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TESORO
LOS ANGELES REFINERY

INTEGRATION AND COMPLIANCE PROJECT

FINAL
ENVIRONMENTAL IMPACT REPORT

VOLUME XIII: Appendices H and I

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APPENDIX H

SUPPLEMENTAL CONSTRUCTION HRA

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SUPPLEMENTAL HEALTH RISK ASSESSMENT

FOR THE

TESORO LOS ANGELES REFINERY INTEGRATION AND COMPLIANCE PROJECT – CONSTRUCTION EMISSIONS

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1.0 EXECUTIVE SUMMARY

In June 2013, the Tesoro Refining & Marketing Company LLC (Tesoro) purchased the BP West Coast Products LLC (BP) Carson Refinery (currently termed the Tesoro Carson Operations). The proposed project is intended to further integrate the Carson Operations with the adjacent Tesoro Wilmington Operations that comprise the Tesoro Los Angeles Refinery (Refinery). A health risk assessment (HRA) was conducted to support the Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA) for the proposed project. The purpose of the analysis was to evaluate the risk associated with toxic emissions from all sources of the proposed project to determine if it has the potential to produce significant risks.

In 2015, the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual contained substantial changes to the HRA methodology and provided guidance for use of the health risk assessment methodology for short-term projects (e.g., construction). This Supplemental HRA augments the previously prepared HRA presented in Appendix B-4 of the FEIR, which addressed operational emissions only, by including diesel particulate emissions from the construction equipment associated with the proposed project (i.e., portable engines, mobile equipment, etc.).

Construction will occur throughout the Refinery but will be clustered in different locations. For purposes of this analysis, the construction emission sources are divided into six construction areas and two line sources within the Refinery. All construction emission sources that are expected to operate within each of the six areas were combined into a single source. The interconnecting pipeline and electrical intertie construction zones were represented as two line sources.

The Supplemental HRA uses the same receptor locations as the operational HRA. The results of the Supplemental HRA are the combination of the construction equipment health risk and the operational health risk presented in Appendix B-4 of the FEIR. The Supplemental HRA conservatively assumes the construction activities for the proposed project occur concurrently with operation of the proposed project to provide a worst case assessment. Diesel particulate has been determined by OEHHA to have carcinogenic health risk, so only the cancer risk results are affected when combining the construction and operational HRA results. Non-cancer health risks are not affected.

For the combined scenario (i.e., construction and operational activities), the highest cancer risk at a residential receptor is 5.7 in one million. The worst-case cancer risk at a worker receptor is 9.3 in one million. This receptor is located along the fenceline[1] where long-term (multi-decade) 40 hour/week exposure is highly unlikely to occur. The highest calculated cancer risk at a sensitive receptor was 4.2 in one million, at Bethune Mary School.

[1] Per discussions with AQMD staff, fenceline receptors in the vicinity of the rail-line could be included as worker receptors as a conservative measure.

As shown in Table 1 below, the highest calculated cancer risks in the combined scenario at residential, sensitive, and worker receptors are below 10 in one million.

Table 1: Summary of Maximum Project Offsite Cancer and Non-cancer Risks (Operation and Construction Sources)

Location[a]	Operational HRA Cancer Risk - Increase Cases in-one-million	Supplemental HRA Cancer Risk[2] - Increase Cases in-one-million	Operational HRA - Hazard Index	Supplemental HRA - Hazard Index
Residential receptor [b]	3.7	5.7	0.030	0.033
Offsite workplace receptor	9.3	9.3	0.106	0.114
Sensitive Receptor [c]	2.1	4.2	0.025	0.027

[a] Excluding onsite grid receptors

[b] Worst-case residential exposure

[c] Maximum sensitive receptors:

Cancer Risk: Bethune Mary School

Chronic Risk: Bethune Mary School

2.0 INTRODUCTION

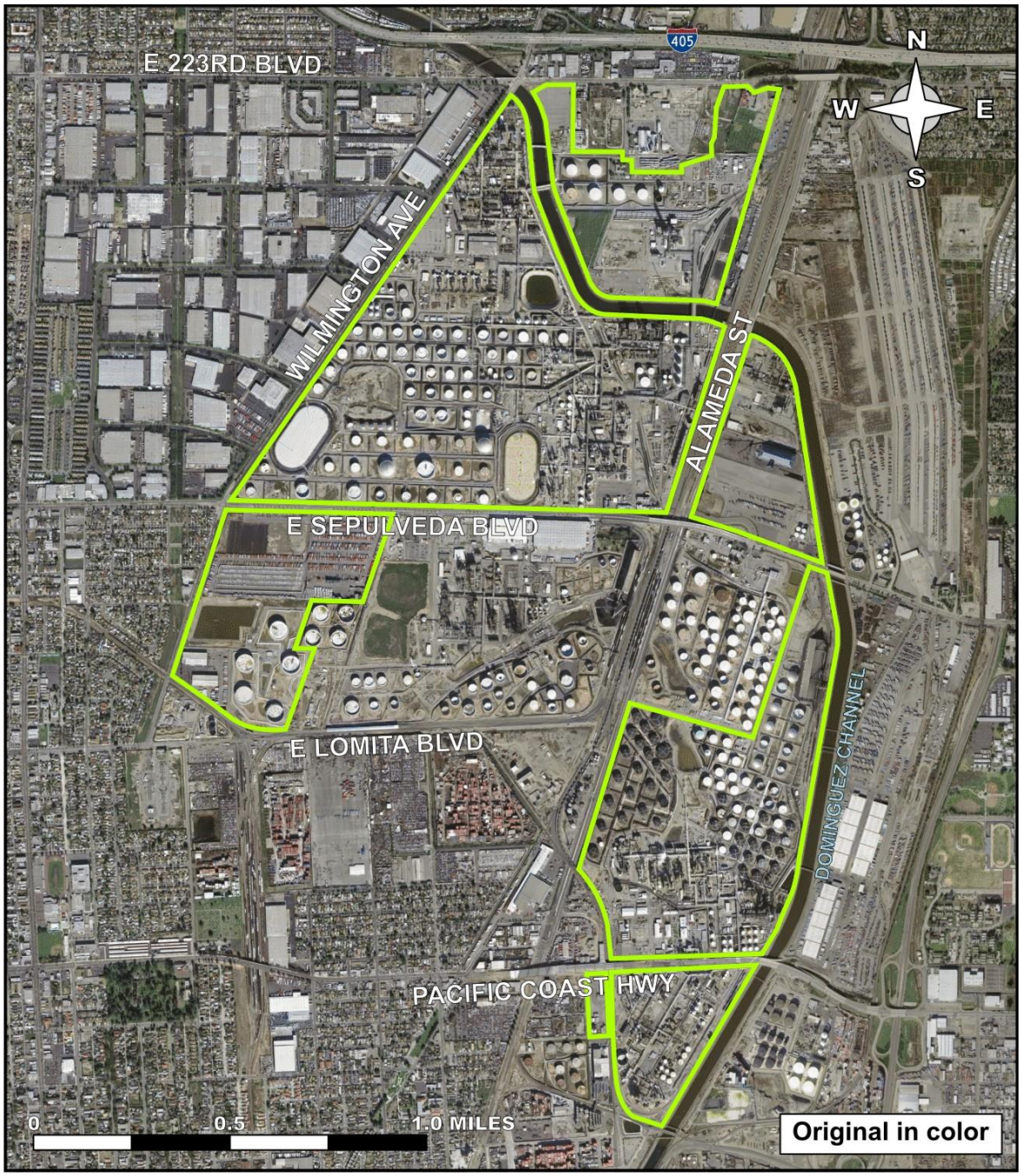
This Supplemental HRA is being conducted to support the EIR for the proposed project as required by CEQA. The assessment evaluates the risk associated with toxic emissions from all sources of the proposed project to determine if it has the potential to produce significant risks. The approach used in this assessment is described later in this report and is based on written South Coast Air Quality Management District (SCAQMD) guidelines and discussions with SCAQMD staff.

This Supplemental HRA augments the operational emissions HRA by including emissions resulting during the construction of the operations (portable engines, mobile equipment, etc.). See Section 2 of the Air Quality Analysis Report as well as the HRA provided in Appendix B-4 of the FEIR for a complete introduction of the project.

Figure 1 shows the boundaries of the Tesoro Los Angeles Refinery.

[2] The Supplemental HRA cancer risk is the combined cancer risk from operational and construction sources.

Figure 1: Tesoro Los Angeles Refinery



3.0 BACKGROUND

3.1 HEALTH EFFECTS

3.1.1 Cancer Risk

See Appendix B-4 Section 3.1.1 of the FEIR for a description of cancer risk and exposure pathways included in this HRA evaluation.

3.1.2 Non-Cancer Risk

See Appendix B-4 Section 3.1.2 of the FEIR for a description of reference exposure levels (RELs), hazard index (HI) and target organs included in this HRA evaluation.

3.2 SIGNIFICANCE CRITERIA

Risks for the entire project that are less than the following regulatory thresholds are not considered to be significant and, therefore, acceptable:

- Cancer risk equal to or less than 10 in one million
- Chronic hazard index equal to or less than 1
- 8-hr chronic hazard index equal to or less than 1
- Acute hazard index equal to or less than 1

The cancer risk and hazard index metrics are generally applied to the maximally exposed individual (MEI). There are separate MEIs for residential exposure (i.e., residential areas) and for worker exposure (i.e., offsite work places).

4.0 RISK ASSESSMENT APPROACH

This health risk assessment was performed following the Office of Environmental Health Hazard Assessment (OEHHA), *Air Toxics Hot Spots Program Risk Assessment Guidelines*[3]. As recommended by this guideline, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program Version 2 (HARP2) was used to perform a refined health risk assessment for the project's emission sources.

Consistent with SCAQMD modeling guidelines, the AMS/EPA Regulatory Model (AERMOD)[4] was used as the air dispersion model for this analysis. HARP2 includes AERMOD but also allows model runs to be performed with AERMOD outside of HARP2. For this project, AERMOD was run outside of HARP2, and the results were imported into HARP2 to complete the risk analysis[5]. This HRA evaluates risk following SCAQMD

[3] California Office of Environmental Health Hazard Assessment (OEHHA) 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015.

[4] The latest version of the AERMOD modeling system and documentation and user's guide is available at http://www.epa.gov/scram001/dispersion_prefrec.htm.

[5] Modeling of construction emissions was performed with AERMOD v15181 and HARP v16217 which were the current versions at the time the modeling was performed. New versions of the models were recently released (AERMOD v 16216r and HARP v17023); however, based on a review of the model change bulletins and version histories, no differences in results between the versions of the models are expected for the types of emission sources and model options for this project.

guidelines[6]. Further discussion of AERMOD is contained in Section 4.2.1.1 of this Supplemental HRA and in Section 4.2.1 of the FEIR.

In general, risk assessment involves four steps:

1. Hazard identification
2. Exposure assessment
3. Dose-response assessment
4. Risk characterization

Hazard identification involves identifying the toxic pollutants and whether the pollutant is a carcinogen or is associated with other types of adverse health effects. Toxic emissions from project sources are then quantified. Exposure assessment includes air dispersion modeling, identification of exposure routes, and estimation of exposure levels (dose). Dose-response requires identifying the relationship between exposure to a pollutant and the incidence of an adverse health effect in exposed populations. Finally, risk characterization combines the hazard identification, exposure assessment, dose-response assessment to estimate total cancer and non-cancer risk. The details of these four steps are presented below.

4.1 HAZARD IDENTIFICATION/ EMISSIONS ASSESSMENT

4.1.1 Project Emission Sources

This HRA supplements the previously prepared HRA by including emissions resulting during the construction (e.g., portable engines, mobile equipment, etc.) of the stationary source operations.

See Section 4.1.1 of Appendix B-4 for a description of emissions and assumptions associated with operational emissions.

This supplemental analysis focused on the additional emissions of diesel particulate matter (DPM) resulting from construction areas. The specific construction areas are listed in Table 2 below:

[6] South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act, June 5, 2015.

Table 2: Summary of Construction Emissions

Construction Project	Duration (months)	Total DPM Emissions (lbs)
Wilmington	17	497
Wilmington Crude Tanks	12	225
SARP	14	218
Carson North	17	288
Carson South	35	248
Carson Crude Tanks	58	235
Pipeline	16	925
Electrical	12	289

4.1.2 Emission Calculation Approach

The purpose of the HRA was to evaluate the risk associated with changes in emissions resulting from the integration of the Wilmington and Carson operations. Operational emission changes from the proposed project are described in Section 4.1.2 of Appendix B-4. Emission changes resulting from construction during the proposed project are summarized in Table 2, and below:

Portable Diesel Engines	Emissions increase in diesel particulate matter (DPM) was based on the estimated portable diesel engine activity associated with the project.
Truck Idling Emissions	DPM emissions from truck idling in the various construction areas were included. Idling emissions were added to the emissions from portable diesel engines and assumed to occur over the same time frame.

Details of the emission calculations for construction-related emissions are presented in Attachment H-1.

4.2 EXPOSURE ASSESSMENT

Exposure assessment for construction emissions was performed in the same manner as the assessment for operational emissions (see Section 4.2 of the FEIR).

4.2.1 Air Dispersion

Air dispersion modeling for construction emissions was performed in the same manner as the air dispersion modeling for operational emissions (see Appendix B-4 Section 4.2.1 of the FEIR).

4.2.1.1 Using AERMOD with HARP2

AERMOD was run independently of HARP2. The rationale for this choice is described in Section 4.2.1.1 of the FEIR. Separate model runs were performed for DPM.

4.2.1.2 Project Sources

Project stationary emission sources identified in Section 4.1.1 of this Supplemental HRA were modeled as described in Section 4.2.1.2 of Appendix B-4. Construction sources were modeled as follows:

Pipeline and Electrical: DPM emissions from construction of the pipeline and electrical power were modeled as line sources represented as strings of volume sources. Spacing between volume sources was set at 50 meters. UTM coordinates for each of the volume sources are provided in Attachment H-2.

