2.0E+02		2/00											X	
ARSENIC AND COMPOUNDS (INORGANIC)[TAC]	7440-38-2 1016 [1015]	1.5E-02		12/08			X	X						X	X	X
			3.5E-06	12/08			X	X						X	X	X
ARSINE	7784-42-1	1.5E-02		12/08			X	X						X	X	X
BENZENE[TAC]	71-43-2	3.0E+00		6/14							X					
BERYLLIUM AND COMPOUNDS	7440-41-7 [1021]	7.0E-03		12/01								X			X	
			2.0E-03	12/01	X											
1,3-BUTADIENE[TAC]	106-99-0	2.0E+00		7/13				X								
CADMIUM AND COMPOUNDS[TAC]	7440-43-9 [1045]	2.0E-02		1/01									X		X	
			5.0E-04	10/00									X			
CAPROLACTAM	105-60-2	2.2E+00		10/13											X	
CARBON DISULFIDE	75-15-0	8.0E+02		5/02				X						X		
CARBON TETRACHLORIDE[TAC] (Tetrachloromethane)	56-23-5	4.0E+01		1/01	X			X						X		
CARBONYL SULFIDE	463-58-1	1.0E+01		2/17										X		
CHLORINE	7782-50-5	2.0E-01		2/00											X	
CHLORINE DIOXIDE	10049-04-4	6.0E-01		1/01											X	
CHLOROBENZENE	108-90-7	1.0E+03		1/01	X			X					X			
CHLOROFORM[TAC]	67-66-3	3.0E+02		4/00	X			X					X			
CHLOROPICRIN	76-06-2	4.0E-01		12/01											X	
CHROMIUM 6+[TAC]	18540-29-9	2.0E-01		1/01											X	
			2.0E-02	10/00							X					
Barium chromate	*10294-40-3*	*2.0E-01*		*1/01*											✓	
			2.0E-02	*10/00*							✓					
Calcium chromate	*13765-19-0*	*2.0E-01*		*1/01*											✓	

Last updated: August 21, 2020

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
			2.0E-02	*10/00*							✓					
Lead chromate	*7758-97-6*	*2.0E-01*		*1/01*											✓	
			2.0E-02	*10/00*							✓					
Sodium dichromate	*10588-01-9*	*2.0E-01*		*1/01*											✓	
			2.0E-02	*10/00*							✓					
Strontium chromate	*7789-06-2*	*2.0E-01*		*1/01*											✓	
			2.0E-02	*10/00*							✓					
CHROMIUM TRIOXIDE (as chromic acid mist)	1333-82-0	2.0E-03		1/01											X	
			2.0E-02	*10/00*							✓					
CRESOLS (mixtures of)	1319-77-3	6.0E+02		1/01										X		
m-CRESOL	108-39-4	6.0E+02		1/01										X		
o-CRESOL	95-48-7	6.0E+02		1/01										X		
p-CRESOL	106-44-5	6.0E+02		1/01										X		
Cyanide Compounds (inorganic)	*57-12-5 1073*	*9.0E+00*		*4/00*			✓		✓					✓		
HYDROGEN CYANIDE (Hydrocyanic acid)	74-90-8	9.0E+00		4/00			X		X					X		
p-DICHLOROBENZENE	106-46-7	8.0E+02		1/01	X								X	X	X	
1,1,-DICHLOROETHYLENE … (see Vinylidene Chloride)																
DIESEL EXHAUST … (see Particulate Emissions from Diesel-Fueled Engines)																
DIETHANOLAMINE	111-42-2	3.0E+00		12/01							X				X	
N,N-DIMETHYL FORMAMIDE	68-12-2	8.0E+01		1/01	X										X	
1,4-DIOXANE; (1,4-Diethylene dioxide)	123-91-1	3.0E+03		4/00	X		X						X			
EPICHLOROHYDRIN (1-Chloro-2,3-epoxypropane)	106-89-8	3.0E+00		1/01						X					X	
1,2-EPOXYBUTANE	106-88-7	2.0E+01		1/01			X								X	
ETHYL BENZENE	100-41-4	2.0E+03		2/00	X			X	X				X			
ETHYL CHLORIDE (Chlorethane)	75-00-3	3.0E+04		4/00	X			X								

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
ETHYLENE DIBROMIDE[TAC] (1,2-Dibromoethane)	106-93-4	8.0E-01		12/01				X								
ETHYLENE DICHLORIDE[TAC] (1,2-Dichloroethane)	107-06-2	4.0E+02		1/01	X											
ETHYLENE GLYCOL	107-21-1	4.0E+02		4/00				X					X		X	
ETHYLENE OXIDE[TAC] (1,2-Epoxyethane)	75-21-8	3.0E+01		1/01										X		
Fluorides and Compounds	1101	1.3E+01				X									X	
			4.0E-02	8/03		X										
HYDROGEN FLUORIDE (Hydrofluoric acid)	7664-39-3	1.4E+01				X									X	
			4.0E-02	8/03		X										
FORMALDEHYDE[TAC]	50-00-0	9.0E+00		12/08											X	
GLUTARALDEHYDE	111-30-8	8.0E-02		1/01											X	
GLYCOL ETHERS	1115															
ETHYLENE GLYCOL BUTYL ETHER – EGBE	111-76-2	8.2E+01		5/18											X	
ETHYLENE GLYCOL ETHYL ETHER – EGEE	110-80-5	7.0E+01		2/00				X			X					
ETHYLENE GLYCOL ETHYL ETHER ACETATE - EGEEA	111-15-9	3.0E+02		2/00				X								
ETHYLENE GLYCOL METHYL ETHER – EGME	109-86-4	6.0E+01		2/00				X								
ETHYLENE GLYCOL METHYL ETHER ACETATE - EGMEA	110-49-6	9.0E+01		2/00				X								
1,6-HEXAMETHYLENE DIISOCYANATE[i] (monomer)	822-06-0	3.0E-02		9/19											X	
n-HEXANE	110-54-3	7.0E+03		4/00										X		
HYDRAZINE	302-01-2	2.0E-01		1/01	X				X							
HYDROCHLORIC ACID (Hydrogen chloride)	7647-01-0	9.0E+00		2/00											X	
HYDROGEN CYANIDE (Hydrocyanic acid) (see Cyanide Compounds)																
HYDROGEN BROMIDE ... (see Bromine & Compounds)																
HYDROGEN FLUORIDE (Hydrofluoric acid) (see Fluorides & Compounds)																
HYDROGEN SULFIDE	7783-06-4	1.0E+01		4/00											X	
ISOPHORONE	78-59-1	2.0E+03		12/01	X			X								

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
ISOPROPYL ALCOHOL (Isopropanol)	67-63-0	7.0E+03		2/00				X					X			
LINDANE ... (see gamma-Hexachlorocyclohexane)																
MALEIC ANHYDRIDE	108-31-6	7.0E-01		12/01											X	
MANGANESE AND COMPOUNDS	7439-96-5 [1132]	9.0E-02		12/08										X		
MERCURY AND INORGANIC COMPOUNDS	7439-97-6 [1133]	3.0E-02		12/08				X					X	X		
			1.6E-04	12/08				X					X	X		
Mercuric chloride	*7487-94-7*	*3.0E-02*		*12/08*				✓					✓	✓		
			1.6E-04	*12/08*				✓					✓	✓		
METHANOL	67-56-1	4.0E+03		4/00				X								
METHYL BROMIDE (Bromomethane)	74-83-9	5.0E+00		2/00				X						X	X	
METHYL tertiary-BUTYL ETHER	1634-04-4	8.0E+03		2/00	X					X			X			
METHYL CHLOROFORM (1,1,1-Trichloroethane)	71-55-6	1.0E+03		2/00										X		
METHYL ISOCYANATE	624-83-9	1.0E+00		12/01				X							X	
METHYLENE CHLORIDE[TAC] (Dichloromethane)	75-09-2	4.0E+02		2/00			X							X		
4,4'-METHYLENE DIANILINE (AND ITS DICHLORIDE)	101-77-9	2.0E+01		12/01	X					X						
METHYLENE DIPHENYL DIISOCYANATE	101-68-8	8.0E-02		3/16											X	
NAPHTHALENE	91-20-3	9.0E+00		4/00											X	
NICKEL AND COMPOUNDS[TAC]	7440-02-0 [1145]	1.4E-02		3/12							X				X	
			1.1E-02	3/12				X								
Nickel acetate	*373-02-4*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
Nickel carbonate	*3333-67-3*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
Nickel carbonyl	*13463-39-3*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
Nickel hydroxide	*12054-48-7*	*1.4E-02*		*3/12*							✓				✓	