Construction Areas: The construction areas were modeled as area sources, with the dimensions and boundaries of each source based on where the bulk of the construction activity is expected to occur. Area sources that were not rectangular in shape were modeled as AREAPOLY sources. In AERMOD, AREA sources are defined as a rectangle, and the user enters the southwest corner coordinate along with the length, width, release height and vertical dimension, and angle of orientation. For an AEREAPOLY source, the user enters each corner coordinate plus release height and vertical dimension.

Source parameters are provided in Table 3, Table 4, and Table 5. Figure 2 shows the model representation of the point, volume, and area sources representing stationary, locomotive, and truck traffic sources (operational sources). Figure 3 shows the model representation of the area and volume sources related to construction areas.

Table 3: Release Parameters for Volume Sources Representing Pipeline and Electrical Construction Areas

Source Description	Release Height		Spacing Between Sources		Horizontal Dimension (σ_{yo})		Vertical Dimension (σ_{zo})	
	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)
Pipeline and Electrical Construction Areas	3.0	0.91	164.0	50	76.3	23.26	2.8	0.85

Table 4: Release Parameters for AREAPOLY Sources Representing Construction Areas

Source Description	Model ID	Release Height		Number of Vertices	Vertical Dimension (σ_{zo})	
		(ft)	(m)		(ft)	(m)
Carson crude tanks construction emissions	CAR_TKS	6.0	1.83	4	2.8	0.85
Wilmington construction emissions	WIL	6.0	1.83	8	2.8	0.85
Carson construction emissions (Northern area)	CAR_N	6.0	1.83	3	2.8	0.85

Table 5: Release Parameters for Area Sources Representing Construction Areas

Source Description	Model ID	Release Height		Easterly Length		Northerly Length		Angle from North	Vertical Dimension (σ_{zo})	
		(ft)	(m)	(ft)	(m)	(ft)	(m)	(Degrees)	(ft)	(m)
Carson construction emissions (Southern area)	CAR_S	6.0	1.83	812.3	247.6	778.5	237.3	2.0	2.8	0.85
Wilmington crude tanks construction emissions	WIL_TKS	6.0	1.83	216.9	66.1	627.0	191.1	17.4	2.8	0.85
Wilmington sulfuric acid regeneration plant	SARP	6.0	1.83	198.0	60.4	147.0	44.8	29.0	2.8	0.85

Figure 2: Modeled Point, Volume, and Area Source Locations (Operational Sources)

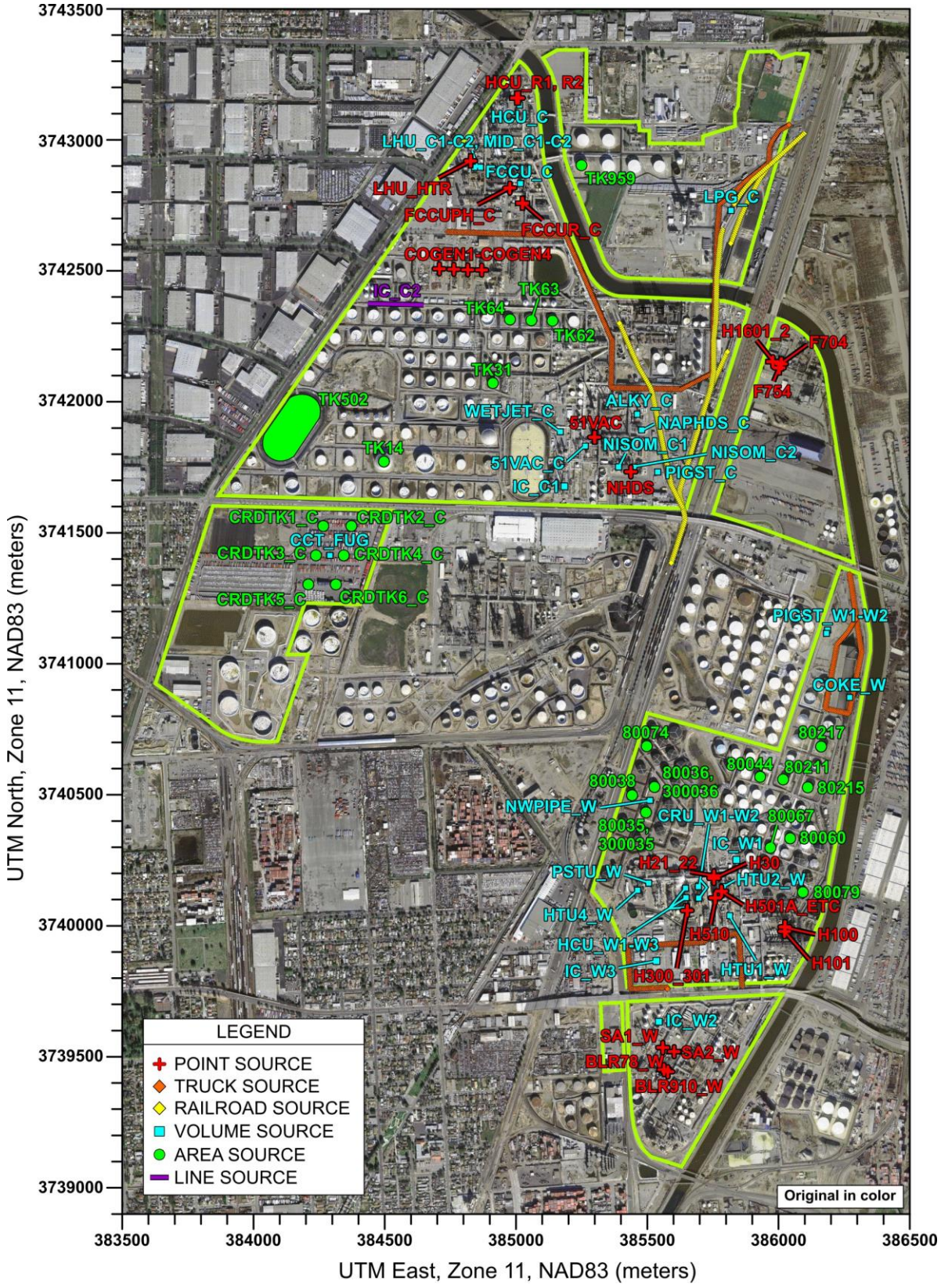
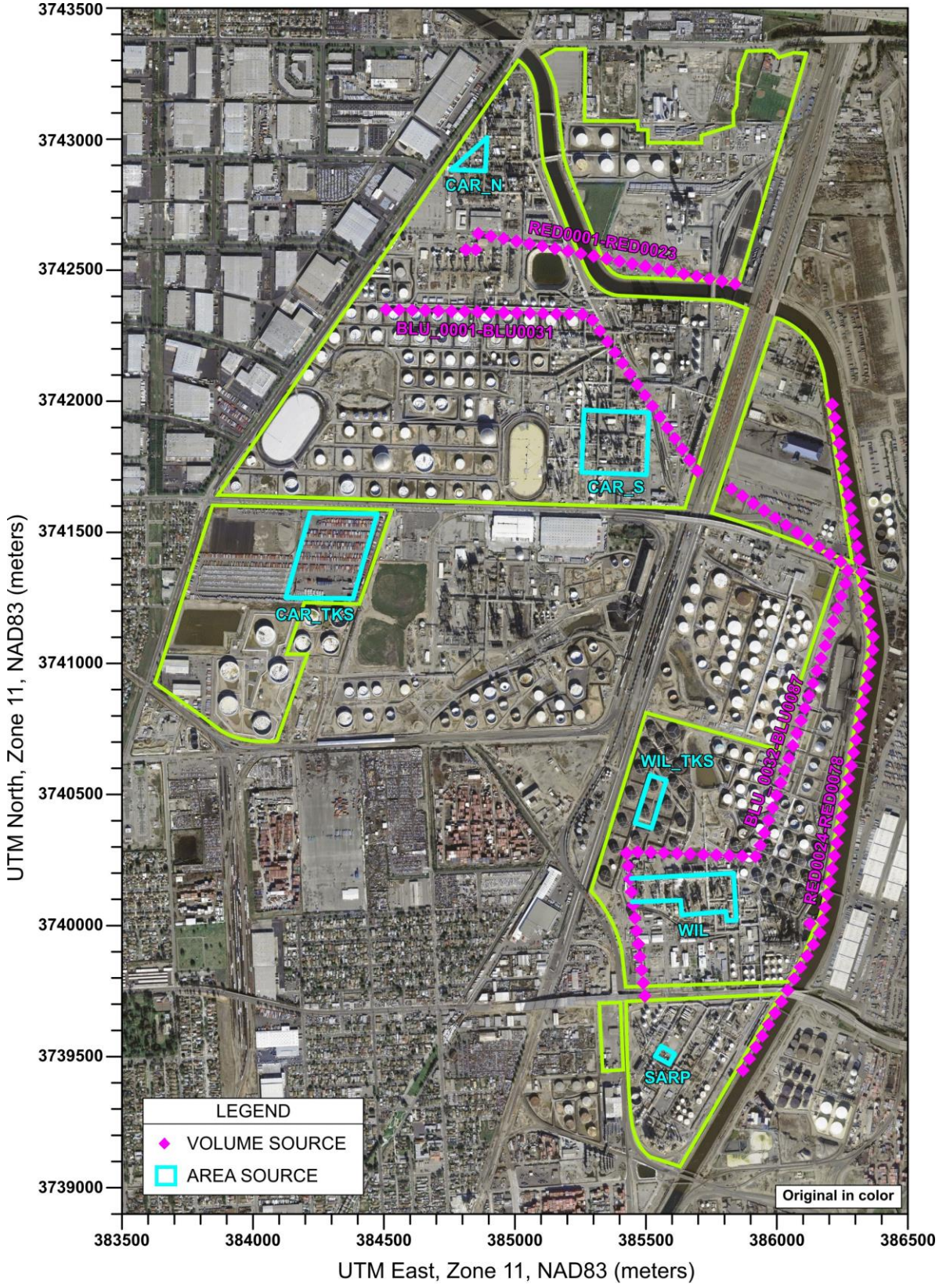


Figure 3: Modeled Volume and Area Source Locations (Construction Sources)



4.2.1.3 Terrain Characterization

AERMOD requires that each source in the analysis be categorized as being in either a rural or an urban setting. Consistent with SCAQMD guidance, all sources were designated as urban.

Although the area is relatively flat, source and receptors were modeled with consideration of terrain elevations. The AERMOD terrain processor (AERMAP) was used to calculate terrain elevations for each source and receptor from the U.S. Geological Survey (USGS) National Elevation Dataset (NED).

4.2.1.4 Building Downwash

The effects of building downwash have been examined in this modeling analysis. A complete description of how downwash is included is provided in Section 4.2.1.4 of the FEIR. Note that building downwash does not affect dispersion from fugitive sources such as area and volume sources in AERMOD.

4.2.1.5 Meteorological Data

The same 2006, 2007, 2008, 2009, and 2011 Long Beach, CA monitoring station meteorological data used for the air dispersion modeling for operational HRA was used for this Supplemental HRA (see Section 4.2.1.5 of the FEIR).

4.2.1.6 Receptors

The same receptor locations used for the air dispersion modeling for the operational HRA was used for this Supplemental HRA (see Section 4.2.1.6 of the FEIR). The receptor grids are shown in Figure 4 and Figure 5.

4.2.2 Exposure Pathways

The same exposure pathways used for the air dispersion modeling for the operational HRA was used for this Supplemental HRA (see Section 4.2.2 of the FEIR). Acute and 8-hr chronic impacts of DPM are not calculated as there are no acute or 8-hr chronic RELs for DPM.

Figure 4: Fenceline and Grid Receptor Locations

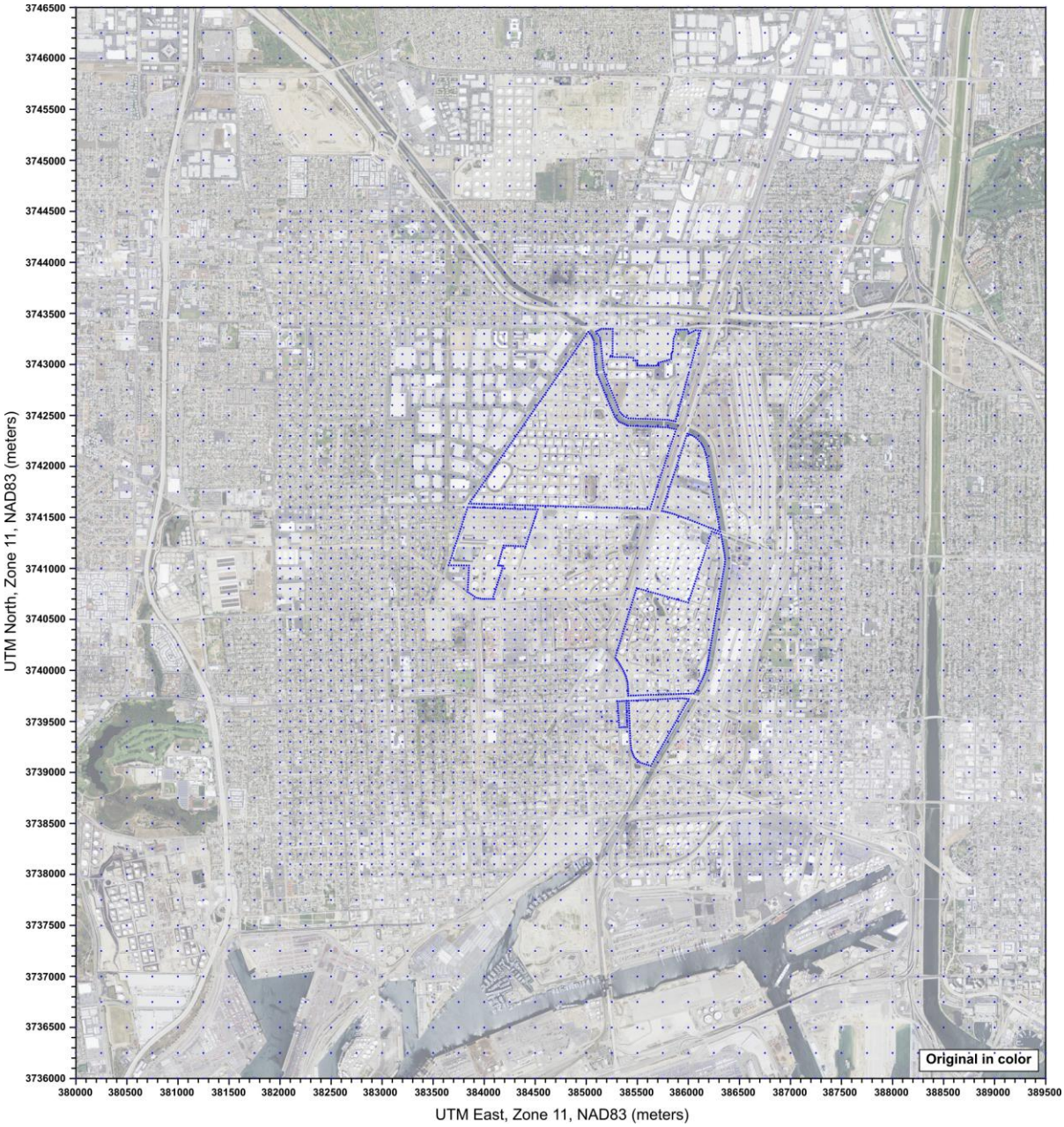
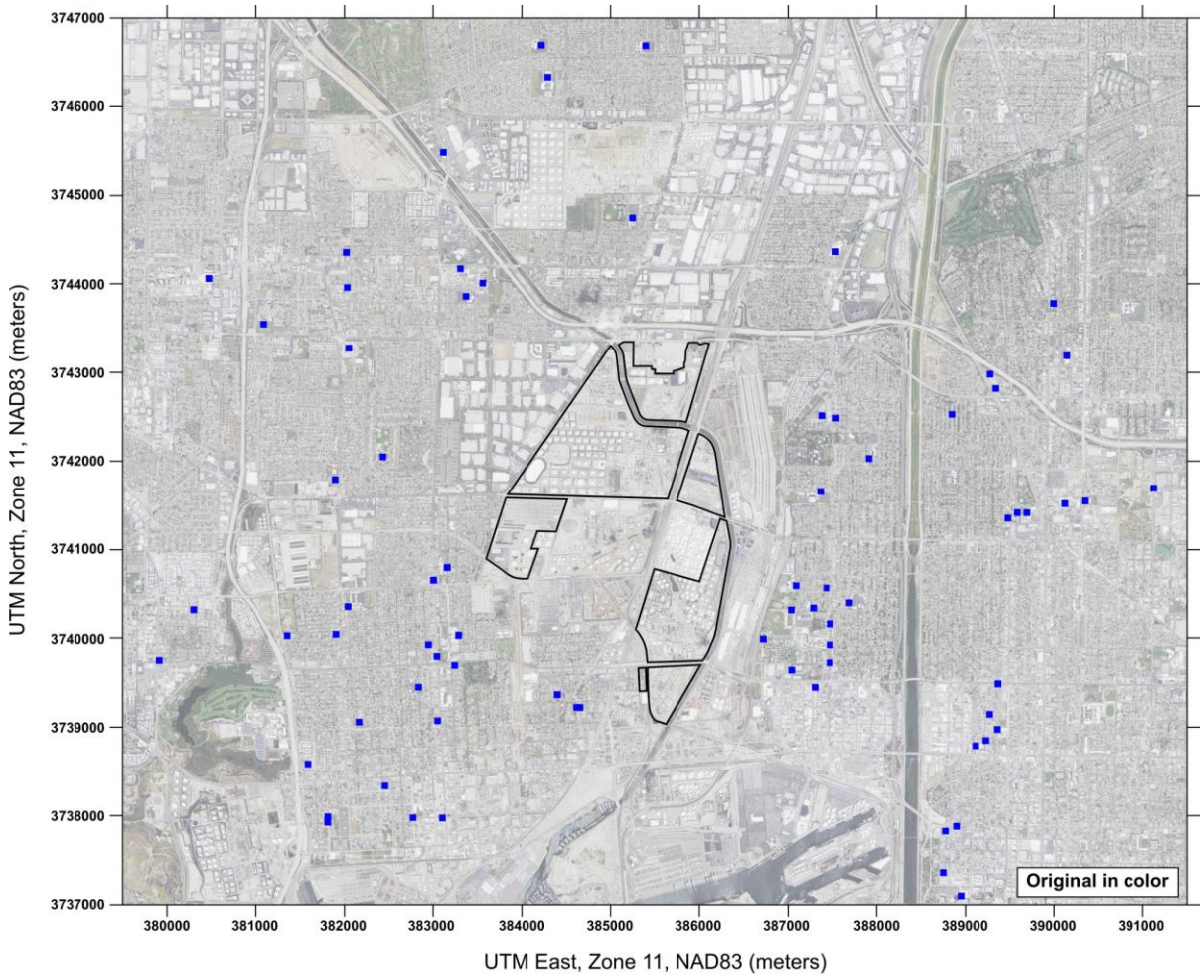


Figure 5: Sensitive Receptor Locations



4.3 EXPOSURE DOSE

The exposure dose calculation methodology is described in Section 4.3 of the FEIR.

4.4 DOSE-RESPONSE

The exposure dose-response assessment methodology is described in Section 4.4 of the FEIR.

5.0 RISK CHARACTERIZATION

By combining the results from the exposure assessment and dose response assessment, the HARP2 software program estimated potential cancer risk and non-cancer risks. More specifically, the calculated doses and exposure pathway information are used with the RELs and cancer potency factors to quantify cancer and non-cancer health impacts.

5.1 CARCINOGENS

The cancer health impacts are characterized as a cancer risk that represents the chances per million people of developing cancer. The cancer risk from each substance is added together to arrive at a total cancer risk. The combined cancer risk from operational and construction is calculated as follows:

1. Cancer risk from operational sources is calculated as described in Appendix B-4.
2. Cancer risk from construction sources is calculated as described in this document.
3. The combined cancer risk from both operational and construction sources is calculated by summing the operational cancer risk and construction-related cancer risks on a receptor by receptor basis in an Excel spreadsheet. This is done separately for residential and workplace exposures.

The exposure durations modeled in HARP2 followed OEHHA and SCAQMD guidance and are shown in Table 6 below.

Table 6: Exposure Durations Used in Risk Modeling

Risk type	Exposure Duration		
	hrs/day	days/yr	years
Residential and sensitive receptor cancer risk	24	350	See note below
Worker cancer risk	8	250	See note below

Each construction project has an estimated duration between 12 and 58 months. HARP2 allows the user to enter the specific duration of exposure. To account for the varying durations of each project, HARP2 was run separately for each construction project, and the results were added together in a spreadsheet. Additionally, HARP2 allows the user to define the starting age of exposure. For residential exposure a start age of zero, rather than

the default age of -0.25 (3rd trimester of pregnancy), was used for each construction project[7]. Using a start age of zero is conservative as the breathing rate used in HARP for the 3rd trimester of pregnancy is lower than for infants 0-2 years of age (with the same age sensitivity factor) and most construction projects have an estimated duration less than two years.

HARP2 default exposure calculations for workers assumes emissions occur continuously 24 hours per day, 7 days per week. When emissions are non-continuous, a worker adjustment factor (WAF) must be applied[8]. The WAF provides a "correction" to account for the time that the source emissions were zero. The WAF is calculated as follows:

$$WAF = (H_{residential} / H_{source}) \times (D_{residential} / D_{source})$$

Where;
$H_{residential}$ = The number of hour per day the long-term concentration is based on (always 24 hours)
H_{source} = The number of hours the source operates per day
$D_{residential}$ = The number of days the per week the long-term residential concentration is based on (always 7 days)
D_{source} = The number of days the source operates per week

The construction schedule was assumed to be 10 hrs/day, 5 days/week. This results in a WAF of 24/10 X 7/5 X 1 = 3.4. The WAF was applied to worker cancer risk estimates within HARP2.

Cancer burden calculations are based on a 70-year exposure. Exposure to construction emissions would occur for less than five years. Therefore, cancer burden was not calculated for construction emissions as it would not be representative of the short-term nature of these emissions.

5.2 NON-CARCINOGENS

The non-cancer health impacts are characterized through a hazard index (HI). The HI for each toxicological endpoint or target organ system is calculated for each applicable substance. The total HI for each target organ system is equal to the sum of the HI from each substance. As a conservative measure, pre-project impacts were not subtracted from post-project impacts in the non-carcinogen risk calculations. An HI of one or less indicates that adverse non-cancer health impacts are not anticipated.

[7] This methodology is conservative as it assumes all projects start at the same time. Actual construction would be staggered, with some construction projects starting months after others (an infant would not be exposed to all projects at the same time, or would not be an infant for the entire duration of some of the projects).
[8] South Coast Air Quality Management District, Risk Assessment Procedures for Rules 1401, 1401.1 and 212, Version 8.0, June 5, 2015.

5.2.1 Chronic HI

The chronic HI calculations are based on annual average concentrations and the chronic REL. Separate HARP2 analyses were run for DPM and for all other toxic chemicals. The proposed project total HI is calculated within a spreadsheet by adding the operational HI and construction-related HI on a receptor by receptor basis. The results from the separate HARP2 runs were then summed together to determine the total HI.

5.2.2 8-Hr Chronic HI

No 8-hr chronic RELs exist for DPM, therefore 8-hr chronic HI is not addressed in this study.

5.2.3 Acute HI

No acute RELs exist for DPM, therefore acute HI is not addressed in this study.

5.3 HARP2 ANALYSIS METHOD

The HARP2 analysis methods followed SCAQMD guidance[9] and are shown in Table 7 below. These options affect the way the cancer risk and chronic HI are calculated at each receptor.

Table 7: Analysis Methods Used in Risk Modeling

Risk	Method
Residential cancer risk	RMP Using the Derived Method
Worker cancer risk	OEHHA Derived Method
Residential chronic risk	OEHHA Derived Method
Worker chronic risk	OEHHA Derived Method

6.0 HEALTH RISK RESULTS

6.1 CANCER RISK

The predicted increase in health risks at maximally exposed offsite receptors are summarized by category in Table 8, Table 9, and Table 10. Table 8 shows the predicted increase in cancer and chronic health risks from emissions of operational sources. Table 9 shows the predicted increase in cancer and chronic health risks from construction DPM emissions. Table 10 shows the predicted increase in cancer and chronic health risks from emissions of operational and construction sources combined. As shown, the highest calculated cancer risks in the combined scenario at residential, sensitive, and worker receptors are below 10 in one million. It should be noted that because the maximum risk associated with operational emissions does not necessarily occur at the same receptor location as the maximum risk associated with construction emissions, the maximum combined risk may not be equal to the sum of each maximum value.

[9] HARP2: South Coast Air Quality Management District, Supplemental Guidelines for Preparing Risk Assessment for the Air Toxics “Hot Spots” Information and Assessment Act, June 5, 2015, Table 11.

For the combined scenario, the highest cancer risk at a residential receptor is a cancer risk value of 5.7 in one million. The receptor is located just west of the western boundary of the southernmost portion of the operations – see Figure 6. Contours showing the aerial distribution of calculated cancer risks for worst-case residential exposure are shown on Figure 7. The highest calculated cancer risk at a listed sensitive receptor was 4.2 in one million, at Bethune Mary School located about 500 meters east of the eastern boundary of the Wilmington Operations area. Table 11 provides a list of the highest cancer risk for sensitive receptors.

The receptor with the highest calculated worker exposure cancer risk was located near the railroad tracks at the northeastern boundary of the refinery – see Figure 5. The receptor is in the immediate vicinity of the location where a locomotive engine enters and exits the facility boundary when moving LPG railcars. The worst-case worker cancer risk at this receptor is 9.3 in one million. This receptor is located along the fenceline[10] where long-term (multi-decade) 40 hour/week exposure is highly unlikely to occur. Contours showing the areal distribution of calculated cancer risks for worst-case worker exposure are shown on Figure 8.

Table 12 provides the contributions of DPM to the total cancer risks shown in Table 10. DPM is the primary source of cancer risk for the maximum offsite worker receptor, and contributes about half of the cancer risk for the maximum residential and sensitive receptors.

6.2 CHRONIC RISK

The maximum chronic hazard index (worker or residential) of 0.115 was predicted at a receptor just east of the southern portion of the facility. The maximum chronic HI receptors are shown in Figure 6. The maximum chronic HI receptors were in close proximity to or along facility boundaries.

[10] Per discussions with AQMD staff, fenceline receptors in the vicinity of the rail-line could be included as worker receptors as a conservative measure.