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
			1.1E-02	*3/12*				✓								
Nickelocene	*1271-28-9*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
NICKEL OXIDE	1313-99-1	2.0E-02		3/12											X	
			1.1E-02	*3/12*				✓								
Nickel refinery dust from pyrometallurgical process	*1146*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
Nickel subsulfide	*12035-72-2*	*1.4E-02*		*3/12*							✓				✓	
			1.1E-02	*3/12*				✓								
PARTICULATE EMISSIONS FROM DIESEL-FUELED ENGINES[TAC, e]	9901	5.0E+00 TAC		8/98											X	
PERCHLOROETHYLENE[TAC] (Tetrachloroethylene)	127-18-4	3.5E+01 TAC		10/91	X								X			
PHENOL	108-95-2	2.0E+02		4/00	X		X						X	X		
PHOSPHINE	7803-51-2	8.0E-01		9/02	X						X		X	X	X	
PHOSPHORIC ACID	7664-38-2	7.0E+00		2/00											X	
PHTHALIC ANHYDRIDE	85-44-9	2.0E+01		1/01											X	
DIOXIN-LIKE POLYCHLORINATED BIPHENYLS (PCBS)[f, g]	1336-36-3															
3,3',4,4'-TETRACHLOROBIPHENYL (PCB 77)	32598-13-3	4.0E-01		8/03	X			X	X		X				X	
			1.0E-04	8/03	X			X	X		X				X	
3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)	70362-50-4	1.3E-01		1/11	X			X	X		X				X	
			3.3E-05	1/11	X			X	X		X				X	
2,3,3',4,4'-PENTACHLOROBIPHENYL (PCB 105)	32598-14-4	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
2,3,4,4',5-PENTACHLOROBIPHENYL (PCB 114)	74472-37-0	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)	31508-00-6	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
2,3',4,4',5'-PENTACHLOROBIPHENYL (PCB 123)	65510-44-3	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)	57465-28-8	4.0E-04		8/03	X			X	X		X				X	
			1.0E-07	8/03	X			X	X		X				X	
2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)	38380-08-4	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)	69782-90-7	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)	52663-72-6	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)	32774-16-6	1.3E-03		1/11	X			X	X		X				X	
			3.3E-07	1/11	X			X	X		X				X	
2,3,3',4,4',5,5'-HEPTACHLOROBIPHENYL (PCB 189)	39635-31-9	1.3E+00		1/11	X			X	X		X				X	
			3.3E-04	1/11	X			X	X		X				X	
POLYCHLORINATED DIBENZO-P-DIOXINS (PCDD) (Treated as 2,3,7,8-TCDD for HRA)[TAC, f]	1085 1086	4.0E-05		2/00	X			X	X		X				X	
			1.0E-08	10/00	X			X	X		X				X	
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN[TAC]	1746-01-6	4.0E-05		2/00	X			X	X		X				X	
			1.0E-08	10/00	X			X	X		X				X	
1,2,3,7,8-PENTACHLORODIBENZO-P-DIOXIN	40321-76-4	4.0E-05		8/03	X			X	X		X				X	
			1.0E-08	8/03	X			X	X		X				X	
1,2,3,4,7,8-HEXACHLORODIBENZO-P-DIOXIN	39227-28-6	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	57653-85-7	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	19408-74-3	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
1,2,3,4,6,7,8-HEPTACHLORODIBENZO-P-DIOXIN	35822-46-9	4.0E-03		2/00	X			X	X		X				X	
			1.0E-06	10/00	X			X	X		X				X	
1,2,3,4,6,7,8,9-OCTACHLORODIBENZO-P-DIOXIN	3268-87-9	1.3E-01		1/11	X			X	X		X				X	
			3.3E-05	1/11	X			X	X		X				X	
POLYCHLORINATED DIBENZOFURANS (PCDF) (Treated as 2,3,7,8-TCDD for HRA) [TAC, f]	1080	4.0E-05		2/00	X			X	X		X				X	
			1.0E-08	10/00	X			X	X		X				X	
2,3,7,8-TETRACHLORODIBENZOFURAN	5120-73-19	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,7,8-PENTACHLORODIBENZOFURAN	57117-41-6	1.3E-03		1/11	X			X	X		X				X	
			3.3E-07	1/11	X			X	X		X				X	
2,3,4,7,8-PENTACHLORODIBENZOFURN	57117-31-4	1.3E-04		1/11	X			X	X		X				X	
			3.3E-08	1/11	X			X	X		X				X	
1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	70648-26-9	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	57117-44-9	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	72918-21-9	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	60851-34-5	4.0E-04		2/00	X			X	X		X				X	
			1.0E-07	10/00	X			X	X		X				X	
1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	67562-39-4	4.0E-03		2/00	X			X	X		X				X	
			1.0E-06	10/00	X			X	X		X				X	
1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	55673-89-7	4.0E-03		2/00	X			X	X		X				X	
			1.0E-06	10/00	X			X	X		X				X	
1,2,3,4,6,7,8,9-OCTACHLORODIBENZOFURAN	39001-02-0	1.3E-01		1/11	X			X	X		X				X	
			3.3E-05	1/11	X			X	X		X				X	
POTASSIUM BROMATE ... (see Bromine & Compounds)																

Last updated: August 21, 2020

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Substance	Chemical[b] Abstract Number	Chronic Inhalation REL ($\mu g/m^3$)	Chronic Oral REL (mg/kg-d)	Date[c] Value Reviewed [Added]	Target Organs											
					Alimentary	Bone and Teeth	Cardiovascular	Reproductive/[d] Development	Endocrine	Eye	Hematologic	Immune	Kidney	Nervous	Respiratory	Skin
PROPYLENE (PROPENE)	115-07-1	3.0E+03		4/00											X	
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	7.0E+03		2/00	X											
PROPYLENE OXIDE	75-56-9	3.0E+01		2/00											X	
SELENIUM AND COMPOUNDS (other than hydrogen selenide)[h]	7782-49-2 [1170]	2.0E+01		12/01	X		X							X		
			5.0E-03	12/01	X		X							X		
Selenium sulfide	*7446-34-6*	*2.0E+01*		*12/01*	✓		✓							✓		
			5.0E-03	*12/01*	✓		✓							✓		
SILICA [CRYSTALLINE, RESPIRABLE]	1175	3.0E+00		2/05											X	
STYRENE	100-42-5	9.0E+02		4/00										X		
Sulfuric Acid	7664-93-9	1.0E+00		12/01											X	
Sulfuric Trioxide	*7446-71-9*	*1.0E+00*		*12/01*											✓	
TOLUENE	108-88-3	4.2E+02		8/20						X						
Toluene diisocyanates	*26471-62-5*	*8.0E-03*		*3/16*											✓	
TOLUENE-2,4-DIISOCYANATE	584-84-9	8.0E-03		3/16											X	
TOLUENE-2,6-DIISOCYANATE	91-08-7	8.0E-03		3/16											X	
TRICHLOROETHYLENE[TAC]	79-01-6	6.0E+02		4/00						X				X		
TRIETHYLAMINE	121-44-8	2.0E+02		9/02						X						
VINYL ACETATE	108-05-4	2.0E+02		12/01											X	
VINYLIDENE CHLORIDE (1,1,-Dichloroethylene)	75-35-4	7.0E+01		1/01	X											
XYLENES (mixed isomers)	1330-20-7	7.0E+02		4/00						X				X	X	
m-XYLENE	108-38-3	7.0E+02		4/00						X				X	X	
o-XYLENE	95-47-6	7.0E+02		4/00						X				X	X	
p-XYLENE	106-42-3	7.0E+02		4/00						X				X	X	

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

Purpose:	The purpose of this reference table is to provide a quick list of all health values that have been approved by the Office of Environmental Health Hazard Assessment (OEHHA) and the Air Resources Board (ARB) for use in facility health risk assessments conducted for the AB 2588 Air Toxics "Hot Spots" Program. The OEHHA has developed and adopted new risk assessment guidelines that update and replace the California Air Pollution Control Officers Association's (CAPCOA) *Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993*. The OEHHA has adopted three technical support documents for these guidelines, which can be found on their website (http://www.oehha.ca.gov/air/hot_spots/index.html). This table lists the OEHHA adopted inhalation and oral noncancer chronic RELs. OEHHA is still in the process of adopting new health values. Therefore, new health values will periodically be added to, or deleted from, this table. Users of this table are advised to monitor the OEHHA website (*www.oehha.ca.gov*) for any updates to the health values. May 2008 update: The Air Resources Board adopted amendments to the AB 2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidelines Regulation (Title 17, California Code of Regulations, Section 93300.5) on November 16, 2006. The amendments became effective on September 26, 2007, after approval from the Office of Administrative Law. Under the new amendments, the substances previously listed in Appendix A-I *(Substances For Which Emissions Must Be Quantified*) and Appendix F (*Criteria For Inputs For Risk Assessment Using Screening Air Dispersion Modeling*) of the ARB's *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) (July 1997)* have been removed from this table.
a	The checkmarks included in this table clarify applicability of OEHHA adopted health effects values to individual or grouped substances listed in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines*, Appendix A-I list of *"Substances For Which Emissions Must Be Quantified"*.
b	Chemical Abstract Service Number (CAS): For chemical groupings and mixtures where a CAS number is not applicable, the 4-digit code used in the *Air Toxics* "*Hot Spots" Emission Inventory Criteria and Guidelines (EICG) Report* is listed. The 4-digit codes enclosed in brackets [ ] are codes that have been phased out, but may still appear on previously reported Hot Spots emissions. For information on the origin and use of the 4-digit code, see the EICG report.

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

c	Date Value Reviewed [Added]: This column lists the date that the health value was last reviewed by OEHHA and the Scientific Review Panel, and/or approved for use in the AB 2588 Air Toxics Hot Spots Program. If the health value is unchanged since it was first approved for use in the "Hot Spots" Program, then the date that the value was first approved for use by CAPCOA is listed within the brackets [ ]. • February 2000, April 2000, January 2001, and December 2001 are listed for the first set of 22, the second set of 16, the third set of 22, and the fourth set of 12 noncancer chronic RELs, respectively. The chronic REL for carbon disulfide was adopted in May 2002. Chronic RELs for phosphine and triethylamine were adopted in September 2002. Chronic RELs for fluorides including hydrogen fluoride were adopted August 2003. Chronic REL for silica [crystalline respirable] was adopted February 2005. • October 2000 is listed for the oral chronic RELs. • For the substances identified as Toxic Air Contaminants, the Air Resources Board hearing date is listed. The date for acetaldehyde represents the date the value was approved by the Scientific Review Panel. • On December 19, 2008, OEHHA adopted new chronic RELs for acetaldehyde, acrolein, arsenic, formaldehyde, manganese, and mercury. The most current health values can be found at: http://www.oehha.ca.gov/air/allrels.html. Note that the 8-hour RELs are not included in the HARP program. These health factors will be added after OEHHA approves the Guidelines Manual (Part V). Note: 1. We present the new oral RELs only in milligrams (mg/kg-d), although OEHHA has presented oral RELs in other tables in either micrograms (μg/kg-d) or mg/kg-d . 2. At OEHHA's direction, the chronic oral REL for arsenic does not apply to arsine, because arsine is a gas and not particle associated. • January 2011 is listed to reflect OEHHA's adoption of the World Health Organization's 2005 Toxicity Equivalency Factors for polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs), and dioxin-like polychlorinated biphenyls (PCBs). See Appendix C of OEHHA's *Air Toxics Hot Spots Program Technical Support Document for Cancer Potencies* at: http://www.oehha.ca.gov/air/hot_spots/pdf/AppCdioxinTEFs013111.pdf for more information. • On March 23, 2012, OEHHA adopted revised acute, 8-hour and chronic RELs for nickel and nickel compounds, a separate chronic inhalation REL for nickel oxide, and a revised chronic oral REL for nickel and nickel compounds (including nickel oxide). The values of the RELs are listed in the table at: http://www.oehha.ca.gov/air/chronic_rels/032312CREL.html. • On July 29, 2013, OEHHA adopted an acute and an 8-hour REL and a revised chronic REL for 1,3-butadiene. The REL value and summary can be found online at: http://www.oehha.ca.gov/air/hot_spots/index.html. • On October 18, 2013 (February 2014 table update), OEHHA adopted acute, 8-hour, and chronic RELs for caprolactam. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/pdf/Caprolactam2013.pdf. Changes have been made to target organs to the following substances with no change to health factors: Diethanolamine, Fluorides and Hydrogen Fluoride, and Xylenes. The "date added" in this table reflects the date of the health factor only. See footnotes below that discuss changes to substance target organs only. • On June 27, 2014, OEHHA adopted a new 8-hour REL and revised acute and chronic RELs for benzene. The REL values and summary can be found at: http://www.oehha.ca.gov/air/chronic_rels/BenzeneJune2014.html. • On March 28, 2016, OEHHA adopted new and revised RELs for toluene diisocyanate (TDI) and methylene diphenyl diisocyanate (MDI). The REL values and summaries can be found at: http://www.oehha.ca.gov/air/chronic_rels/032816TDI_MDI_RELs.html. • On February21, 2017, OEHHA adopted new acute, 8-hour, and chronic inhalation RELs for carbonyl sulfide. The REL values and summary can be found at: http://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-carbonyl-sulfide. • On May 4, 2018, OEHHA adopted new 8-hour and chronic inhalation RELs, and a revised acute REL for ethylene glycol butyl ether. The REL values and summary can be found at: https://oehha.ca.gov/air/chemicals/ethylene-glycol-monobutyl-ether. • On September 6, 2019, OEHHA adopted new RELs for xexamethylene diisocyanate. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-hexamethylene-diisocyanate. • On August 20, 2020, OEHHA adopted new and revised RELs for toluene. The REL values and summary can be found at: https://oehha.ca.gov/air/crnr/notice-adoption-reference-exposure-levels-toluene.
d	February 2014. Per OEHHA's current policy, substances with Reproductive System and/or Development as the hazard Index target organ(s) are represented under the single endpoint "Reproductive/Development".
TAC	Toxic Air Contaminant: The Air Resources Board has identified this substance as a Toxic Air Contaminant.