Table 8: Summary of Maximum Project Offsite Cancer and Non-cancer Risks (Operation Sources Only)

Location[a]	Cancer Risk			Chronic Risk		
	Increase Cases in-one-million	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)
Residential receptor [b]	3.7	383700.0	3741400.0	0.030	387500.0	3739600.0
Offsite workplace receptor	9.3	386005.9	3742921.4	0.106	386152.5	3741127.8
Sensitive Receptor [b]	2.1	386720.8	3739987.2	0.025	387304.0	3739447.0

[a] Excluding onsite grid receptors
[b] Worst-case residential exposure
[c] Maximum sensitive receptors:
Cancer Risk: Bethune Mary School
Chronic Risk: Long Beach Japanese School

Table 9: Summary of Maximum Project Offsite Cancer and Non-cancer Risks (Construction Sources Only)

Location[a]	Cancer Risk			Chronic Risk		
	Increase Cases in-one-million	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)
Residential receptor [b]	2.9	385251.4	3739502.8	0.003	385251.4	3739502.8
Offsite workplace receptor	2.5	384457.8	3741374.6	0.017	386221.3	3741336.7
Sensitive Receptor [b]	2.1	386720.8	3739987.2	0.002	386720.8	3739987.2

[a] Excluding onsite grid receptors
[b] Worst-case residential exposure
[c] Maximum sensitive receptors:
Cancer Risk: Bethune Mary School
Chronic Risk: Bethune Mary School

Table 10: Summary of Maximum Project Offsite Cancer and Non-cancer Risks (Operation Plus Construction Sources)

Location[a]	Cancer Risk			Chronic Risk		
	Increase Cases in-one-million	UTM Coordinates (NAD83)		Hazard Index	UTM Coordinates (NAD83)	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)
Residential receptor [b]	5.7	385251.4	3739502.8	0.033	385251.4	3739502.8
Offsite workplace receptor	9.3	386005.9	3742921.4	0.115	386152.5	3741127.8
Sensitive Receptor [b]	4.2	386720.8	3739987.2	0.027	386720.8	3739987.2

[a] Excluding onsite grid receptors

[b] Worst-case residential exposure

[c] Maximum sensitive receptors:

Cancer Risk: Bethune Mary School

Chronic Risk: Bethune Mary School

Figure 6: Location of Maximum Calculated Health Risks

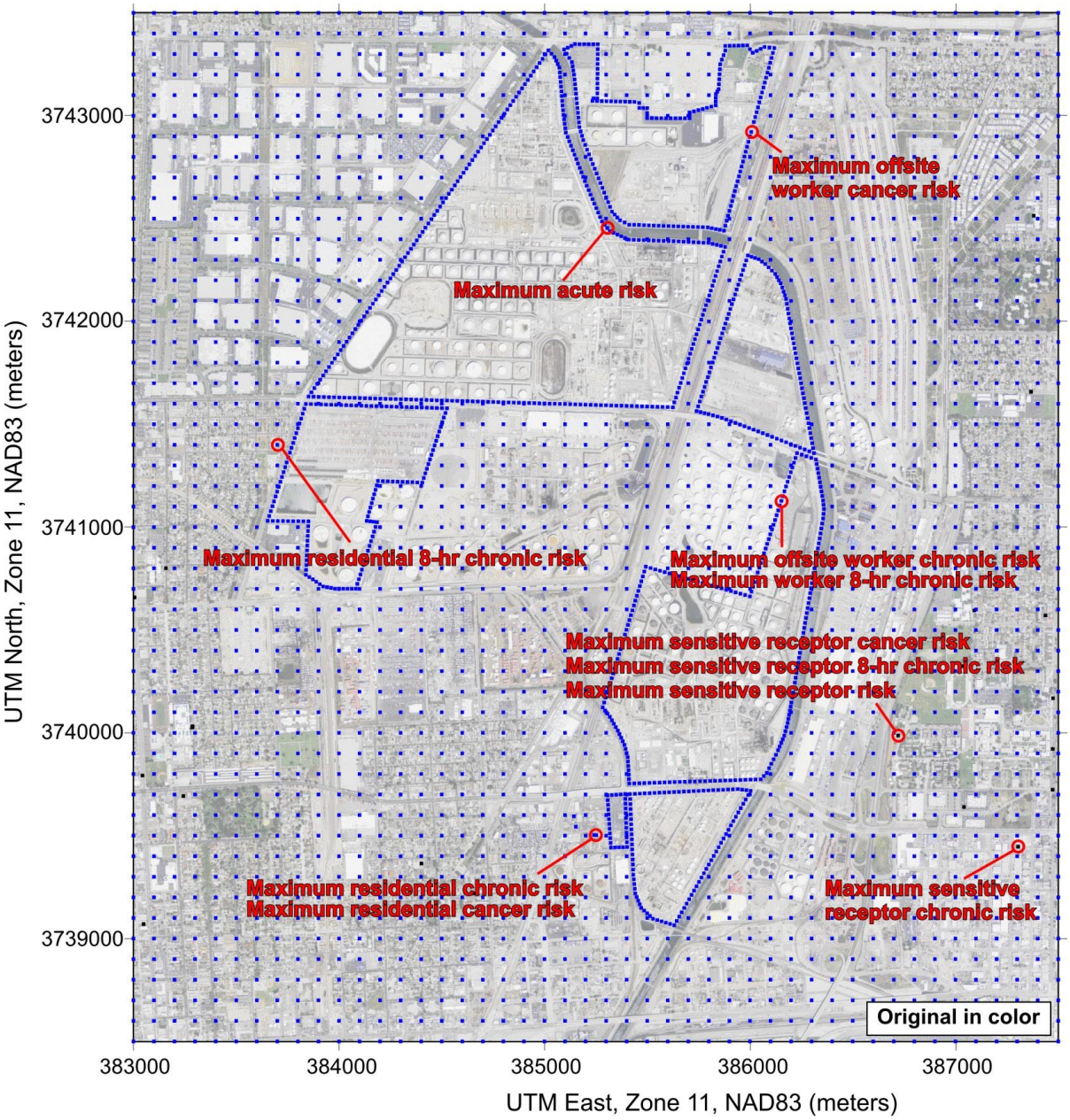
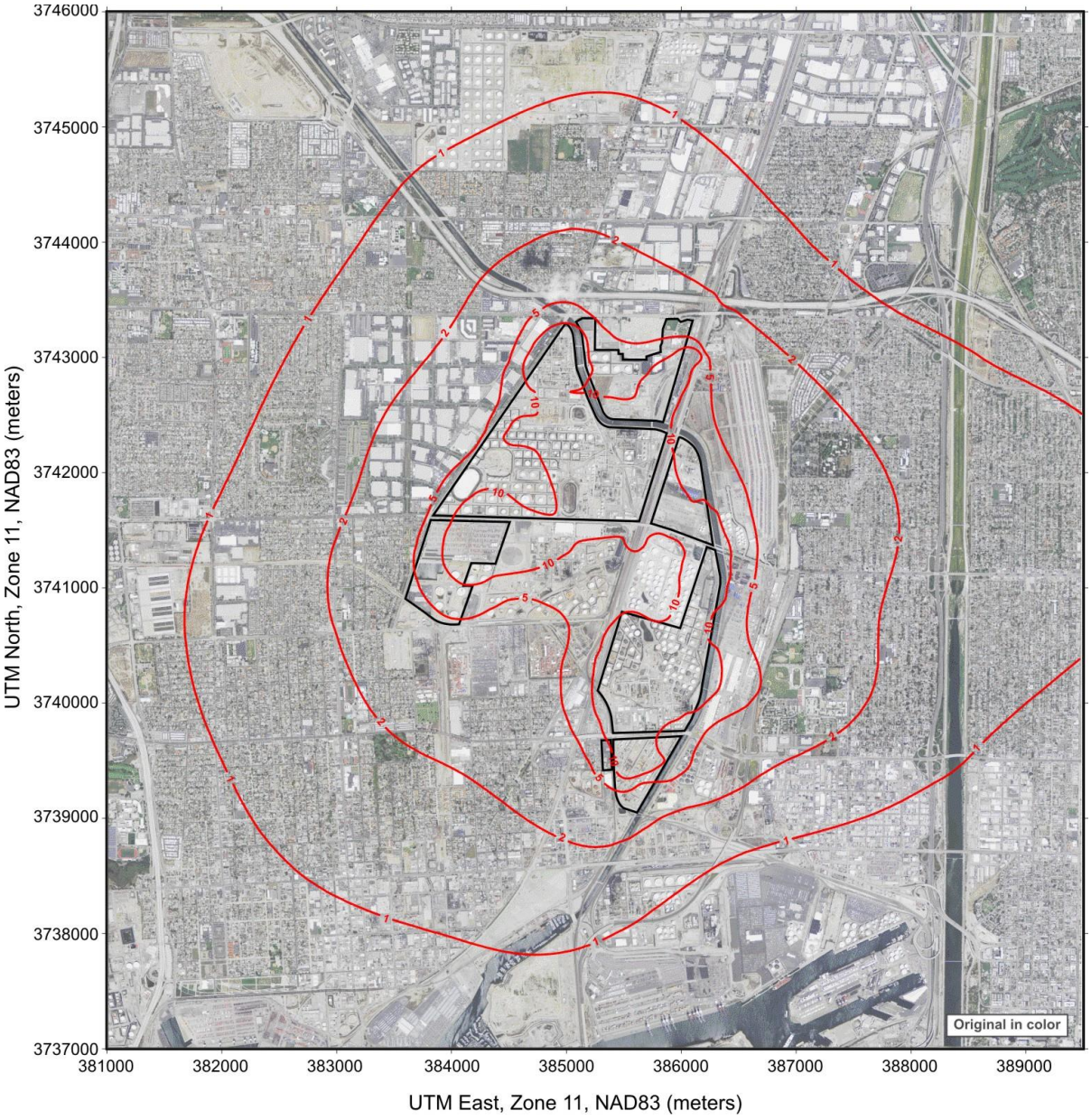
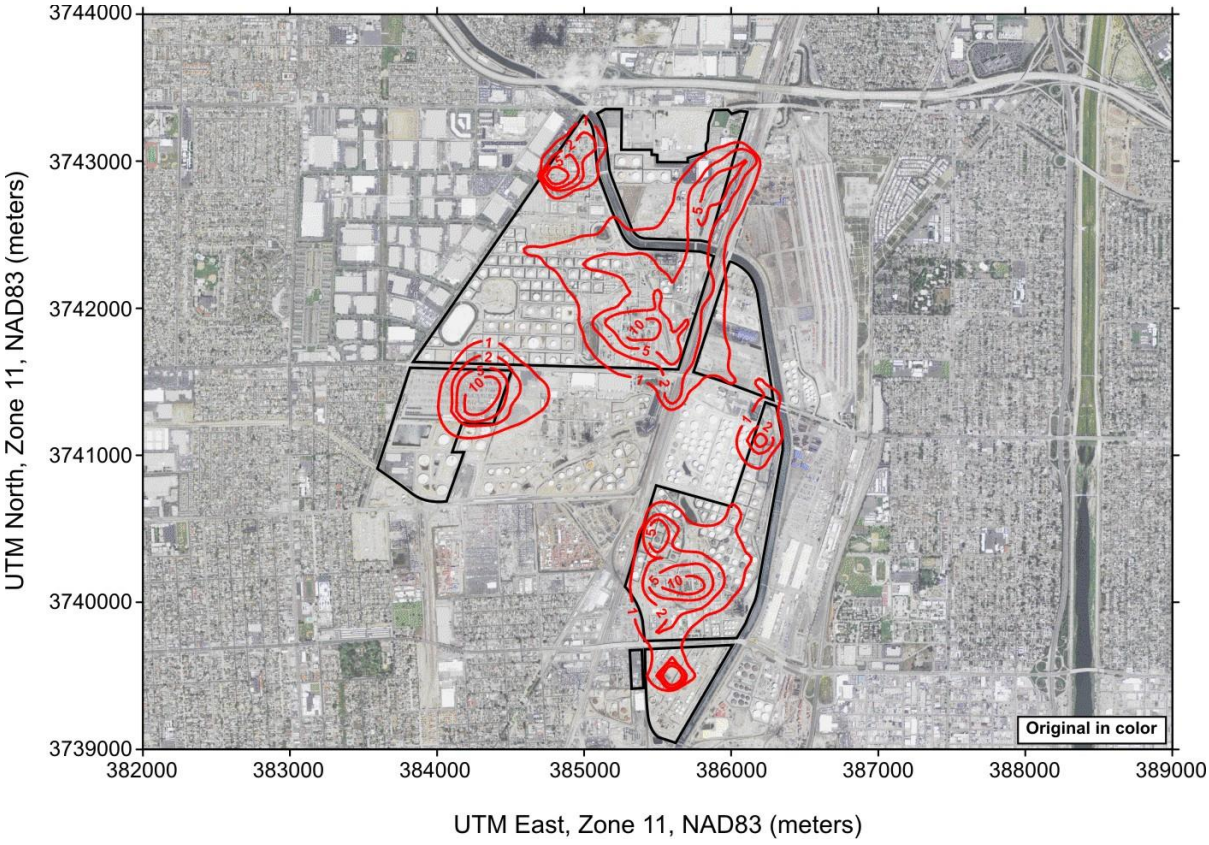


Figure 7: Contours of Residential Cancer Risk, per million exposed



Note: The contours shown above represent worst-case hypothetical residential exposure.

Figure 8: Contours of Worker Cancer Risk, per million exposed



Note: The contours shown above represent worst-case hypothetical worker exposure.

Table 11: Summary of Project Cancer Risks at the Most Exposed Sensitive Receptors

Sensitive Receptor Name	UTM Coordinates (NAD83)		Increased Cancer Cases (in-one-million)	
	Easting (m)	Northing (m)	Operational Emissions	Operation & Construction Emissions
Bethune Mary School	386721	3739987	2.13	4.22
Will J. Reid High School	387037	3740324	1.94	3.29
Elizabeth Hudson Elementary School	387091	3740595	1.77	2.91
Long Beach Child Development	387287	3740345	1.58	2.65
William Logan Stephens Junior High	387367	3741657	1.61	2.60
Broad Avenue Elementary School	383158	3740800	1.75	2.37
Wilmington Park Children's Center	384655	3739221	1.40	2.32
St. Lucy's School	387437	3740571	1.43	2.32
West Child Development Center	387474	3740168	1.32	2.30
Wilmington Park Elementary School	384618	3739222	1.38	2.28

Holy Family Grammar School	384401	3739366	1.38	2.21
Wyo Tech National Institute of Tech	387041	3739640	1.12	2.17
Cabrillo High School	387473	3739922	1.14	2.11
Phineas Banning Senior High School	383288	3740032	1.41	2.05
Webster Elementary School	387380	3742512	1.43	2.05
Banning High School	383286	3740026	1.43	2.04
Wilmington Christian School	383005	3740658	1.49	2.03
Garfield Head Start Elementary School	387692	3740405	1.21	2.02
Santa Fe Convalescent Hospital	387542	3742485	1.33	1.92
John Muir Elementary School	387914	3742030	1.27	1.87
Long Beach Job Corp Dynamic Educational	387472	3739724	0.97	1.85
First Baptist Church	383243	3739694	1.21	1.79
Avalon High School	383044	3739793	1.15	1.68
Banning-Marine Avenue Adult Center	382948	3739923	1.15	1.65
Long Beach Japanese School	387304	3739447	0.85	1.59
Fries Avenue Elementary School	382836	3739449	0.94	1.39
Wilmington YMCA	383050	3739071	0.87	1.33
Del Amo Elementary School	385247	3744738	0.77	1.30
Royal Care Skilled Nursing Care Center	389480	3741357	0.79	1.19
Catskill Elementary School	382435	3742047	0.84	1.17
Old King Cole Day Care	388848	3742528	0.84	1.17
Pacific Hospital of Long Beach	389587	3741419	0.77	1.16

Table 12: Contribution of Diesel Particulate Matter to Calculated Cancer Risks

Chemical	Contribution (Increase Cases in-one-million)		
	Residential Receptor	Offsite Workplace Receptor	Sensitive Receptor
DPM	2.98	9.20	2.19
Other TACs [a]	2.69	0.15	2.02
Total	5.67	9.35	4.22

[a] The TACs primarily responsible for cancer risk are benzene, benzo(a)pyrene, benzo(b)fluoranthene, naphthalene, and 1,3-butadiene.

Attachment H-5 contains the AERMOD input and output files. The attachment also has the HARP Risk module outputs with the calculated stationary source risks at each receptor, and the spreadsheet outputs of calculated mobile DPM risks and total (stationary plus mobile) risks for each receptor.

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Wilmington Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.67	0.67	0.67	1.51	1.51	1.48	2.51	4.08	7.38	3.08	6.12	6.01	2.28	2.28	2.28	2.28	6.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	0.00	0.00	0.00	7.05	7.05	7.05	17.89	17.89	17.55	30.23	43.02	73.97	32.33	61.56	60.22	23.20	23.20	23.20	23.20	64.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	0.00	0.00	0.00	9.38	9.38	9.38	21.22	21.22	20.89	35.61	57.82	95.19	43.73	77.14	75.33	32.33	32.33	32.33	32.33	84.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.00	0.00	0.00	0.02	0.02	0.02	0.05	0.05	0.05	0.08	0.12	0.21	0.10	0.18	0.17	0.07	0.07	0.07	0.07	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.00	0.00	0.00	0.45	0.45	0.45	1.04	1.04	1.01	1.73	2.79	4.82	2.02	3.85	3.78	1.49	1.49	1.49	1.49	4.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.00	0.00	0.00	0.44	0.44	0.44	1.01	1.01	0.99	1.70	2.73	4.73	1.98	3.77	3.71	1.46	1.46	1.46	1.46	4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	0.00	0.00	0.00	0.49	0.49	0.49	1.15	1.15	1.14	1.97	2.95	5.01	2.40	4.31	4.15	1.70	1.70	1.70	1.70	4.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	0.00	0.00	0.00	14.65	14.65	14.65	33.14	33.14	32.47	55.18	89.79	162.46	67.80	134.59	132.21	50.12	50.12	50.12	50.12	151.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/mo)	0.00	0.00	0.00	155.10	155.10	155.10	393.50	393.50	386.06	664.95	946.33	1627.33	711.29	1354.29	1324.74	510.43	510.43	510.43	510.43	1426.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/mo)	0.00	0.00	0.00	206.27	206.27	206.27	466.81	466.81	459.55	783.52	1271.97	2094.22	961.98	1697.15	1657.36	711.25	711.25	711.25	711.25	1857.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/mo)	0.00	0.00	0.00	0.45	0.45	0.45	1.05	1.05	1.04	1.80	2.70	4.57	2.19	3.94	3.79	1.55	1.55	1.55	1.55	4.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/mo)	0.00	0.00	0.00	9.81	9.81	9.81	22.78	22.78	22.21	38.06	61.28	106.11	44.39	84.65	83.19	32.77	32.77	32.77	32.77	96.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/mo)	0.00	0.00	0.00	9.62	9.62	9.62	22.33	22.33	21.77	37.30	60.05	103.99	43.50	82.96	81.53	32.11	32.11	32.11	32.11	94.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DPM (lb/yr)												302.67												439.92												0.00
Annualized DPM (lb/hr)												0.16												0.18												0.00

Note: Assumes 10 hours per day, 5 days per week, 50 weeks per year.

Average DPM ER	1.99	lb/day
Average ER	496.3835	lb/yr
Project duration	17	months
	1.416667	years

HHD idling

Project duration	28	months
Average ER	0.000106	lb/hr
	0.654919	total lbs, this project
	0.038525	average lb/month, this project
	0.462296	lb/yr

MD idling	181	Total months, all projects
	17	Total months, this project
	0.093923	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.3955	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.001058	Average MD idling emissions, lb/day (this project)
	0.264399	lb/yr idling emissions, this project
	497.11	lb/yr, construction plus HD and MD idling

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Wilmington Crude Tank Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.58	1.58	1.58	1.48	1.48	1.48	1.37	1.37	1.37	1.47	1.31	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.88	14.88	14.88	13.66	13.66	13.66	12.31	12.31	12.31	13.54	13.74	13.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.49	20.49	20.49	19.29	19.29	19.29	17.48	17.48	17.48	18.68	16.57	16.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.99	0.99	0.91	0.91	0.91	0.84	0.84	0.84	0.92	0.79	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.97	0.97	0.89	0.89	0.89	0.83	0.83	0.83	0.90	0.77	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	1.09	1.09	1.03	1.03	1.03	0.87	0.87	0.87	0.94	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.78	34.78	34.78	32.54	32.54	32.54	30.16	30.16	30.16	32.41	28.81	28.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	327.45	327.45	327.45	300.43	300.43	300.43	270.88	270.88	270.88	297.90	302.18	302.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	450.80	450.80	450.80	424.39	424.39	424.39	384.60	384.60	384.60	411.01	364.43	364.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.75	21.75	21.75	20.01	20.01	20.01	18.54	18.54	18.54	20.29	17.38	17.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.32	21.32	21.32	19.61	19.61	19.61	18.17	18.17	18.17	19.88	17.03	17.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DPM (lb/yr)												0.00												201.21												34.76
Annualized DPM (lb/hr)												0.00												0.08												0.08

Average DPM ER	0.89	lb/day
Average ER	223.456	lb/yr
Project duration	12	months
	1	years
HHD idling		
Project duration	15	months
Average ER	0.00031	lb/hr
	1.0298	total lbs, this project
	0.08582	average lb/month, this project
	1.0298	lb/yr
MD idling	181	Total months, all projects
	12	Total months, this project
	0.0663	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.2792	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.00106	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	224.75	lb/yr, construction plus HD and MD idling

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

SARP Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.62	1.62	1.62	1.52	1.52	1.52	1.24	1.24	1.24	1.24	1.24	1.34	1.19	1.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.76	14.76	14.76	13.53	13.53	13.53	10.04	10.04	10.04	10.04	10.04	11.27	11.27	11.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.43	21.43	21.43	20.23	20.23	20.23	15.86	15.86	15.86	15.86	15.86	17.06	15.09	15.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04	1.04	1.04	0.96	0.96	0.96	0.77	0.77	0.77	0.77	0.77	0.85	0.73	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	1.02	1.02	0.94	0.94	0.94	0.76	0.76	0.76	0.76	0.76	0.83	0.72	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	1.15	1.15	1.08	1.08	1.08	0.74	0.74	0.74	0.74	0.74	0.80	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.73	35.73	35.73	33.48	33.48	33.48	27.20	27.20	27.20	27.20	27.20	29.44	26.14	26.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	324.73	324.73	324.73	297.71	297.71	297.71	220.90	220.90	220.90	220.90	220.90	247.92	248.02	248.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	471.51	471.51	471.51	445.10	445.10	445.10	348.82	348.82	348.82	348.82	348.82	375.23	332.09	332.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05	1.05	1.05	0.99	0.99	0.99	0.67	0.67	0.67	0.67	0.67	0.73	0.73	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.96	22.96	22.96	21.21	21.21	21.21	16.98	16.98	16.98	16.98	16.98	18.72	16.13	16.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/mo)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.50	22.50	22.50	20.79	20.79	20.79	16.64	16.64	16.64	16.64	16.64	18.35	15.81	15.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DPM (lb/yr)												0.00												236.11												32.26
Annualized DPM (lb/hr)												0.00												0.09												0.08

Average DPM ER	0.87	lb/day
Average ER	217.831	lb/yr
Project duration	14	months
	1.16667	years
HHD idling		
Project duration	12	months
Average ER	8.7E-05	lb/hr
	0.23035	total lbs, this project
	0.01645	average lb/month, this project
	0.19744	lb/yr
MD idling	181	Total months, all projects
	14	Total months, this project
	0.07735	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.3257	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.00106	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	218.293	lb/yr, construction plus HD and MD idling

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Carson North Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.72	1.42	1.82	1.62	1.62	1.62	1.73	2.00	2.00	2.28	1.56	5.84	0.44	0.40	5.22	0.62	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	0.00	6.38	14.80	18.44	16.60	16.60	16.60	17.51	20.72	20.72	23.88	17.26	56.55	5.00	4.60	48.58	7.53	7.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	0.00	8.20	18.12	23.90	20.93	20.93	20.93	22.74	25.53	25.53	28.69	20.51	60.32	5.42	5.04	51.55	8.61	8.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.00	0.02	0.04	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.05	0.14	0.01	0.01	0.12	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.00	0.43	0.90	1.17	1.03	1.03	1.03	1.11	1.29	1.29	1.45	1.02	3.39	0.29	0.26	2.99	0.41	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.00	0.42	0.88	1.15	1.01	1.01	1.01	1.09	1.26	1.26	1.42	1.00	3.32	0.29	0.26	2.93	0.40	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	0.00	0.42	0.98	1.26	1.11	1.11	1.11	1.18	1.33	1.33	1.56	1.14	3.41	0.30	0.28	2.89	0.50	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	0.00	15.92	31.18	39.95	35.57	35.57	35.57	38.17	43.90	43.90	50.16	34.26	128.57	9.60	8.83	114.93	13.74	13.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/mo)	0.00	140.43	325.68	405.79	365.19	365.19	365.19	385.21	455.84	455.84	525.28	379.67	1244.04	110.10	101.25	1068.79	165.65	165.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/mo)	0.00	180.42	398.58	525.77	460.38	460.38	460.38	500.26	561.69	561.69	631.20	451.30	1327.09	119.27	110.92	1134.08	189.41	189.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/mo)	0.00	0.38	0.89	1.15	1.01	1.01	1.01	1.08	1.22	1.22	1.42	1.04	3.12	0.27	0.26	2.64	0.46	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/mo)	0.00	9.47	19.86	25.75	22.73	22.73	22.73	24.45	28.37	28.37	31.99	22.46	74.56	6.43	5.77	65.67	8.95	8.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/mo)	0.00	9.28	19.46	25.24	22.27	22.27	22.27	23.96	27.81	27.81	31.35	22.01	73.06	6.30	5.66	64.36	8.77	8.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DPM (lb/yr)												258.91												170.33												0.00
Annualized DPM (lb/hr)												0.11												0.14												0.00

Average DPM ER	1.15	lb/day
Average ER	286.921	lb/yr
Project duration	17	months
	1.41667	years
HHD idling		
Project duration	13	months
Average ER	0.00018	lb/hr
	0.52845	total lbs, this project
	0.03109	average lb/month, this project
	0.37302	lb/yr
MD idling	181	Total months, all projects
	17	Total months, this project
	0.09392	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.3955	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.00106	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	287.559	lb/yr, construction plus HD and MD idling

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Carson South Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.82	0.82	0.80	0.80	0.80	0.80	0.78	1.41	4.29	2.19	1.69	1.19	2.01	1.87	1.86	1.79	1.79	1.27	1.27	1.27	5.21	5.21	0.70	5.58	5.54	0.53	0.53	0.53	0.53	0.52	0.52	0.52	0.52	0.53	0.53
CO (lb/day)	0.00	7.58	7.58	7.30	7.30	7.30	7.30	7.03	13.44	40.18	20.51	15.69	11.57	18.98	17.37	17.25	16.44	16.44	10.99	10.99	10.99	47.28	47.28	5.95	55.60	55.20	8.04	8.04	8.04	8.04	7.77	7.77	7.77	7.77	8.02	8.02
NOx (lb/day)	0.00	12.29	12.29	12.00	12.00	12.00	12.00	11.61	19.69	53.08	30.31	23.37	15.74	27.39	25.87	25.75	24.66	24.66	17.91	17.91	17.91	56.83	56.83	10.04	56.38	56.04	7.70	7.70	7.70	7.70	7.40	7.40	7.40	7.40	7.60	7.60
SOx (lb/day)	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.12	0.06	0.05	0.03	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.04	0.13	0.13	0.02	0.15	0.14	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
PM10 (lb/day)	0.00	0.54	0.54	0.52	0.52	0.52	0.52	0.50	0.92	2.74	1.44	1.10	0.74	1.28	1.17	1.16	1.12	1.12	0.80	0.80	0.80	3.06	3.06	0.45	3.09	3.06	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.32	0.32
PM2.5 (lb/day)[1]	0.00	0.53	0.53	0.51	0.51	0.51	0.51	0.49	0.90	2.68	1.41	1.08	0.73	1.26	1.14	1.13	1.10	1.10	0.78	0.78	0.78	3.00	3.00	0.44	3.03	3.00	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.31	0.31
CO_2 (lb/day)	0.00	0.66	0.66	0.64	0.64	0.64	0.64	0.61	1.02	2.80	1.54	1.20	0.84	1.43	1.37	1.37	1.27	1.27	0.89	0.89	0.89	3.11	3.11	0.49	3.49	3.48	0.53	0.53	0.53	0.53	0.50	0.50	0.50	0.50	0.52	0.52