Table 4
OEHHA/ARB APPROVED CHRONIC REFERENCE EXPOSURE LEVELS AND TARGET ORGANS[a]

e	Particulate Emissions from Diesel-Fueled Engines: The inhalation cancer potency factor was derived from whole diesel exhaust and should be used only for impacts from the inhalation pathway (based on diesel PM measurements). The inhalation impacts from speciated emissions from diesel-fueled engines are already accounted for in the inhalation cancer potency factor and REL. However, at the discretion of the risk assessor, speciated emissions from diesel-fueled engines may be used to estimate acute noncancer health impacts or the contribution to cancer risk or chronic noncancer health impacts for the non-inhalation exposure pathway. The noncancer chronic REL for diesel exhaust is based on assumptions of contributions of diesel PM to ambient PM. It should be used with diesel PM measurement. There is not an oral chronic REL for diesel exhaust. See Appendix D of OEHHA's document *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* for more information.
f	Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans (also referred to as chlorinated dioxins and dibenzofurans) and dioxin-like PCB congeners: The OEHHA has adopted the World Health Organization 2005 (WHO-05) Toxicity Equivalency Factor scheme for evaluating the risk due to exposure to samples containing mixtures of polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) and a number of dioxin-like PCB congeners. See Appendix A of OEHHA's Technical Support Document For Describing Available Cancer Potency Factors for more information about the scheme. See Appendix C (revised 01/20/11) of OEHHA's Technical Support Document: Methodologies for Derivation, Listing of Available Values, and Adjustments to Allow for Early Life Exposures (2009) online at http://oehha.ca.gov/air/hot_spots/tsd052909.html for more information about the scheme.
g	Polychlorinated Biphenyls (unspeciated): As of February, 2014, there is no approved method that can be used to assess the noncancer hazard of an unspeciated PCB mixture. Persons preparing HRAs for the Hot Spots Program should consult with OEHHA and the local Air Pollution Control or Air Quality Management District if an assessment of the noncancer hazard for unspeciated PCB mixtures is needed.
h	SELENIUM AND COMPOUNDS: In February 2014, an oral REL was added to the consolidated table. The REL was adopted in Dec 2001, but could not be used by the Hot Spots Program (or HARP software) until transfer factors for the oral and dermal routes were adopted. Transfer factors are included in the OEHHA's Technical Support Document for Exposure Assessment and Stochastic Analysis (August 2012) and will be added to the HARP software in the future.
i	1,6-HEXAMETHYLENE DIISOCYANATE (HDI): On September 19, 2019, acute, 8-hour, and chronic RELs were added to the table and HARP for the HDI (monomer). OEHHA adopted these RELs and others for HDI polyisocyanates on September 6, 2019. The Acute, 8-hour, and chronic RELs for HDI polyisocyanates will be added to the consolidated table and HARP when the Air Toxics "Hot Spots" Program Emission Inventory Criteria and Guidelines is updated to include HDI polyisocyanates.

Other Changes:

February 2014 corrections based on original REL summaries:

- Removed applicability of oleum to the sulfuric acid chronic inhalation REL because oleum represents only an acute health hazard.
- Diethanolamine – deleted cardiovascular and nervous system as target organs, and added hematologic and respiratory systems as target organs.
- Fluorides and Hydrogen Fluoride – target organ for these substances was reconfigured so that "Bone and Teeth" are a combined target organ.
- Xylenes (mixed isomers) – added eye as a target organ.
- Removed "METHYL MERCURY …(see Mercury & Compounds)" entry because methyl mercury has different chemical properties, potency, and toxicity compared to elemental mercury and mercury salts, and it is not emitted directly from any California facilities.
- 9/1/2017, changed the "1101 Fluorides" entry back to "1101 Fluorides and compounds" to keep the consistency with the Emission Inventory Guidelines. The substance name for CAS# 1101 was changed from "Fluorides and compounds" as in 2002 to "Fluorides" in 2003 without footnotes about the change.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

21865 Copley Drive, Diamond Bar, CA 91765-4182
Information: 1-800-CUT-SMOG (1-800-288-7664)
Internet: http://www.aqmd.gov

Air Quality Reporting

Since 1977, the South Coast Air Quality Management District has served as the local government agency responsible for measuring, reporting and taking steps to improve air quality.

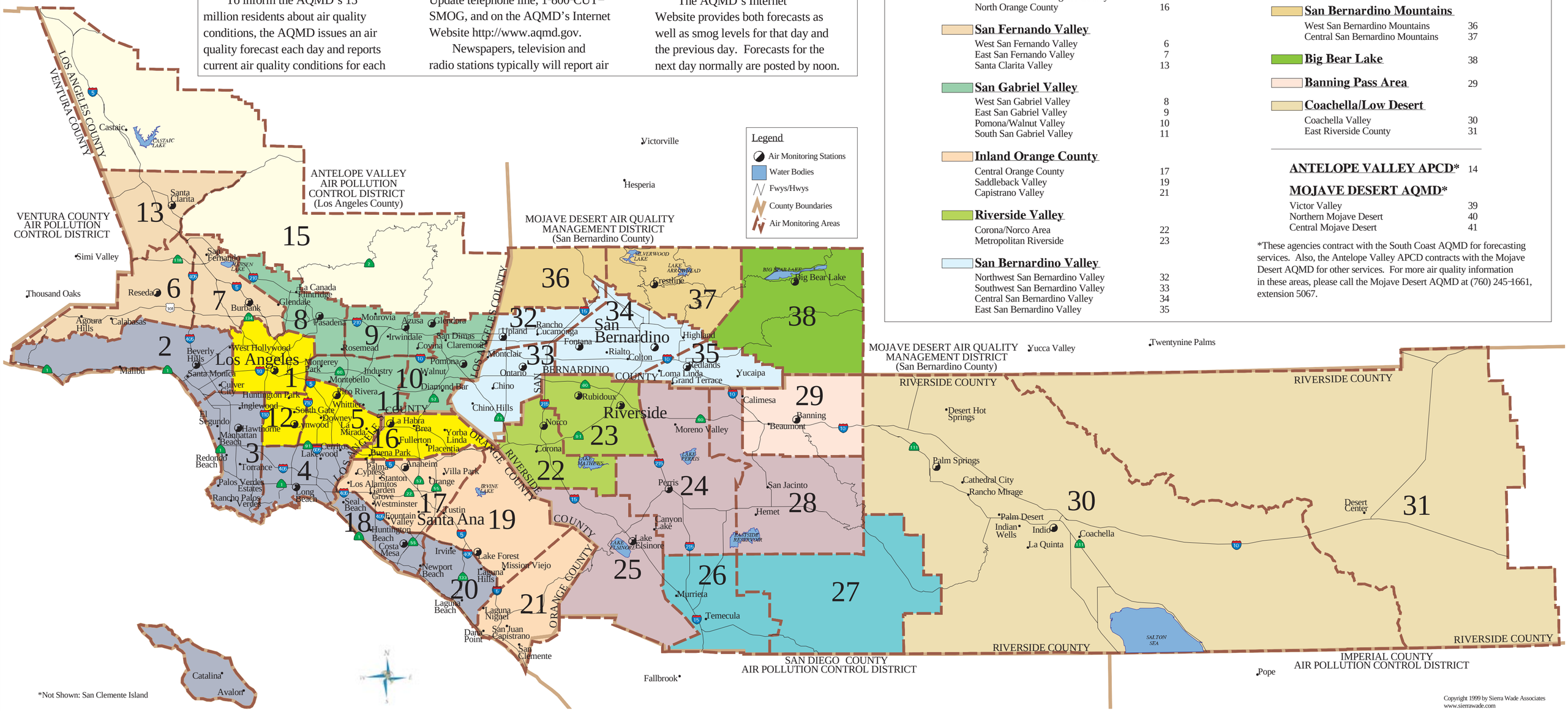
To inform the AQMD's 15 million residents about air quality conditions, the AQMD issues an air quality forecast each day and reports current air quality conditions for each numbered Monitoring Area and General Forecast Area depicted here.

This air quality information is transmitted to the public through newspapers, television, radio and pager services, through faxes to schools, through recorded messages on the AQMD's toll-free Smog Update telephone line, 1-800-CUT-SMOG, and on the AQMD's Internet Website http://www.aqmd.gov.

Newspapers, television and radio stations typically will report air quality information using the General Forecast Areas, shown in color below, which are larger groupings of the more specific Air Monitoring Areas.

The 1-800-CUT-SMOG (1-800-288-7664) line also provides smog forecast and current smog level information by ZIP code.