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	0.00	18.11	18.11	17.57	17.57	17.57	17.57	17.07	31.10	94.35	48.14	37.19	26.07	44.16	41.08	40.86	39.43	39.43	27.84	27.84	27.84	114.63	114.63	15.37	122.66	121.98	11.75	11.75	11.75	11.75	11.34	11.34	11.34	11.34	11.72	11.72
CO (lb/mo)	0.00	166.67	166.67	160.56	160.56	160.56	160.56	154.64	295.61	883.94	451.16	345.08	254.45	417.53	382.14	379.44	361.70	361.70	241.82	241.82	241.82	1040.13	1040.13	130.86	1223.18	1214.40	176.95	176.95	176.95	176.95	171.04	171.04	171.04	171.04	176.41	176.41
NOx (lb/mo)	0.00	270.34	270.34	263.94	263.94	263.94	263.94	255.42	433.23	1167.82	666.77	514.07	346.33	602.54	569.12	566.48	542.61	542.61	394.11	394.11	394.11	1250.25	1250.25	220.94	1240.39	1232.90	169.40	169.40	169.40	169.40	162.70	162.70	162.70	162.70	167.22	167.22
SOx (lb/mo)	0.00	0.60	0.60	0.59	0.59	0.59	0.59	0.56	0.93	2.55	1.41	1.10	0.77	1.31	1.25	1.25	1.16	1.16	0.82	0.82	0.82	2.84	2.84	0.45	3.19	3.18	0.49	0.49	0.49	0.49	0.46	0.46	0.46	0.46	0.47	0.47
PM10 (lb/mo)	0.00	11.84	11.84	11.41	11.41	11.41	11.41	11.09	20.29	60.21	31.70	24.23	16.36	28.27	25.65	25.48	24.60	24.60	17.58	17.58	17.58	67.30	67.30	9.84	67.95	67.37	6.91	6.91	6.91	6.91	6.66	6.66	6.66	6.66	6.95	6.95
PM2.5 (lb/mo)	0.00	11.61	11.61	11.18	11.18	11.18	11.18	10.87	19.88	59.00	31.06	23.75	16.03	27.70	25.14	24.97	24.11	24.11	17.23	17.23	17.23	65.95	65.95	9.64	66.59	66.03	6.77	6.77	6.77	6.77	6.53	6.53	6.53	6.53	6.81	6.81
DPM (lb/yr)												216.85												342.16												203.49
Annualized DPM (lb/hr)												0.09												0.14												0.08

Average DPM ER	0.99	lb/day
Average ER	247.566	lb/yr
Project duration	35	months
	2.91667	years
HHD idling		
Project duration	30	months
Average ER	0.00012	lb/hr
	0.82204	total lbs, this project
	0.02349	average lb/month, this project
	0.28184	lb/yr
MD idling	181	Total months, all projects
	35	Total months, this project
	0.19337	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.8144	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.00106	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	248.112	lb/yr, construction plus HD and MD idling

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Carson Crude Tank Construction Emission Summary

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	2.44	3.67	3.67	2.44	3.21	3.06	3.32	3.20	0.88	0.91	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.69	0.47	0.47	0.63	0.51	0.72	0.76	0.76	0.78	0.72	0.72	0.72
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	19.12	26.95	26.95	19.12	31.00	29.13	32.67	36.12	17.32	18.15	17.34	17.34	17.34	17.34	17.34	17.34	17.34	15.12	15.12	11.76	8.64	8.64	10.40	8.51	12.13	14.74	14.74	15.67	14.87	14.87	14.87
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	34.15	52.41	52.41	34.15	49.18	46.10	50.66	52.16	20.12	20.74	19.98	19.98	19.98	19.98	19.98	19.98	19.98	15.11	15.11	12.55	9.58	9.58	12.08	9.71	13.31	17.53	17.53	18.08	17.40	17.40	17.40
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.06	0.09	0.09	0.06	0.10	0.08	0.10	0.10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.03	0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	1.55	2.35	2.35	1.55	2.33	2.25	2.42	2.55	1.10	1.12	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.83	0.83	0.67	0.51	0.51	0.60	0.54	0.67	0.92	0.92	0.94	0.88	0.88	0.88
PM2.5 (lb/day)	0.00	0.00	0.00	0.00	0.00	1.52	2.30	2.30	1.52	2.29	2.21	2.37	2.50	1.08	1.10	1.04	1.04	1.04	1.04	1.04	1.04	1.04	0.81	0.81	0.66	0.50	0.50	0.59	0.53	0.65	0.90	0.90	0.92	0.87	0.87	0.87
CO_2 (MT/day)	0.00	0.00	0.00	0.00	0.00	1.51	2.27	2.27	1.51	2.33	2.05	2.42	2.51	1.00	1.06	1.03	1.03	1.03	1.03	1.03	1.03	1.03	0.84	0.84	0.78	0.57	0.57	0.82	0.54	0.91	1.00	1.00	1.06	1.03	1.03	1.03

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	53.59	80.73	80.73	53.59	70.65	67.25	73.03	70.37	19.42	20.11	18.57	18.57	18.57	18.57	18.57	18.57	18.57	18.57	18.57	15.29	10.37	10.37	13.91	11.14	15.86	16.65	16.65	17.24	15.88	15.88	15.88
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	420.62	592.81	592.81	420.62	682.10	640.78	718.71	794.73	380.97	399.22	381.52	381.52	381.52	381.52	381.52	381.52	381.52	332.56	332.56	258.75	190.13	190.13	228.69	187.17	266.78	324.19	324.19	344.71	327.14	327.14	327.14
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	751.21	1152.98	1152.98	751.21	1081.94	1014.10	1114.57	1147.58	442.56	456.28	439.58	439.58	439.58	439.58	439.58	439.58	439.58	332.36	332.36	276.06	210.76	210.76	265.70	213.62	292.79	385.57	385.57	397.68	382.71	382.71	382.71
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	1.37	2.07	2.07	1.37	2.13	1.87	2.21	2.29	0.92	0.97	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.72	0.52	0.52	0.75	0.49	0.83	0.92	0.92	0.97	0.94	0.94	0.94
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	34.10	51.73	51.73	34.10	51.34	49.52	53.25	56.14	24.22	24.64	23.33	23.33	23.33	23.33	23.33	23.33	23.33	18.27	18.27	14.74	11.11	11.11	13.26	11.98	14.68	20.29	20.29	20.57	19.43	19.43	19.43
PM2.5 (lb/day)	0.00	0.00	0.00	0.00	0.00	33.42	50.70	50.70	33.42	50.31	48.53	52.19	55.02	23.73	24.14	22.86	22.86	22.86	22.86	22.86	22.86	22.86	17.90	17.90	14.44	10.89	10.89	12.99	11.74	14.39	19.89	19.89	20.16	19.04	19.04	19.04
DPM (lb/yr)												325.76												304.83												196.33
Annualized DPM (lb/hr)												0.22												0.12												0.08

Note: Assumes 10 hours per day, 5 days per week, 50 weeks per year.

	Year 4												Year 5												Year 6											
Emissions from Equipment	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/day)	0.66	0.66	0.66	0.66	0.66	0.66	0.64	0.44	0.44	0.59	0.47	0.67	0.68	0.68	0.71	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.58	0.41	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	14.70	14.70	14.70	14.70	12.56	12.56	11.64	8.54	8.54	10.30	8.41	12.02	15.41	15.41	16.32	15.53	15.53	15.53	15.53	15.53	15.53	15.53	13.43	13.43	12.41	9.32	9.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	15.82	15.82	15.82	15.82	11.93	11.93	11.41	8.73	8.73	10.99	8.84	12.15	14.90	14.90	15.40	14.80	14.80	14.80	14.80	14.80	14.80	14.80	11.26	11.26	9.81	7.58	7.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.02	0.02	0.03	0.02	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.78	0.78	0.78	0.78	0.60	0.60	0.59	0.45	0.45	0.54	0.48	0.59	0.74	0.74	0.75	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.54	0.54	0.47	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)	0.76	0.76	0.76	0.76	0.58	0.58	0.57	0.44	0.44	0.53	0.47	0.58	0.72	0.72	0.73	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.53	0.53	0.46	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (MT/day)	1.03	1.03	1.03	1.03	0.84	0.84	0.78	0.57	0.57	0.82	0.54	0.91	1.04	1.04	1.09	1.06	1.06	1.06	1.06	1.06	1.06	1.06	0.87	0.87	0.82	0.60	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 4												Year 5												Year 6											
Total Emissions	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
VOC (lb/mo)	14.56	14.56	14.56	14.56	14.56	14.56	14.00	9.58	9.58	12.93	10.28	14.75	15.04	15.04	15.59	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	12.71	9.01	9.01									
CO (lb/mo)	323.36	323.36	323.36	323.36	276.41	276.41	256.18	187.84	187.84	226.68	185.06	264.36	339.08	339.08	359.08	341.71	341.71	341.71	341.71	341.71	341.71	341.71	295.52	295.52	273.00	205.14	205.14									
NOx (lb/mo)	347.97	347.97	347.97	347.97	262.56	262.56	251.02	192.09	192.09	241.80	194.44	267.23	327.84	327.84	338.83	325.70	325.70	325.70	325.70	325.70	325.70	325.70	247.75	247.75	215.81	166.75	166.75									
SOx (lb/mo)	0.94	0.94	0.94	0.94	0.77	0.77	0.72	0.52	0.52	0.75	0.49	0.83	0.95	0.95	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.80	0.80	0.75	0.55	0.55									
PM10 (lb/mo)	17.06	17.06	17.06	17.06	13.13	13.13	12.90	9.81	9.81	11.81	10.62	13.08	16.25	16.25	16.44	15.47	15.47	15.47	15.47	15.47	15.47	15.47	11.89	11.89	10.29	8.00	8.00									
PM2.5 (lb/mo)	16.72	16.72	16.72	16.72	12.87	12.87	12.64	9.61	9.61	11.57	10.41	12.82	15.92	15.92	16.11	15.16	15.16	15.16	15.16	15.16	15.16	15.16	11.65	11.65	10.09	7.84	7.84									
DPM (lb/yr)												162.52												180.98												26.29
Annualized DPM (lb/hr)												0.07												0.07												0.04

Note: Assumes 10 hours per day, 5 days per week, 50 weeks per year.

Average DPM ER	0.94	lb/day
Average ER	234.47	lb/yr
Project duration	58	months
	4.8333	years
HHD idling		
Project duration	27	months
Average ER	0.0005	lb/hr
	3.1978	total lbs, this project
	0.0551	average lb/month, this project
	0.6616	lb/yr
MD idling	181	Total months, all projects
	58	Total months, this project
	0.3204	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	1.3495	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.0011	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	235.39	lb/yr, construction plus HD and MD idling

Appendix H

Tesoro Integration and Compliance Project

Attachment H-1: Construction Emission Calculations

Piping and Electrical Construction Emission Summary

Pipe

	2016												2017												2018											
Emissions from Equipment	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	10.07	8.37	8.37	8.37	8.37	8.08	8.08	8.08	8.08	4.24	4.24	4.24	4.03	4.32	4.32	4.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	83.07	62.06	62.06	62.06	62.06	59.54	59.54	59.54	59.54	32.51	32.51	32.51	31.72	34.17	34.17	34.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	99.19	67.00	67.00	67.00	67.00	65.47	65.47	65.47	65.47	41.66	41.66	41.66	39.28	40.79	40.79	40.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.23	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	5.71	4.58	4.58	4.58	4.58	4.44	4.44	4.44	4.44	2.52	2.52	2.52	2.36	2.49	2.49	2.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	5.60	4.49	4.49	4.49	4.49	4.35	4.35	4.35	4.35	2.47	2.47	2.47	2.31	2.44	2.44	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	5.66	3.01	3.01	3.01	3.01	2.93	2.93	2.93	2.93	1.85	1.85	1.85	1.85	1.92	1.92	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Elec

	2016												2017												2018											
Emissions from Equipment	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	0.00	0.00	0.00	0.00	0.00	3.25	1.82	1.82	1.82	1.82	2.12	2.12	2.03	2.27	2.03	2.03	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	0.00	0.00	0.00	0.00	0.00	30.82	14.01	14.01	14.01	14.01	16.53	16.53	16.13	17.55	16.13	16.13	16.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	0.00	0.00	0.00	0.00	0.00	39.01	14.79	14.79	14.79	14.79	16.33	16.33	15.57	19.31	15.57	15.57	15.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	0.00	0.00	0.00	0.00	0.00	1.92	1.01	1.01	1.01	1.01	1.15	1.15	1.09	1.24	1.09	1.09	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.00	0.00	0.00	0.00	0.00	1.88	0.99	0.99	0.99	0.99	1.13	1.13	1.07	1.21	1.07	1.07	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	0.00	0.00	0.00	0.00	0.00	2.67	0.70	0.70	0.70	0.70	0.77	0.77	0.77	0.95	0.77	0.77	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total

	Year 1												Year 2												Year 3											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/day)	10.07	8.37	8.37	8.37	8.37	11.32	9.90	9.90	9.90	6.06	6.36	6.36	6.06	6.59	6.35	6.35	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/day)	83.07	62.06	62.06	62.06	62.06	90.35	73.55	73.55	73.55	46.52	49.04	49.04	47.85	51.72	50.30	50.30	16.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/day)	99.19	67.00	67.00	67.00	67.00	104.48	80.26	80.26	80.26	56.45	57.99	57.99	54.85	60.11	56.36	56.36	15.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/day)	0.23	0.12	0.12	0.12	0.12	0.23	0.15	0.15	0.15	0.11	0.11	0.11	0.11	0.12	0.11	0.11	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/day)	5.71	4.58	4.58	4.58	4.58	6.36	5.45	5.45	5.45	3.54	3.67	3.67	3.45	3.73	3.58	3.58	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1]	5.60	4.49	4.49	4.49	4.49	6.23	5.34	5.34	5.34	3.47	3.60	3.60	3.38	3.66	3.51	3.51	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO_2 (lb/day)	5.66	3.01	3.01	3.01	3.01	5.60	3.63	3.63	3.63	2.54	2.62	2.62	2.62	2.87	2.70	2.70	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1												Year 2												Year 3											
Total Emissions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
VOC (lb/mo)	221.53	184.19	184.19	184.19	184.19	249.11	217.82	217.82	217.82	133.43	139.94	139.94	133.36	145.03	139.69	139.69	44.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CO (lb/mo)	1827.47	1365.27	1365.27	1365.27	1365.27	1987.80	1618.09	1618.09	1618.09	1023.46	1078.90	1078.90	1052.70	1137.87	1106.60	1106.60	354.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx (lb/mo)	2182.14	1474.10	1474.10	1474.10	1474.10	2298.50	1765.66	1765.66	1765.66	1241.97	1275.83	1275.83	1206.64	1322.32	1240.01	1240.01	342.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx (lb/mo)	5.17	2.75	2.75	2.75	2.75	5.12	3.32	3.32	3.32	2.32	2.39	2.39	2.39	2.62	2.46	2.46	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM10 (lb/mo)	125.71	100.69	100.69	100.69	100.69	139.84	119.95	119.95	119.95	77.79	80.82	80.82	75.86	82.14	78.79	78.79	23.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/mo)	123.19	98.68	98.68	98.68	98.68	137.04	117.55	117.55	117.55	76.24	79.20	79.20	74.34	80.49	77.22	77.22	23.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DPM (lb/yr)												1267.58												339.49												0.00
Annualized DPM (lb/hr)												0.51												0.33												0.00

Pipe

Average DPM ER	3.70	lb/day
Average ER	924.87	lb/yr
Project duration	16	months
	1.3333	years
HHD idling		
Project duration	15	months
Average ER	3E-05	lb/hr
	0.1152	total lbs, this project
	0.0072	average lb/month, this project
	0.0864	lb/yr
MD idling	181	Total months, all projects
	16	Total months, this project
	0.0884	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.3723	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.0011	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	925.22	lb/yr, construction plus HD and MD idling

Electric

Average DPM ER	1.15	lb/day
Average ER	288.69	lb/yr
Project duration	12	months
	1	years
HHD idling		
Project duration	15	months
Average ER	0	lb/hr
	0	total lbs, this project
	0	average lb/month, this project
	0	lb/yr
MD idling	181	Total months, all projects
	12	Total months, this project
	0.0663	Fraction of total MD idling emissions
	4.2114	Sum of total idling emissions
	0.2792	Total idling emissions, this project
	0.0233	Average MD idling emissions, lb/month (this project)
	0.0011	Average MD idling emissions, lb/day (this project)
	0.2644	lb/yr idling emissions, this project
	288.95	lb/yr, construction plus HD and MD idling

HHD Idling Emissions

Trucks Per Day

Area	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Till End
Carson North	21	15	12	12	9	9	9	8	8	8	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carson South	0	13	7	7	12	10	10	13	11	11	8	8	8	4	4	4	4	4	4	9	5	5	3	3	3	2	2	2	2	2	2	0
Car-Crude	0	0	0	0	4	4	4	31	31	31	39	39	39	34	34	34	41	41	41	39	39	39	38	38	38	5	5	5	5	5	5	5
Pipe/Elec	51	24	24	24	13	13	13	5	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SARP	0	0	0	0	0	0	0	0	0	0	2	2	2	5	5	5	6	6	6	4	4	4	0	0	0	0	0	0	0	0	0	0
Wilmington	7	3	3	3	16	13	13	10	10	10	3	3	3	3	3	3	0	0	0	2	2	2	5	5	5	5	5	5	1	1	1	0
Wil-Crude	0	0	0	0	0	0	0	0	0	0	14	14	14	15	15	15	18	18	18	17	17	17	12	12	12	0	0	0	0	0	0	0
Total	79	55	46	46	54	49	49	67	65	65	73	73	73	61	61	61	69	69	69	71	67	67	58	58	58	12	12	12	8	8	8	5

Pounds of DPM Per Hour

Area	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Till End
Carson North	0.00043	0.00031	0.00025	0.00025	0.00018	0.00018	0.00018	0.00016	0.00016	0.00016	0.00004	0.00004	0.00004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Carson South	0.00000	0.00027	0.00014	0.00014	0.00025	0.00021	0.00021	0.00027	0.00023	0.00023	0.00016	0.00016	0.00016	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00018	0.00010	0.00010	0.00006	0.00006	0.00006	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00000
Car-Crude	0.00000	0.00000	0.00000	0.00000	0.00008	0.00008	0.00008	0.00064	0.00064	0.00064	0.00080	0.00080	0.00080	0.00070	0.00070	0.00070	0.00084	0.00084	0.00084	0.00080	0.00080	0.00080	0.00078	0.00078	0.00078	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Pipe/Elec	0.00105	0.00049	0.00049	0.00049	0.00027	0.00027	0.00027	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
SARP	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004	0.00004	0.00004	0.00010	0.00010	0.00010	0.00012	0.00012	0.00012	0.00008	0.00008	0.00008	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Wilmington	0.00014	0.00006	0.00006	0.00006	0.00033	0.00027	0.00027	0.00021	0.00021	0.00021	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006	0.00000	0.00000	0.00000	0.00004	0.00004	0.00004	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010	0.00002	0.00002	0.00002	0.00000
Wil-Crude	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00029	0.00029	0.00029	0.00031	0.00031	0.00031	0.00037	0.00037	0.00037	0.00035	0.00035	0.00035	0.00025	0.00025	0.00025	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total	0.00162	0.00113	0.00094	0.00094	0.00111	0.00101	0.00101	0.00138	0.00133	0.00133	0.00150	0.00150	0.00150	0.00125	0.00125	0.00125	0.00142	0.00142	0.00142	0.00146	0.00138	0.00138	0.00119	0.00119	0.00119	0.00025	0.00025	0.00025	0.00016	0.00016	0.00016	0.00010

Based 10 hours per day 5 days per week

Idling Emissions

Vehicle Category	Emission Factor
T7 Trucks	1.15E-03

Tesoro Integration and Compliance Project
Attachment H-1: Construction Emission Calculations

Medium Duty Truck Idling Emissions

Sum of Vehicles Per Year

Vehicle	2016	2017	2018	2019	2020	2021
Water Truck	105	130	94	12	12	3
Delivery Truck	0	0	0	0	0	0
1 Ton Truck	69	132	82	12	12	3
Misc. MD Truck	0	0	0	0	0	0
Total Medium Truck Miles	174	262	176	24	24	6

Average Vehicles Per Day

Vehicle	2016	2017	2018	2019	2020	2021
Water Truck	15.00	10.83	7.83	1.00	1.00	1.00
Delivery Truck	0.00	0.00	0.00	0.00	0.00	0.00
1 Ton Truck	9.86	11.00	6.83	1.00	1.00	1.00
Misc. MD Truck	0.00	0.00	0.00	0.00	0.00	0.00
Total Medium Truck Miles	24.86	21.83	14.67	2.00	2.00	2.00

Pound of DPM Per Day

Vehicle	2016	2017	2018	2019	2020	2021
Water Truck	0.00431	0.00311	0.00225	0.00029	0.00029	0.00029
Delivery Truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1 Ton Truck	0.00283	0.00316	0.00196	0.00029	0.00029	0.00029
Misc. MD Truck	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Total Medium Trucks	0.00714	0.00628	0.00422	0.00057	0.00057	0.00057
Month/yr idling occurs	**7**	**12**	**12**	**12**	**12**	**3**
Total lb/yr	**1.10026**	**1.65672**	**1.11291**	**0.15176**	**0.15176**	**0.03794**

Pounds of DPM Per Hour

Vehicle	2016	2017	2018	2019	2020	2021
Total Medium Trucks	0.0004907	0.0004310	0.0002895	0.0000395	0.0000395	0.0000395

Based 10 hours per day 5 days per week 50 weeks per year

Idling Emissions

Vehicle Category	Emission Factor (lb/hr)
T7 Trucks	1.15E-03

ATTACHMENT H-2 CONSTRUCTION VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
BLU_0001	384507.8	3742351.0
BLU_0002	384557.8	3742349.7
BLU_0003	384607.8	3742348.5
BLU_0004	384657.8	3742347.2
BLU_0005	384707.7	3742346.0
BLU_0006	384757.7	3742344.8
BLU_0007	384807.7	3742343.5
BLU_0008	384857.7	3742342.3
BLU_0009	384907.7	3742341.0
BLU_0010	384957.7	3742339.8
BLU_0011	385007.7	3742338.6
BLU_0012	385057.6	3742337.3
BLU_0013	385107.6	3742336.1
BLU_0014	385157.6	3742334.8
BLU_0015	385207.6	3742333.6
BLU_0016	385257.6	3742332.3
BLU_0017	385296.4	3742310.4
BLU_0018	385324.9	3742269.3
BLU_0019	385353.5	3742228.3
BLU_0020	385382.0	3742187.2
BLU_0021	385410.6	3742146.2
BLU_0022	385439.1	3742105.1
BLU_0023	385467.6	3742064.1
BLU_0024	385496.2	3742023.0
BLU_0025	385524.7	3741981.9
BLU_0026	385553.3	3741940.9
BLU_0027	385581.8	3741899.8
BLU_0028	385610.3	3741858.8
BLU_0029	385638.9	3741817.7
BLU_0030	385667.4	3741776.7
BLU_0031	385696.0	3741735.6
BLU_0032	385827.5	3741666.6
BLU_0033	385869.1	3741638.9
BLU_0034	385910.7	3741611.1
BLU_0035	385952.3	3741583.4
BLU_0036	385993.9	3741555.7
BLU_0037	386035.5	3741527.9
BLU_0038	386077.1	3741500.2
BLU_0039	386118.7	3741472.4
BLU_0040	386160.3	3741444.7
BLU_0041	386201.9	3741417.0
BLU_0042	386243.5	3741389.2
BLU_0043	386270.9	3741353.9
BLU_0044	386262.1	3741305.3
BLU_0045	386246.6	3741257.7
BLU_0046	386231.2	3741210.2
BLU_0047	386215.7	3741162.6
BLU_0048	386200.2	3741115.1
BLU_0049	386184.8	3741067.5
BLU_0050	386169.3	3741020.0
BLU_0051	386153.9	3740972.4
BLU_0052	386138.4	3740924.9
BLU_0053	386122.9	3740877.3
BLU_0054	386107.5	3740829.8
BLU_0055	386092.0	3740782.2
BLU_0056	386076.6	3740734.7
BLU_0057	386061.1	3740687.1
BLU_0058	386045.6	3740639.6
BLU_0059	386030.2	3740592.0
BLU_0060	386014.7	3740544.5
BLU_0061	385999.3	3740496.9
BLU_0062	385983.8	3740449.4
BLU_0063	385968.4	3740401.8
BLU_0064	385952.9	3740354.3
BLU_0065	385937.4	3740306.7
BLU_0066	385918.7	3740263.8
BLU_0067	385868.8	3740265.8
BLU_0068	385818.8	3740267.8
BLU_0069	385768.9	3740269.8
BLU_0070	385718.9	3740271.8
BLU_0071	385668.9	3740273.7
BLU_0072	385619.0	3740275.7
BLU_0073	385569.0	3740277.7
BLU_0074	385519.1	3740279.7
BLU_0075	385469.1	3740281.7
BLU_0076	385425.9	3740277.5
BLU_0077	385432.4	3740227.9
BLU_0078	385438.8	3740178.3
BLU_0079	385445.2	3740128.7
BLU_0080	385451.6	3740079.1
BLU_0081	385458.0	3740029.5
BLU_0082	385464.5	3739979.9
BLU_0083	385470.9	3739930.4
BLU_0084	385477.3	3739880.8
BLU_0085	385483.7	3739831.2
BLU_0086	385490.1	3739781.6
BLU_0087	385496.6	3739732.0
RED_0001	384812.4	3742578.9
RED_0002	384851.0	3742578.9
RED_0003	384860.1	3742640.4
RED_0004	384908.2	3742631.1
RED_0005	384957.3	3742621.5
RED_0006	385006.4	3742611.9
RED_0007	385055.4	3742602.3