The AQMD's Internet Website provides both forecasts as well as smog levels for that day and the previous day. Forecasts for the next day normally are posted by noon.



*Not Shown: San Clemente Island

General Forecast Areas & Air Monitoring Areas

Coastal

Northwest Los Angeles County Coastal	2
Southwest Los Angeles County Coastal	3
South Los Angeles County Coastal	4
North Orange County Coastal	18
Central Orange County Coastal	20

Metropolitan

Central Los Angeles County	1
Southeast Los Angeles County	5
South Central Los Angeles County	12
North Orange County	16

San Fernando Valley

West San Fernando Valley	6
East San Fernando Valley	7
Santa Clarita Valley	13

San Gabriel Valley

West San Gabriel Valley	8
East San Gabriel Valley	9
Pomona/Walnut Valley	10
South San Gabriel Valley	11

Inland Orange County

Central Orange County	17
Saddleback Valley	19
Capistrano Valley	21

Riverside Valley

Corona/Norco Area	22
Metropolitan Riverside	23

San Bernardino Valley

Northwest San Bernardino Valley	32
Southwest San Bernardino Valley	33
Central San Bernardino Valley	34
East San Bernardino Valley	35

Hemet/Elsinore Area

Perris Valley	24
Lake Elsinore	25
Hemet/San Jacinto Valley	28

Temecula/Anza Area

Temecula Valley	26
Anza Area	27

San Gabriel Mountains 15

San Bernardino Mountains

West San Bernardino Mountains	36
Central San Bernardino Mountains	37

Big Bear Lake 38

Banning Pass Area 29

Coachella/Low Desert

Coachella Valley	30
East Riverside County	31

ANTELOPE VALLEY APCD* 14

MOJAVE DESERT AQMD*

Victor Valley	39
Northern Mojave Desert	40
Central Mojave Desert	41

*These agencies contract with the South Coast AQMD for forecasting services. Also, the Antelope Valley APCD contracts with the Mojave Desert AQMD for other services. For more air quality information in these areas, please call the Mojave Desert AQMD at (760) 245-1661, extension 5067.

2017 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2017

Source/Receptor Area No.	Location	Station No.	Carbon Monoxide [a]			Ozone [b]										Nitrogen Dioxide [c]				Sulfur Dioxide [d]		
										No. Days Standard Exceeded												
												2008										
			No. Days of Data	Max Conc. in ppm 1-hour	Max Conc. in ppm 8-hour	No. Days of Data	Max. Conc. in ppm 1-hour	Max. Conc. in ppm 8-hour	Fourth High Conc. ppm 8-hour	Old Federal > 0.124 ppm 1-hour	Current Federal > 0.070 ppm 8-hour	Federal > 0.075 ppm 8-hour	1997 Federal > 0.084 ppm 8-hour	Current State > 0.09 ppm 1-hour	Current State > 0.070 ppm 8-hour	No. Days of Data	Max Conc. in ppb 1-hour	98th Percentile Conc. ppb 1-hour	Annual Average AAM Conc. ppb	No. Days of Data	Max. Conc. in ppb 1-hour	99th Percentile Conc. ppb 1-hour
LOS ANGELES COUNTY																						
1	Central LA	087	365	1.9	1.6	364	0.116	0.086	0.080	0	14	9	2	6	14	364	80.6	61.7	20.5	356	5.7	2.6
2	Northwest Coastal LA County	091	227*	2.0	1.2	228*	0.099	0.077	0.069	0	3	1	0	1	3	229*	55.7	46.2	10.2	--	--	--
3	Southwest Coastal LA County	820	361	2.1	1.6	364	0.086	0.070	0.064	0	0	0	0	0	0	324	72.2	54.8	9.3	365	9.5	6.6
4	South Coastal LA County 1	072	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 2	077	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 3	033	357	3.9	2.6	362	0.082	0.068	0.062	0	0	0	0	0	0	358	89.5	72.9	17.9	361	19.7	14.3
4	I-710 Near Road##	032	--	--	--	--	--	--	--	--	--	--	--	--	--	364	115.5	82.5	25.4	--	--	--
6	West San Fernando Valley	074	365	3.0	2.5	365	0.140	0.114	0.095	4	64	44	15	26	64	337	62.5	54.2	12.9	--	--	--
8	West San Gabriel Valley	088	365	2.2	1.7	365	0.139	0.100	0.092	2	36	25	6	18	36	361	72.3	59.3	15.3	--	--	--
9	East San Gabriel Valley 1	060	365	1.8	0.9	365	0.152	0.114	0.107	7	62	43	21	38	62	365	65.6	51.1	15.8	--	--	--
9	East San Gabriel Valley 2	591	365	0.8	0.6	365	0.157	0.121	0.111	9	60	48	23	45	60	365	55.5	44.5	10.0	--	--	--
10	Pomona/Walnut Valley	075	365	2.0	1.6	360	0.147	0.114	0.106	5	35	20	11	18	35	360	81.2	62.9	20.5	--	--	--
11	South San Gabriel Valley	085	357	2.5	2.2	354	0.118	0.086	0.079	0	9	4	1	7	9	357	75.0	63.7	19.6	--	--	--
12	South Central LA County	112	365	6.1	4.6	352	0.092	0.076	0.072	0	5	1	0	0	5	365	99.1	66.8	16.1	--	--	--
13	Santa Clarita Valley	090	354	1.3	0.8	365	0.151	0.128	0.104	5	73	53	31	45	73	354	57.6	38.3	10.5	--	--	--
ORANGE COUNTY																						
16	North Orange County	3177	365	3.8	1.7	357	0.113	0.086	0.082	0	12	8	1	5	12	365	76.2	61.3	14.5	--	--	--
17	Central Orange County	3176	365	2.5	2.1	365	0.090	0.076	0.073	0	4	2	0	0	4	353	81.2	63.5	14.2	--	--	--
17	I-5 Near Road##	3131	364	3.0 e	2.6	--	--	--	--	--	--	--	--	--	--	365	86.4	64.1	22.5	--	--	--
18	North Coastal Orange County	3195	181*	1.7	1.4	181*	0.088	0.080	0.073	0	4	1	0	0	4	181*	45.3	42.2	7.9	181*	1.9	1.7
19	Saddleback Valley	3812	340	1.4	0.9	365	0.103	0.083	0.082	0	25	14	0	3	25	--	--	--	--	--	--	--
RIVERSIDE COUNTY																						
22	Corona/Norco Area	4155	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	365	1.9	1.7	365	0.145	0.118	0.102	2	81	58	32	47	81	365	63.0	57.9	15.0	365	2.5	1.9
23	Metropolitan Riverside County 3	4165	365	2.2	2.0	362	0.144	0.111	0.102	2	64	48	21	41	64	365	65.1	51.9	13.2	--	--	--
24	Perris Valley	4149	--	--	--	365	0.120	0.105	0.094	0	80	52	22	33	80	--	--	--	--	--	--	--
25	Lake Elsinore	4158	365	1.2	0.8	365	0.121	0.098	0.093	0	54	35	15	23	54	365	49.0	38.3	8.2	--	--	--
26	Temecula Valley	4031	--	--	--	365	0.104	0.088	0.086	0	47	26	6	4	47	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	--	--	--	365	0.128	0.105	0.101	2	82	64	32	50	82	359	56.3	46.0	8.0	--	--	--
30	Coachella Valley 1**	4137	365	1.0	0.5	365	0.113	0.097	0.093	0	57	36	13	18	57	362	42.5	37.7	6.5	--	--	--
30	Coachella Valley 2**	4157	--	--	--	365	0.107	0.093	0.087	0	44	27	8	8	44	--	--	--	--	--	--	--
30	Coachella Valley 3**	4032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	5175	365	1.9	1.4	365	0.150	0.127	0.112	9	87	72	42	66	87	365	64.1	48.7	15.3	--	--	--
33	I-10 Near Road##	5035	359	4.2	1.3	--	--	--	--	--	--	--	--	--	--	362	86.0	77.3	28.8	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	--	--	--	--	--	--	--	--	358	93.2	76.3	32.1	--	--	--
34	Central San Bernardino Valley 1	5197	365	1.6	1.3	361	0.137	0.118	0.095	2	49	38	16	33	49	345	69.2	58.4	18.3	365	3.9	2.1
34	Central San Bernardino Valley 2	5203	357	2.5	2.3	365	0.158	0.136	0.114	14	112	88	57	81	112	365	65.8	56.5	15.9	--	--	--
35	East San Bernardino Valley	5204	--	--	--	363	0.156	0.135	0.109	9	114	89	60	79	114	--	--	--	--	--	--	--
37	Central San Bernardino Mountains	5181	--	--	--	359	0.146	0.121	0.114	11	110	90	63	76	110	--	--	--	--	--	--	--
38	East San Bernardino Mountains	5818	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--
99	DISTRICT MAXIMUM			6.1	4.6		0.158	0.136	0.114	14	114	90	63	81	114		115.5	82.5	32.1		19.7	14.3
99	SOUTH COAST AIR BASIN			6.1	4.6		0.158	0.136	0.114	26	145	122	82	109	145		115.5	82.5	32.1		19.7	14.3

* Incomplete data ** Salton Sea Air Basin -- Pollutant not monitored ppm - Parts Per Million parts of air, by volume ppb – Parts Per Billion parts of air, by volume
AAM = Annual Arithmetic Mean ## Four near-road sites measuring one or more of the pollutants $PM_{2.5}$, CO and/or NO_2 are operating near freeways: I-5, I-10, I-710 and CA-60.

a) - The federal and state 8-hour standards (9 ppm and 9.0 ppm) were not exceeded. The federal and state 1-hour CO standards (35 ppm and 20 ppm) were not exceeded either.
b) - The current (2015) O_3 federal standard was revised effective December 28, 2015.
c) - The NO_2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO_2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm and 0.030 ppm.
d) – The federal SO_2 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average SO_2 > 0.25 ppm (250 ppb) and 24-hour average SO_2 > 0.04 ppm (40 ppb).
e) - Previous value of 8.4 ppm was invalidated due to data quality issues

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182
www.aqmd.gov

For information on the current standard levels and most recent revisions please refer to "Appendix II – Current Air Quality" of the "2016 AQMP" which can be accessed at http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/appendix-ii-final-2012.pdf?sfvrsn=4. Maps showing the source/receptor area boundaries can be accessed via the Internet by entering your address in the AQMD Current Hourly Air Quality Map, at http://www.aqmd.gov/aqimap. A printed map or copy of the AQMP Appendix II is also available free of charge from the AQMD Public Information Center at 1-800-CUT-SMOG.

2017 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2017

Source/Receptor Area No.	Location	Station No.	Suspended Particulates PM10 [e] No. Days of Data	Max. Conc. in µg/m³ 24-hour	No. (%) Samples Exceeding Standards Federal > 150 µg/m³ 24-hour	No. (%) Samples Exceeding Standards State > 50 µg/m³ 24-hour	Annual. Average Conc. [f] (AAM) µg/m³	Fine Particulates PM2.5 [g] No. Days of Data	Max. Conc. in µg/m³ 24-hour	98th Percentile Conc. in µg/m³ 24-hour	No (%) Samples Exceeding Federal Std > 35 µg/m³ 24-hour	Annual. Average Conc. [h] (AAM) µg/m³	Lead [i] Max. Monthly Average Conc. µg/m³	Max. 3-Months Rolling Averages µg/m³	PM10 Sulfate [j] No. Days of Data	Max. Conc. in µg/m³ 24-hour
LOS ANGELES COUNTY																
1	Central LA	087	340	96	0	41 (12%)	34.4	358	49.20	27.80	5 (1.4%)	11.94	0.017	0.01	58	5.1
2	Northwest Coastal LA County	091	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	Southwest Coastal LA County	820	57	46	0	0	19.8	--	--	--	--	--	0.005	0.00	57	5.2
4	South Coastal LA County 1	072	--	--	--	--	--	348	55.30	32.30	4 (1.1%)	10.90	--	--	--	--
4	South Coastal LA County 2	077	34*	70	0	2 (6%)	27.3	356	56.30	31.10	5 (1.4%)	11.02	0.010	0.01	34	3.1
4	South Coastal LA County 3	033	57	79	0	9 (16%)	33.3	--	--	--	--	--	--	--	45	3.8
4	I-710 Near Road##	032	--	--	--	--	--	365	85.40	35.60	8 (2.2%)	12.90	--	--	--	--
6	West San Fernando Valley	074	--	--	--	--	--	109	35.20	20.70	0	9.70	--	--	--	--
8	West San Gabriel Valley	088	--	--	--	--	--	121	22.80	18.80	0	9.68	--	--	--	--
9	East San Gabriel Valley 1	060	55	83	0	6 (11%)	31.4	115	24.90	21.20	0	10.42	0.018	0.01	55	3.9
9	East San Gabriel Valley 2	591	347	140	0	36 (10%)	31.7	--	--	--	--	--	--	--	--	--
10	Pomona/Walnut Valley	075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	South San Gabriel Valley	085	--	--	--	--	--	119	49.50	29.50	1 (0.8%)	12.23	0.010	0.01	--	--
12	South Central LA County	112	--	--	--	--	--	119	66.70	41.30	4 (3.4%)	12.92	0.016	0.01	--	--
13	Santa Clarita Valley	090	54*	66	0	2 (4%)	23.6	--	--	--	--	--	--	--	53	4.5
ORANGE COUNTY																
16	North Orange County	3177	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17	Central Orange County	3176	332	128	0	17 (5%)	26.3	305*	53.90	31.20	6 (2%)	11.39	--	--	58	3.3
17	I-5 Near Road##	3131	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18	North Coastal Orange County	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	3812	57	58	0	1 (2%)	18.4	113	19.50	15.00	0	8.11	--	--	57	3.0
RIVERSIDE COUNTY																
22	Norco/Corona	4155	56	85	0	7 (13%)	31.2	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	366	138	0	103 (28%)	41.6	353	50.30	29.50	6 (1.7%)	12.18	0.008	0.01	119	4.0
23	Metropolitan Riverside County 3+	4165	359	144	0	194 (54%)	54.4	358	62.20	39.80	9 (2.5%)	13.40	--	--	58	3.3
24	Perris Valley	4149	59	75	0	11 (19%)	32.2	--	--	--	--	--	--	--	59	3.0
25	Lake Elsinore	4158	364	133	0	9 (2%)	22.5	--	--	--	--	--	--	--	--	--
26	Temecula Valley	4031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	59	97	0	1 (2%)	22.4	--	--	--		--	--	--	59	2.8
30	Coachella Valley 1**	4137	363	93	0	7 (2%)	21.0	114	14.50	12.80	0	6.05	--	--	56	2.8
30	Coachella Valley 2**	4157	363	128	0	43 (12%)	34.0	110	18.80	14.70	0	8.10	--	--	118	3.4
30	Coachella Valley 3**+	4032	317	150	0	76 (24%)	42.0	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																
32	Northwest San Bernardino Valley	5175	320	106	0	26 (8%)	31.5	--	--	--	--	--	0.004	0.00	--	--
33	I-10 Near Road##	5035	--	--	--	--	--	--	--	--	--	--	--	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	359	44.80	34.50	7 (1.9%)	14.43	--	--	--	--
34	Central San Bernardino Valley 1	5197	43*	75	0	7 (16%)	39.3	120	39.20	26.50	1 (0.8%)	12.04	--	--	43	3.7
34	Central San Bernardino Valley 2+	5203	356	86	0	35 (10%)	30.9	116	38.20	25.60	1 (0.9%)	11.43	0.010	0.01	59	3.6
35	East San Bernardino Valley	5204	59	77	0	2 (3%)	25.8	--	--	--	--	--	--	--	59	3.2
37	Central San Bernardino Mountains	5181	55	56	0	2 (4%)	17.6	--	--	--	--	--	--	--	55	2.4
38	East San Bernardino Mountains	5818	--	--	--	--	--	49	23.50	23.50	0	5.85	--	--	--	--
	DISTRICT MAXIMUM			150	0	194	54.4		85.40	41.3	9	14.43	0.018	0.01		5.2
	SOUTH COAST AIR BASIN			144	0	207	54.4		85.40	41.3	15	14.43	0.018	0.01		5.2

* Incomplete data ** Salton Sea Air Basin µg/m³ - Micrograms per cubic meter of air AAM = Annual Arithmetic Mean -- - Pollutant not monitored

Four near-road sites measuring one or more of the pollutants PM2.5, CO and/or NO2 are operating near the following freeways: I-5, I-10, I-710 and CA-60.

\+ High PM10 (≥ 155 µg/m3) data recorded in Coachella Valley (due to high winds) and the Basin (due to Independence Day fireworks and high winds) are excluded in accordance with the U.S. EPA Exceptional Event Rule.

e) – PM10 statistics listed above are based on combined Federal Reference Method (FRM) and Federal Equivalent Method (FEM) data.

f) - State annual average (AAM) PM10 standard is > 20 µg/m³. Federal annual PM10 standard (AAM > 50 µg/m³) was revoked in 2006.

g) - PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for real-time alerts and forecasting only.

h) - Both Federal and State standards are annual average (AAM) > 12.0 µg/m³.

i) - Federal lead standard is 3-months rolling average > 0.15 µg/m³; state standard is monthly average ≥ 1.5 µg/m³. .Lead standards were not exceeded.

j) - State sulfate standard is 24-hour ≥ 25 µg/m³. There is no federal standard for sulfate. Sulfate data is not available at this time.

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2018 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2018

Source/Receptor Area No.	Location	Station No.	Carbon Monoxide a)			Ozone b)										Nitrogen Dioxide c)				Sulfur Dioxide d)		
										No. Days Standard Exceeded												
			No. Days of Data	Max Conc. in ppm 1-hour	Max Conc. in ppm 8-hour	No. Days of Data	Max. Conc. in ppm 1-hour	Max. Conc. in ppm 8-hour	Fourth High Conc. ppm 8-hour	Old Federal > 0.124 ppm 1-hour	Current Federal > 0.070 ppm 8-hour	2008 Federal > 0.075 ppm 8-hour	1997 Federal > 0.084 ppm 8-hour	Current State > 0.09 ppm 1-hour	Current State > 0.070 ppm 8-hour	No. Days of Data	Max Conc. in ppb 1-hour	98th Percentile Conc. ppb 1-hour	Annual Average AAM Conc. ppb	No. Days of Data	Max. Conc. in ppb 1-hour	99th Percentile Conc. ppb 1-hour
LOS ANGELES COUNTY																						
1	Central LA	087	365	2.0	1.7	359	0.098	0.073	0.071	0	4	0	0	2	4	365	70.1	57.2	18.5	358	17.9	2.8
2	Northwest Coastal LA County	091	359	1.6	1.3	364	0.094	0.073	0.068	0	2	0	0	0	2	242	64.7	46.1	12.6	--	--	--
3	Southwest Coastal LA County	820	342	1.8	1.5	365	0.074	0.065	0.060	0	0	0	0	0	0	338	59.6	49.8	9.2	365	11.5	5.3
4	South Coastal LA County 1	072	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 2	077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 3	033	364	4.7	2.1	363	0.074	0.063	0.053	0	0	0	0	0	0	359	85.3	62.7	17.3	365	10.5	9.4
4	I-710 Near Road##	032	--	--	--	--	--	--	--	--	--	--	--	--	--	355	90.3	79.1	22.3	--	--	--
6	West San Fernando Valley	074	359	3.4	2.1	362	0.120	0.101	0.094	0	49	23	12	14	49	365	57.2	50.1	12.1	--	--	--
8	West San Gabriel Valley	088	365	2.0	1.4	365	0.112	0.090	0.085	0	19	8	4	8	19	364	68.2	54.4	14.4	--	--	--
9	East San Gabriel Valley 1	060	365	1.4	1.0	364	0.139	0.099	0.097	3	42	23	10	24	42	363	70.8	56.8	14.9	--	--	--
9	East San Gabriel Valley 2	591	365	1.0	0.8	365	0.140	0.104	0.102	5	46	27	10	32	46	349	55.2	44.2	9.7	--	--	--
10	Pomona/Walnut Valley	075	365	2.1	1.8	362	0.112	0.092	0.081	0	10	8	3	7	10	365	67.9	60.4	19.4	--	--	--
11	South San Gabriel Valley	085	344	2.0	1.8	352	0.115	0.082	0.074	0	5	2	0	3	5	356	76.8	59.7	18.3	--	--	--
12	South Central LA County	112	357	4.7	3.5	365	0.075	0.063	0.058	0	0	0	0	0	0	335	68.3	55.6	15.0	--	--	--
13	Santa Clarita Valley	090	365	1.0	0.8	365	0.132	0.106	0.097	3	52	36	12	21	52	365	58.9	37.9	10.9	--	--	--
ORANGE COUNTY																						
16	North Orange County	3177	365	3.0	1.4	365	0.111	0.077	0.071	0	4	3	0	3	4	365	67.1	50.4	13.0	--	--	--
17	Central Orange County	3176	358	2.3	1.9	365	0.112	0.071	0.065	0	1	0	0	1	1	365	66.0	54.5	13.7	--	--	--
17	I-5 Near Road##	3131	320	2.7	2.2	--	--	--	--	--	--	--	--	--	--	348	61.7	55.8	20.8	--	--	--
18	North Coastal Orange County	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	3812	300	1.2	0.9	365	0.121	0.088	0.074	0	9	2	2	2	9	--	--	--	--	--	--	--
RIVERSIDE COUNTY																						
22	Corona/Norco Area	4155	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	365	2.2	2.0	365	0.123	0.101	0.096	0	53	34	14	22	53	364	55.4	50.5	14.3	360	1.7	1.6
23	Metropolitan Riverside County 3	4165	358	2.6	2.4	355	0.129	0.107	0.097	1	57	32	12	21	57	358	54.5	50.4	13.7	--	--	--
24	Perris Valley	4149	--	--	--	365	0.117	0.103	0.095	0	67	47	19	31	67	--	--	--	--	--	--	--
25	Lake Elsinore	4158	361	1.1	0.8	365	0.116	0.095	0.089	0	30	26	7	16	30	359	41.3	36.4	8.5	--	--	--
26	Temecula Valley	4031	--	--	--	363	0.107	0.085	0.077	0	15	5	1	2	15	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	--	--	--	363	0.119	0.106	0.100	0	69	43	22	33	69	344	50.6	46.5	8.5	--	--	--
30	Coachella Valley 1**	4137	349	1.1	0.8	362	0.111	0.099	0.093	0	56	22	10	11	56	364	42.6	35.4	6.8	--	--	--
30	Coachella Valley 2**	4157	--	--	--	359	0.106	0.091	0.089	0	49	28	8	4	49	--	--	--	--	--	--	--
30	Coachella Valley 3**	4032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	5175	365	1.7	1.2	363	0.133	0.111	0.106	6	52	32	14	25	52	355	58.7	48.9	14.7	--	--	--
33	I-10 Near Road##	5035	339	1.6	1.3	--	--	--	--	--	--	--	--	--	--	339	88.3	67.7	27.2	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	--	--	--	--	--	--	--	--	357	79.4	71.3	30.4	--	--	--
34	Central San Bernardino Valley 1	5197	365	1.9	1.1	365	0.141	0.111	0.106	7	69	47	18	38	69	365	63.0	55.9	18.3	362	2.9	2.5
34	Central San Bernardino Valley 2	5203	362	2.7	2.5	362	0.138	0.116	0.107	7	102	71	33	63	102	362	57.3	49.9	15.8	--	--	--
35	East San Bernardino Valley	5204	--	--	--	365	0.136	0.114	0.111	4	94	66	26	53	94	--	--	--	--	--	--	--
37	Central San Bernardino Mountains	5181	--	--	--	362	0.142	0.125	0.105	3	113	91	46	57	113	--	--	--	--	--	--	--
38	East San Bernardino Mountains	5818	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	DISTRICT MAXIMUM			4.7	3.5		0.142	0.125	0.111	7	113	91	46	63	113		90.3	79.1	30.4		17.9	9.4
	SOUTH COAST AIR BASIN			4.7	3.5		0.142	0.125	0.111	10	141	108	59	84	141		90.3	79.1	30.4		17.9	9.4

** Salton Sea Air Basin -- Pollutant not monitored ppm - Parts Per Million parts of air, by volume ppb – Parts Per Billion parts of air, by volume
AAM = Annual Arithmetic Mean ## Four near-road sites measuring one or more of the pollutants $PM_{2.5}$, CO and/or NO_2 are operating near freeways: I-5, I-10, I-710 and CA-60.

a) - The federal and state 8-hour CO standards (9 ppm and 9.0 ppm) and the federal and state 1-hour CO standards (35 ppm and 20 ppm) were not exceeded.
b) - The current (2015) O_3 federal standard was revised effective December 28, 2015.
c) - The NO_2 federal 1-hour standard is100 ppb and the federal annual standard is 53.4 ppb. The state 1-hour and annual standards are 0.18 ppm and 0.030 ppm, respectively.
d) – The federal SO_2 1-hour standard is 75 ppb (0.075 ppm). The state 1-hour SO standard is 0.25 ppm (250 ppb) and the state 24-hour SO_2 standard is 0.04 ppm (40 ppb).

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182
www.aqmd.gov

For information on the current standard levels and most recent revisions please refer to "Appendix II – Current Air Quality" of the "2016 AQMP" which can be accessed at https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp . Maps showing the source/receptor area boundaries can be accessed via the Internet by entering your address in the South Coast AQMD Current Hourly Air Quality Map, at https://www.aqmd.gov/aqimap. A printed map or copy of the AQMP Appendix II is also available free of charge from the South Coast AQMD Public Information Center at 1-800-CUT-SMOG.

2018 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2018

Source/Receptor Area No.	Location	Station No.	Suspended Particulates PM10 e)+					Fine Particulates PM2.5 g)#					Lead i)++		PM10 Sulfate j)	
			No. Days of Data	Max. Conc. in µg/m3 24-hour	No. (%) Samples Exceeding Standards Federal > 150 µg/m3 24-hour	No. (%) Samples Exceeding Standards State > 50 µg/m3 24-hour	Annual. Average Conc. f) (AAM) µg/m3	No. Days of Data	Max. Conc. in µg/m3 24-hour	98th Percentile Conc. in µg/m3 24-hour	No (%) Samples Exceeding Federal Std. > 35 µg/m3 24-hour	Annual. Average Conc. h) (AAM) µg/m3	Max. Monthly Average Conc. µg/m3	Max. 3-Months Rolling Averages µg/m3	No. Days of Data	Max. Conc. in µg/m3 24-hour
LOS ANGELES COUNTY																
1	Central LA	087	363	81	0	31 (9%)	34.1	344	43.80	30.50	3 (0.9%)	12.58	0.011	0.011	53	4.5
2	Northwest Coastal LA County	091	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	Southwest Coastal LA County	820	48	45	0	0	20.5	--	--	--	--	--	0.005	0.004	48	5.2
4	South Coastal LA County 1	072	--	--	--	--	--	342	46.40	29.80	2 (0.6%)	10.99	--	--	--	--
4	South Coastal LA County 2	077	58	55	0	1 (2%)	23.9	330	47.10	27.70	2 (0.6%)	11.15	0.006	0.007	58	4.0
4	South Coastal LA County 3	033	57	84	0	4 (7%)	32.3	--	--	--	--	--	--	--	57	5.0
4	I-710 Near Road##	032	--	--	--	--	--	359	46.10	31.90	4 (1.1%)	12.75	--	--	--	--
6	West San Fernando Valley	074	--	--	--	--	--	106	31.00	22.60	0	10.32	--	--	--	--
8	West San Gabriel Valley	088	--	--	--	--	--	121	32.50	29.50	0	10.28	--	--	--	--
9	East San Gabriel Valley 1	060	60	78	0	10 (17%)	32.2	119	30.20	25.90	0	10.35	--	--	60	4.0
9	East San Gabriel Valley 2	591	317	101	0	20 (6%)	27.1	--	--	--	--	--	--	--	--	--
10	Pomona/Walnut Valley	075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	South San Gabriel Valley	085	--	--	--	--	--	113	35.40	28.10	0	12.31	0.009	0.009	--	--
12	South Central LA County	112	--	--	--	--	--	117	43.00	34.20	1 (0.9%)	12.96	0.009	0.011	--	--
13	Santa Clarita Valley	090	54	49	0	0	23.4	--	--	--	--	--	--	--	54	3.5
ORANGE COUNTY																
16	North Orange County	3177	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17	Central Orange County	3176	320	129	0	13 (4%)	27.2	353	54.10	28.90	3 (0.8%)	11.02	--	--	61	4.1
17	I-5 Near Road##	3131	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18	North Coastal Orange County	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	3812	59	55	0	1 (2%)	19.0	107	20.80	18.50	0	8.31	--	--	59	4.0
RIVERSIDE COUNTY																
22	Corona/Norco Area	4155	58	100	0	3 (5%)	30.2	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	356	126	0	132 (37%)	44.0	354	50.70	26.30	2 (0.6%)	12.41	0.009	0.007	117	4.1
23	Metropolitan Riverside County 3	4165	354	148	0	168 (47%)	49.4	349	64.80	32.80	4 (1.1%)	13.87	--	--	59	3.5
24	Perris Valley	4149	60	64	0	3 (5%)	29.7	--	--	--	--	--	--	--	60	3.2
25	Elsinore Valley	4158	342	104	0	9 (3%)	22.4	--	--	--	--	--	--	--	--	--
26	Temecula Valley	4031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	61	39	0	0	19.4	--	--	--	--	--	--	--	61	2.9
30	Coachella Valley 1**	4137	359	117	0	7 (2%)	21.0	122	30.20	14.30	0	6.02	--	--	61	2.7
30	Coachella Valley 2**	4157	353	146	0	43 (12%)	33.2	122	28.70	17.00	0	8.32	--	--	118	3.7
30	Coachella Valley 3**	4032	352	274	2 (1%)	63 (18%)	38.8	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																
32	Northwest San Bernardino Valley	5175	322	73	0	14 (4%)	32.3	--	--	--	--	--	--	--	--	--
33	I-10 Near Road##	5035	--	--	--	--	--	--	--	--	--	--	--	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	357	47.90	30.40	5 (1.4%)	14.31	--	--	--	--
34	Central San Bernardino Valley 1	5197	56	64	0	9 (16%)	34.1	110	29.20	26.80	0	11.13	--	--	56	3.9
34	Central San Bernardino Valley 2	5203	355	129	0	25 (7%)	30.2	114	30.10	22.90	0	11.17	0.008	0.008	58	3.8
35	East San Bernardino Valley	5204	59	74	0	2 (3%)	25.9	--	--	--	--	--	--	--	59	3.6
37	Central San Bernardino Mountains	5181	59	78	0	1 (2%)	19.5	--	--	--	--	--	--	--	59	2.4
38	East San Bernardino Mountains	5818	--	--	--	--	--	54	17.30	16.00	0	6.80	--	--	--	--
	DISTRICT MAXIMUM			148	0	168	49.4		64.8	34.2	5	14.31	0.011	0.011		5.2
	SOUTH COAST AIR BASIN			148	0	185	49.4		64.8	34.2	11	14.31	0.011	0.011		5.2

** Salton Sea Air Basin µg/m3 – Micrograms per cubic meter of air AAM – Annual Arithmetic Mean -- Pollutant not monitored

\+ High PM10 (≥ 155 µg/m3) data recorded in the Coachella Valley and the Basin attributed to high winds are excluded because they likely meet the exclusion criteria specified in the U.S. EPA Exceptional Event Rule. Exceptional event demonstrations will be submitted to U.S. EPA for events that have regulatory significance.

\# PM2.5 concentrations above the 24-hour standard attributed to wildfire smoke and fireworks are excluded because they likely meet the exclusion criteria specified in the U.S. EPA Exceptional Event Rule. Exceptional event demonstrations will be submitted to U.S. EPA for events that have regulatory significance.

++ Higher lead concentrations were recorded at near-source monitoring sites immediately downwind of stationary lead sources. Maximum monthly and 3-month rolling averages recorded were 0. 096 µg/m3 and 0.059 µg/m3, respectively.

Four near-road sites measuring one or more of the pollutants PM2.5, CO and/or NO2 are operating near the following freeways: I-5, I-10, CA-60 and I-710.

e) PM10 statistics listed above are based on combined Federal Reference Method (FRM) and Federal Equivalent Method (FEM) data.

f) State annual average (AAM) PM10 standard is 20 µg/m3. Federal annual PM10 standard (50 µg/m3) was revoked in 2006.

g) PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for real-time alerts and forecasting only.

h) The federal and state annual standards are 12.0 µg/m3.

i) Federal lead standard is 3-months rolling average > 0.15 µg/m3; state standard is monthly average ³ 1.5 µg/m3. Lead standards were not exceeded.

j) State sulfate standard is 24-hour ³ 25 µg/m3. There is no federal standard for sulfate.

2019 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2019

Source/Receptor Area No.	Location	Station No.	Carbon Monoxide a)			Ozone b)										Nitrogen Dioxide c)				Sulfur Dioxide d)		
										No. Days Standard Exceeded												
			No. Days of Data	Max Conc. in ppm 1-hour	Max Conc. in ppm 8-hour	No. Days of Data	Max. Conc. in ppm 1-hour	Max. Conc. in ppm 8-hour	Fourth High Conc. ppm 8-hour	Old Federal > 0.124 ppm 1-hour	Current Federal > 0.070 ppm 8-hour	2008 Federal > 0.075 ppm 8-hour	1997 Federal > 0.084 ppm 8-hour	Current State > 0.09 ppm 1-hour	Current State > 0.070 ppm 8-hour	No. Days of Data	Max Conc. in ppb 1-hour	98th Percentile Conc. ppb 1-hour	Annual Average AAM Conc. ppb	No. Days of Data	Max. Conc. in ppb 1-hour	99th Percentile Conc. ppb 1-hour
LOS ANGELES COUNTY																						
1	Central LA	87	364	2.0	1.6	364	0.085	0.080	0.065	0	2	1	0	0	2	365	69.7	55.5	17.7	365	10.0	2.3
2	Northwest Coastal LA County	91	364	1.9	1.2	360	0.086	0.075	0.064	0	1	0	0	0	1	365	48.8	43.0	9.7	--	--	--
3	Southwest Coastal LA County	820	364	1.8	1.3	365	0.082	0.067	0.060	0	0	0	0	0	0	363	56.6	48.9	9.5	365	8.2	3.7
4	South Coastal LA County 1	72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 2	77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 3	33	340	3.0	2.1	343	0.074	0.064	0.055	0	0	0	0	0	0	255	71.8	56.3	16.2	344	8.9	7.7
4	I-710 Near Road##	32	--	--	--	--	--	--	--	--	--	--	--	--	--	365	97.7	78.3	22.8	--	--	--
6	West San Fernando Valley	74	363	2.6	2.2	267	0.101	0.087	0.076	0	6	4	1	1	6	365	64.4	43.8	10.7	--	--	--
8	West San Gabriel Valley	88	361	1.5	1.2	302	0.120	0.098	0.086	0	12	8	4	4	12	361	59.1	50.6	13.2	--	--	--
9	East San Gabriel Valley 1	60	361	1.6	1.1	362	0.123	0.094	0.090	0	39	21	10	34	39	365	59.7	49.8	13.7	--	--	--
9	East San Gabriel Valley 2	591	360	1.2	0.8	356	0.130	0.102	0.097	1	58	38	17	46	58	360	52.9	36.5	8.6	--	--	--
10	Pomona/Walnut Valley	75	364	1.7	1.3	365	0.096	0.083	0.077	0	12	4	0	1	12	365	64.4	57.8	17.9	--	--	--
11	South San Gabriel Valley	85	364	1.9	1.5	364	0.108	0.091	0.073	0	7	3	1	5	7	364	61.8	55.1	17.6	--	--	--
12	South Central LA County	112	363	3.8	3.2	363	0.100	0.079	0.064	0	1	1	0	1	1	363	70.0	52.8	14.1	--	--	--
13	Santa Clarita Valley	90	359	1.5	1.2	359	0.128	0.106	0.101	1	56	42	17	34	56	357	46.3	35.3	9.1	--	--	--
ORANGE COUNTY																						
16	North Orange County	3177	364	2.6	1.2	364	0.107	0.094	0.074	0	6	3	1	2	6	362	59.4	44.5	12.1	--	--	--
17	Central Orange County	3176	363	2.4	1.3	365	0.096	0.082	0.064	0	1	1	0	1	1	365	59.4	49.2	12.7	--	--	--
17	I-5 Near Road##	3131	350	2.6	1.6	--	--	--	--	--	--	--	--	--	--	365	59.4	50.4	19.2	--	--	--
18	North Coastal Orange County	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	3812	363	1.0	0.8	365	0.106	0.087	0.082	0	11	7	1	3	11	--	--	--	--	--	--	--
RIVERSIDE COUNTY																						
22	Corona/Norco Area	4155	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	364	1.5	1.2	360	0.123	0.096	0.092	0	59	37	15	24	59	365	56.0	52.8	13.5	365	1.8	1.4
23	Metropolitan Riverside County 3	4165	364	2.0	1.3	365	0.131	0.099	0.096	2	64	42	19	26	64	346	56.0	49.4	12.2	--	--	--
24	Perris Valley	4149	--	--	--	365	0.118	0.095	0.090	0	64	38	13	26	64	--	--	--	--	--	--	--
25	Lake Elsinore	4158	364	1.6	0.7	365	0.108	0.089	0.079	0	28	11	1	4	28	365	38.0	33.3	6.8	--	--	--
26	Temecula Valley	4031	--	--	--	365	0.091	0.079	0.074	0	6	2	0	0	6	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	--	--	--	365	0.119	0.096	0.093	0	59	37	11	24	59	364	56.0	43.3	7.5	--	--	--
30	Coachella Valley 1**	4137	360	1.3	0.7	364	0.100	0.084	0.083	0	34	17	0	5	34	361	41.4	32.2	7.3	--	--	--
30	Coachella Valley 2**	4157	--	--	--	365	0.103	0.087	0.083	0	43	15	2	4	43	--	--	--	--	--	--	--
30	Coachella Valley 3**	4032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	5175	337	1.5	1.1	338	0.131	0.107	0.097	1	52	34	13	31	52	328	57.9	46.4	14.0	--	--	--
33	I-10 Near Road##	5035	364	1.5	1.1	--	--	--	--	--	--	--	--	--	--	346	86.3	70.5	27.6	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	--	--	--	--	--	--	--	--	364	87.7	73.9	29.0	--	--	--
34	Central San Bernardino Valley 1	5197	359	2.7	1.0	364	0.124	0.109	0.097	0	67	46	20	41	67	365	76.1	57.7	17.2	358	2.4	1.9
34	Central San Bernardino Valley 2	5203	352	1.3	1.1	354	0.127	0.114	0.103	2	96	73	37	63	96	352	59.3	46.3	14.3	--	--	--
35	East San Bernardino Valley	5204	--	--	--	364	0.137	0.117	0.106	8	109	88	63	73	109	--	--	--	--	--	--	--
37	Central San Bernardino Mountains	5181	--	--	--	365	0.129	0.112	0.106	2	99	79	44	53	99	--	--	--	--	--	--	--
38	East San Bernardino Mountains	5818	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	DISTRICT MAXIMUM e)			3.8	3.2		0.137	0.117	0.106	8	109	88	63	73	109		97.7	78.3	29.0		10.0	7.7
	SOUTH COAST AIR BASIN f)			3.8	3.2		0.137	0.117	0.106	10	126	101	71	82	126		97.7	78.3	29.0		10.0	7.7

*Incomplete Data ** Salton Sea Air Basin -- Pollutant not monitored ppm - Parts Per Million parts of air, by volume ppb – Parts Per Billion parts of air, by volume
AAM = Annual Arithmetic Mean ## Four near-road sites measuring one or more of the pollutants $PM_{2.5}$, CO and/or NO_2 are operating near freeways: I-5, I-10, I-710 and CA-60.

a) - The federal and state 8-hour CO standards (9 ppm and 9.0 ppm) and the federal and state 1-hour CO standards (35 ppm and 20 ppm) were not exceeded.

b) - The current (2015) O_3 federal standard was revised effective December 28, 2015.

c) - The NO_2 federal 1-hour standard is100 ppb and the federal annual standard is 53.4 ppb. The state 1-hour and annual standards are 0.18 ppm and 0.030 ppm.

d) - The federal SO_2 1-hour standard is 75 ppb (0.075 ppm). The state 1-hour SO standard is 0.25 ppm (250 ppb) and the state 24-hour SO_2 standard is 0.04 ppm (40 ppb).

e) - District Maximum is the maximum value calculated at any station in the South Coast AQMD Jurisdiction

f) - Concentrations are the maximum value observed at any station in the South Coast Air Basin. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the South Coast Air Basin.

For information on the current standard levels and most recent revisions please refer to "Appendix II – Current Air Quality" of the "2016 AQMP" which can be accessed at https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp . Maps showing the source/receptor area boundaries can be accessed via the Internet by entering your address in the South Coast AQMD Current Hourly Air Quality Map, at https://www.aqmd.gov/aqimap. A printed map or copy of the AQMP Appendix II is also available free of charge from the South Coast AQMD Public Information Center at 1-800-CUT-SMOG.

2019 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2019

Source/Receptor Area No.	Location	Station No.	Suspended Particulates PM10 e)+ No. Days of Data	Max. Conc. in µg/m3 24-hour	No. (%) Samples Exceeding Standards Federal > 150 µg/m3 24-hour	No. (%) Samples Exceeding Standards State > 50 µg/m3 24-hour	Annual. Average Conc. f) (AAM) µg/m3	Fine Particulates PM2.5 g)# No. Days of Data	Max. Conc. in µg/m3 24-hour	98th Percentile Conc. in µg/m3 24-hour	No (%) Samples Exceeding Federal Std. > 35 µg/m3 24-hour	Annual. Average Conc. h) (AAM) µg/m3	Lead i)++ Max. Monthly Average Conc. µg/m3	Max. 3-Months Rolling Averages µg/m3	PM10 Sulfate j) No. Days of Data	Max. Conc. in µg/m3 24-hour
LOS ANGELES COUNTY																
1	Central LA	087	9	62	0	3 (6%)	25.5	360	43.50	28.30	1 (0.3%)	10.85	0.012	0.010	55	5.1
2	Northwest Coastal LA County	091	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3	Southwest Coastal LA County	820	59	62	0	2 (3%)	19.2	--	--	--	--	--	0.004	0.004	--	--
4	South Coastal LA County 1	072	--	--	--	--	--	159	28.00	20.70	0	9.23	--	--	--	--
4	South Coastal LA County 2	077	60	72	0	2 (3%)	21.0	354	30.60	23.20	0	9.22	0.006	0.005	--	--
4	South Coastal LA County 3	033	58	74	0	3 (5%)	26.9	--	--	--	--	--	--	--	59	5.8
4	I-710 Near Road##	032	--	--	--	--	--	365	36.70	26.40	1 (0.3%)	10.99	--	--	--	--
6	West San Fernando Valley	074	--	--	--	--	--	118	30.00	26.30	0	9.16	--	--	--	--
8	West San Gabriel Valley	088	--	--	--	--	--	118	30.90	24.60	0	8.90	--	--	--	--
9	East San Gabriel Valley 1	060	61	82	0	4 (7%)	28.1	120	28.30	21.20	0	9.18	--	--	61	6.2
9	East San Gabriel Valley 2	591	308	97	0	3 (1%)	20.8	--	--	--	--	--	--	--	--	--
10	Pomona/Walnut Valley	075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	South San Gabriel Valley	085	--	--	--	--	--	119	29.60	24.40	0	10.34	0.009	0.007	--	--
12	South Central LA County	112	--	--	--	--	--	303	39.50	26.60	1 (0.3%)	10.87	0.009	0.007	--	--
13	Santa Clarita Valley	090	60	62	0	1 (2%)	18.4	--	--	--	--	--	--	--	--	--
ORANGE COUNTY																
16	North Orange County	3177	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17	Central Orange County	3176	364	127	0	13 (4%)	21.9	346	36.10	23.30	3 (0.9%)	9.32	--	--	60	5.1
17	I-5 Near Road##	3131	--	--	--	--	--	--	--	--	--	--	--	--	--	--
18	North Coastal Orange County	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	3812	60	45	0	0	16.6	111	20.80	14.70	0	7.11	--	--	--	--
RIVERSIDE COUNTY																
22	Corona/Norco Area	4155	--	--	--	--	--	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	4144	120	99	0	21 (18%)	34.4	352	46.70	31.80	4 (1.1%)	11.13	0.008	0.007	121	14.6
23	Metropolitan Riverside County 3	4165	362	143	0	130 (36%)	43.1	356	46.70	36.20	9 (2.5%)	12.53	--	--	--	--
24	Perris Valley	4149	61	97	0	4 (7%)	25.3	--	--	--	--	--	--	--	--	--
25	Elsinore Valley	4158	301	93	0	5 (2%)	18.7	--	--	--	--	--	--	--	--	--
26	Temecula Valley	4031	--	--	--	--	--	--	--	--	--	--	--	--	--	--
29	San Gorgonio Pass	4164	56	63	0	2 (4%)	17.9	--	--	--	--	--	--	--	--	--
30	Coachella Valley 1**	4137	346	75	0	5 (1%)	19.5	119	15.50	12.40	0	6.05	--	--	--	--
30	Coachella Valley 2**	4157	361	141	0	27 (7%)	27.8	118	15.00	13.50	0	7.37	--	--	119	3.2
30	Coachella Valley 3**	4032	324	154	0	44 (14%)	33.3	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY																
32	Northwest San Bernardino Valley	5175	306	125	0	7 (2%)	28.1	--	--	--	--	--	--	--	--	--
33	I-10 Near Road##	5035	--	--	--	--	--	--	--	--	--	--	--	--	--	--
33	CA-60 Near Road##	5036	--	--	--	--	--	364	41.30	30.70	5 (1.4%)	12.70	--	--	--	--
34	Central San Bernardino Valley 1	5197	61	88	0	12 (20%)	34.8	114	46.50	29.70	2 (1.8%)	10.84	--	--	62	5.2
34	Central San Bernardino Valley 2	5203	269	112	0	36 (13%)	29.9	97	34.80	33.00	0	10.06	0.013	0.011	--	--
35	East San Bernardino Valley	5204	59	44	0	0	21.2	--	--	--	--	--	--	--	--	--
37	Central San Bernardino Mountains	5181	54	38	0	0	16.1	--	--	--	--	--	--	--	--	--
38	East San Bernardino Mountains	5818	--	--	--	--	--	46	31.00	31.00	0	5.94	--	--	--	--
	DISTRICT MAXIMUM k)			154	0	130	43.1		46.7	36.2	9	12.70	0.013	0.011		14.6
	SOUTH COAST AIR BASIN m)			143	0	137	43.1		46.7	36.2	10	12.70	0.013	0.011		14.6

* Incomplete data due to the site improvement. ** Salton Sea Air Basin µg/m3 – Micrograms per cubic meter of air AAM – Annual Arithmetic Mean -- Pollutant not monitored

\+ High PM10 (≥ 155 µg/m3) data recorded in the Coachella Valley and the Basin (due to high winds) are excluded because they likely meet the exclusion criteria specified in the U.S. EPA Exceptional Event Rule. Exceptional event demonstrations will be submitted to U.S. EPA for events that have regulatory significance.

\# PM2.5 concentrations above the 24-hour standard attributed to wildfire smoke and fireworks are excluded because they likely meet the exclusion criteria specified in the U.S. EPA Exceptional Event Rule. Exceptional event demonstrations will be submitted to U.S. EPA for events that have regulatory significance.

e) PM10 statistics listed above are based on combined Federal Reference Method (FRM) and Federal Equivalent Method (FEM) data.

f) State annual average (AAM) PM10 standard is > 20 µg/m3. Federal annual PM10 standard (AAM > 50 µg/m3) was revoked in 2006.

g) PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for real-time alerts and forecasting only.

h) Both Federal and State standards are annual average (AAM) > 12.0 µg/m3.

i) Federal lead standard is 3-months rolling average > 0.15 µg/m3; state standard is monthly average ³ 1.5 µg/m3. Lead standards were not exceeded.

j) State sulfate standard is 24-hour ³ 25 µg/m3. There is no federal standard for sulfate.

k) District Maximum is the maximum value calculated at any station in the South Coast AQMD Jurisdiction

m) Concentrations are the maximum value observed at any station in the South Coast Air Basin. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the South Coast Air Basin.

++ Higher lead concentrations were recorded at near-source monitoring sites immediately downwind of stationary lead sources. Maximum monthly and 3-month rolling averages recorded were 0. 021 µg/m3 and 0.017 µg/m3, respectively.

Four near-road sites measuring one or more of the pollutants PM2.5, CO and/or NO2 are operating near the following freeways: I-5, I-10, CA-60 and I-710.

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: SO2
Year: 2017
Exceptional Events: Included (if any)

Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8383	5.7	3	3	350	1.5	1.4	0	0.36	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8557	19.7	15.7	14	360	3.2	2.9	0	0.85	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
8459	9.5	7.8	7	352	2.5	1.9	0	0.67	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09

Get detailed information about this report, including column descriptions, at https://www.epa.gov/outdoor-air-quality-data/about-air-data-reports#mon

AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated by state, local, and tribal organizations who own and submit the data.

Readers are cautioned not to rank order geographic areas based on AirData reports. Air pollution levels measured at a particular monitoring site are not necessarily representative of the air quality for an entire county or urban area.

This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: January 26, 2021

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: SO2
Year: 2018
Exceptional Events: Included (if any)

Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8392	17.9	2.9	3	350	1.3	1	0	0.34	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8634	10.5	9.9	9	359	2	2	0	0.7	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
8580	11.5	5.8	5	358	2	1.3	0	0.51	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09

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Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: January 26, 2021

Monitor Values Report

Geographic Area: Los Angeles County, CA
Pollutant: SO2
Year: 2019
Exceptional Events: Included (if any)

Note: The * indicates the mean does not satisfy minimum data completeness criteria.

Obs 1hr	First Max 1hr	Second Max 1hr	99th Percentile	Obs 24hr	First Max 24hr	Second Max 24hr	Days >STD	Annual Mean	Exc Events	Monitor Number	Site ID	Address	City	County	State	EPA Region
8621	10	2.8	2	361	1.4	1.1	0	0.33	None	9	060371103	1630 N Main St, Los Angeles	Los Angeles	Los Angeles	CA	09
8094	8.9	8.7	8	339	2.2	2.1	0	0.45	None	1	060374006	2425 Webster St., Long Beach, Ca	Long Beach	Los Angeles	CA	09
8625	8.2	5.5	4	360	1.1	1.1	0	0.29	None	1	060375005	7201 W. Westchester Parkway	Los Angeles	Los Angeles	CA	09

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AirData reports are produced from a direct query of the AQS Data Mart. The data represent the best and most recent information available to EPA from state agencies. However, some values may be absent due to incomplete reporting, and some values may change due to quality assurance activities. The AQS database is updated by state, local, and tribal organizations who own and submit the data.

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This report is based on monitor-level summary statistics. Air quality standards for some pollutants (PM2.5 and Pb) allow for combining data from multiple monitors into a site-level summary statistic that can be compared to the standard. In those cases, the site-level statistics may differ from the monitor-level statistics upon which this report is based.

Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: January 26, 2021