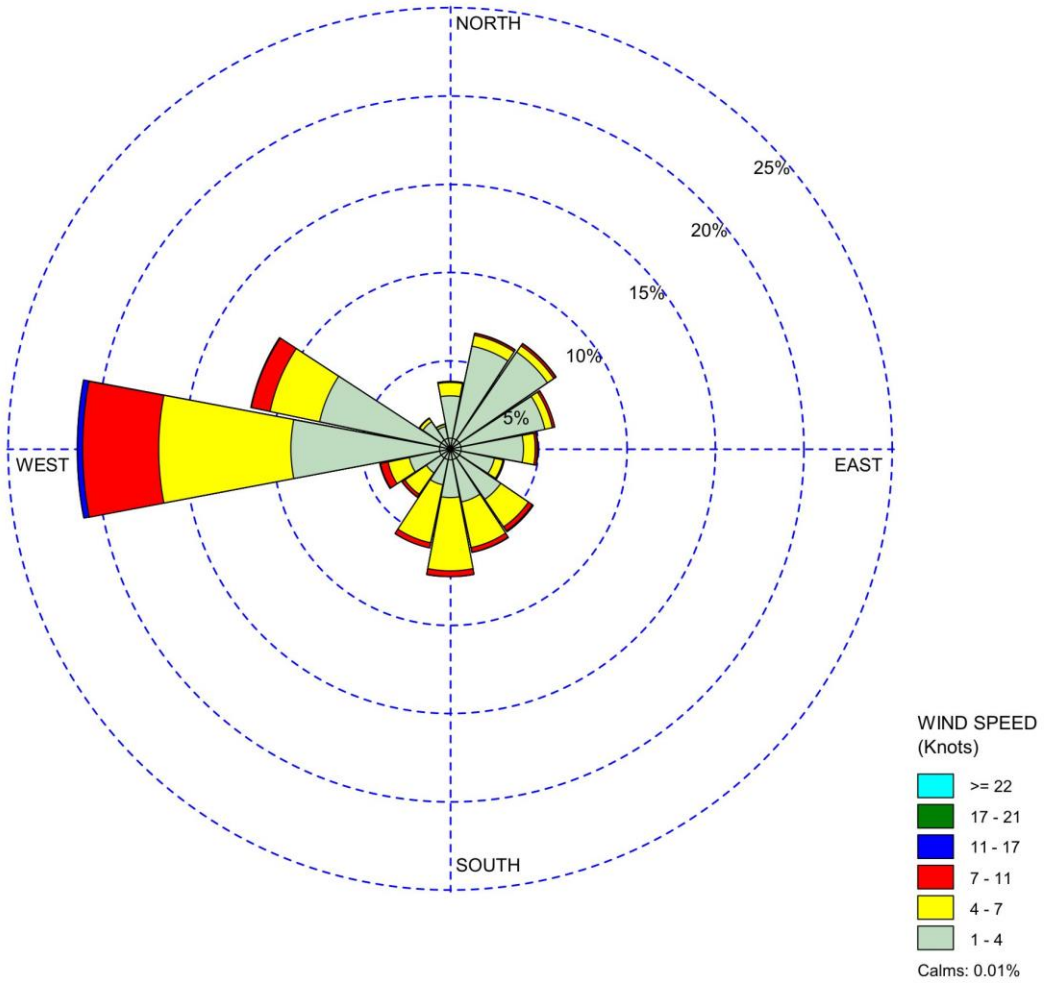
ATTACHMENT H-2 CONSTRUCTION VOLUME SOURCE LOCATIONS

Source ID	UTM (X)	UTM (Y)
RED_0008	385104.5	3742592.7
RED_0009	385153.6	3742583.1
RED_0010	385202.7	3742573.5
RED_0011	385251.7	3742564.0
RED_0012	385300.8	3742554.4
RED_0013	385349.9	3742544.8
RED_0014	385398.9	3742535.2
RED_0015	385448.0	3742525.6
RED_0016	385497.1	3742516.0
RED_0017	385546.2	3742506.4
RED_0018	385595.2	3742496.8
RED_0019	385644.3	3742487.2
RED_0020	385693.4	3742477.7
RED_0021	385742.5	3742468.1
RED_0022	385791.5	3742458.5
RED_0023	385840.6	3742448.9
RED_0024	386212.1	3741988.8
RED_0025	386220.7	3741939.5
RED_0026	386229.4	3741890.3
RED_0027	386238.0	3741841.0
RED_0028	386246.6	3741791.8
RED_0029	386255.3	3741742.5
RED_0030	386263.9	3741693.3
RED_0031	386272.6	3741644.0
RED_0032	386281.2	3741594.8
RED_0033	386289.8	3741545.5
RED_0034	386298.5	3741496.3
RED_0035	386307.1	3741447.0
RED_0036	386315.7	3741397.8
RED_0037	386324.4	3741348.5
RED_0038	386333.0	3741299.3
RED_0039	386341.6	3741250.0
RED_0040	386350.3	3741200.8
RED_0041	386358.9	3741151.6
RED_0042	386367.6	3741102.3
RED_0043	386366.5	3741053.1
RED_0044	386357.4	3741003.9
RED_0045	386348.2	3740954.8
RED_0046	386339.1	3740905.6
RED_0047	386329.9	3740856.5
RED_0048	386320.8	3740807.3
RED_0049	386311.6	3740758.2
RED_0050	386302.5	3740709.0
RED_0051	386293.3	3740659.9
RED_0052	386284.1	3740610.7
RED_0053	386275.0	3740561.6
RED_0054	386265.8	3740512.4
RED_0055	386256.7	3740463.2
RED_0056	386247.5	3740414.1
RED_0057	386238.4	3740364.9
RED_0058	386229.2	3740315.8
RED_0059	386220.1	3740266.6
RED_0060	386210.9	3740217.5
RED_0061	386201.8	3740168.3
RED_0062	386192.6	3740119.2
RED_0063	386183.4	3740070.0
RED_0064	386174.3	3740020.9
RED_0065	386163.9	3739972.1
RED_0066	386139.5	3739928.5
RED_0067	386115.1	3739884.9
RED_0068	386090.6	3739841.2
RED_0069	386066.2	3739797.6
RED_0070	386041.8	3739754.0
RED_0071	386017.4	3739710.4
RED_0072	385993.0	3739666.7
RED_0073	385968.6	3739623.1
RED_0074	385944.1	3739579.5
RED_0075	385919.7	3739535.8
RED_0076	385895.3	3739492.2
RED_0077	385870.9	3739448.6
RED_0078	386126.6	3740008.4

ATTACHMENT H-3 WINDROSE

WIND ROSE PLOT:
Long Beach, CA

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Met years: 2006, 2007, 2008, 2009, 2011	**Start Date: 1/1/2006 - 00:00** **End Date: 12/31/2011 - 23:00**	MODELER:	
	CALM WINDS: **0.01%**	TOTAL COUNT: **43378 hrs.**	
	AVG. WIND SPEED: **3.66 Knots**	DATE: **5/19/2014**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

ATTACHMENT H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
385600	3739100	3.8	385600	3740100	3.8	386100	3740600	13.0
385500	3739200	3.6	385700	3740100	4.2	386200	3740600	14.4
385600	3739200	3.8	385800	3740100	4.9	385500	3740700	10.7
385700	3739200	3.0	385900	3740100	5.3	385600	3740700	9.0
385500	3739300	3.5	386000	3740100	6.7	385700	3740700	8.5
385600	3739300	3.2	386100	3740100	6.7	385800	3740700	9.0
385700	3739300	3.5	385400	3740200	10.2	386100	3740700	11.0
385500	3739400	3.7	385500	3740200	4.3	386200	3740700	13.5
385600	3739400	3.5	385600	3740200	4.6	383900	3740800	13.0
385700	3739400	3.5	385700	3740200	6.0	384000	3740800	13.0
385800	3739400	3.2	385800	3740200	6.6	384100	3740800	13.0
385500	3739500	7.5	385900	3740200	6.7	385500	3740800	11.5
385600	3739500	5.1	386000	3740200	7.9	386100	3740800	9.5
385700	3739500	3.6	386100	3740200	9.3	386200	3740800	11.8
385800	3739500	3.3	386200	3740200	5.6	386300	3740800	10.7
385500	3739600	8.7	385400	3740300	10.9	383900	3740900	13.0
385600	3739600	7.7	385500	3740300	9.9	384000	3740900	13.0
385700	3739600	3.5	385600	3740300	8.6	384100	3740900	13.0
385800	3739600	3.5	385700	3740300	6.6	386100	3740900	9.4
385900	3739600	3.3	385800	3740300	7.2	386200	3740900	11.4
385500	3739700	9.9	385900	3740300	7.3	386300	3740900	12.8
385600	3739700	8.4	386000	3740300	8.8	383900	3741000	13.0
385700	3739700	8.5	386100	3740300	11.1	384000	3741000	12.8
385800	3739700	6.9	386200	3740300	9.0	384100	3741000	13.0
385900	3739700	4.6	385400	3740400	11.8	386200	3741000	8.9
385500	3739800	10.8	385500	3740400	10.3	386300	3741000	11.3
385600	3739800	10.2	385600	3740400	9.0	383700	3741100	13.7
385700	3739800	10.2	385700	3740400	6.9	383800	3741100	13.0
385800	3739800	9.9	385800	3740400	8.1	383900	3741100	13.0
385900	3739800	8.0	385900	3740400	8.6	384000	3741100	12.9
386000	3739800	7.6	386000	3740400	10.3	384100	3741100	12.7
385500	3739900	11.4	386100	3740400	11.9	386200	3741100	9.8
385600	3739900	10.8	386200	3740400	14.2	386300	3741100	13.0
385700	3739900	11.0	385400	3740500	12.3	383800	3741200	13.1
385800	3739900	9.3	385500	3740500	10.8	383900	3741200	12.5
385900	3739900	6.8	385600	3740500	9.4	384000	3741200	12.3
386000	3739900	7.2	385700	3740500	7.1	384100	3741200	12.7
386100	3739900	5.4	385800	3740500	8.4	386200	3741200	10.5
385400	3740000	11.7	385900	3740500	9.3	386300	3741200	13.7
385500	3740000	10.9	386000	3740500	11.2	383800	3741300	12.2
385600	3740000	9.7	386100	3740500	13.3	383900	3741300	11.9
385700	3740000	3.3	386200	3740500	14.3	384000	3741300	12.3
385800	3740000	4.7	385500	3740600	10.8	384100	3741300	12.3
385900	3740000	6.0	385600	3740600	9.0	384200	3741300	12.4
386000	3740000	6.2	385700	3740600	8.1	384300	3741300	12.1
386100	3740000	5.6	385800	3740600	8.7	384400	3741300	11.5
385400	3740100	11.5	385900	3740600	9.7	386300	3741300	13.1
385500	3740100	9.0	386000	3740600	11.0	383800	3741400	11.7

ATTACHMENT H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
383900	3741400	11.8	386200	3741700	5.3	384700	3742000	10.8
384000	3741400	12.4	384000	3741800	11.2	384800	3742000	8.4
384100	3741400	12.4	384100	3741800	11.7	384900	3742000	7.2
384200	3741400	12.3	384200	3741800	12.1	385000	3742000	6.9
384300	3741400	12.1	384300	3741800	11.5	385100	3742000	8.7
384400	3741400	11.3	384400	3741800	10.9	385200	3742000	9.1
386300	3741400	5.7	384500	3741800	11.1	385300	3742000	9.0
383900	3741500	11.7	384600	3741800	11.1	385400	3742000	9.0
384000	3741500	11.8	384700	3741800	9.9	385500	3742000	8.7
384100	3741500	12.1	384800	3741800	10.2	385600	3742000	6.0
384200	3741500	12.3	384900	3741800	8.4	385700	3742000	6.6
384300	3741500	12.1	385000	3741800	8.7	385900	3742000	6.6
384400	3741500	11.2	385100	3741800	9.7	386000	3742000	6.6
386000	3741500	6.0	385200	3741800	9.9	386100	3742000	6.9
386100	3741500	5.4	385300	3741800	9.5	384200	3742100	11.6
386200	3741500	8.2	385400	3741800	9.0	384300	3742100	11.2
385100	3741600	9.6	385500	3741800	8.4	384400	3742100	10.6
385200	3741600	9.5	385600	3741800	6.9	384500	3742100	11.1
385300	3741600	8.7	385900	3741800	6.5	384600	3742100	10.8
385400	3741600	8.7	386000	3741800	6.3	384700	3742100	10.8
385500	3741600	9.0	386100	3741800	6.0	384800	3742100	8.1
385600	3741600	9.0	386200	3741800	6.3	384900	3742100	8.2
385800	3741600	6.6	384100	3741900	11.6	385000	3742100	7.2
385900	3741600	6.3	384200	3741900	11.8	385100	3742100	7.2
386000	3741600	6.0	384300	3741900	11.5	385200	3742100	6.8
386100	3741600	5.7	384400	3741900	10.7	385300	3742100	6.7
386200	3741600	5.3	384500	3741900	11.1	385400	3742100	6.5
384000	3741700	11.4	384600	3741900	11.1	385500	3742100	6.7
384100	3741700	11.7	384700	3741900	10.8	385600	3742100	6.9
384200	3741700	11.8	384800	3741900	8.6	385700	3742100	6.9
384300	3741700	11.5	384900	3741900	7.9	386000	3742100	6.6
384400	3741700	11.0	385000	3741900	7.2	386100	3742100	6.9
384500	3741700	11.4	385100	3741900	9.6	384300	3742200	10.9
384600	3741700	11.6	385200	3741900	9.6	384400	3742200	10.6
384700	3741700	11.4	385300	3741900	9.3	384500	3742200	10.8
384800	3741700	9.6	385400	3741900	9.0	384600	3742200	10.5
384900	3741700	10.1	385500	3741900	8.7	384700	3742200	10.8
385000	3741700	10.2	385600	3741900	6.6	384800	3742200	8.9
385100	3741700	10.0	385700	3741900	6.9	384900	3742200	8.1
385200	3741700	9.9	385900	3741900	6.6	385000	3742200	7.8
385300	3741700	9.6	386000	3741900	6.3	385100	3742200	7.5
385400	3741700	9.0	386100	3741900	6.3	385200	3742200	6.9
385500	3741700	8.7	386200	3741900	6.6	385300	3742200	6.2
385600	3741700	7.3	384200	3742000	11.8	385400	3742200	5.7
385800	3741700	6.6	384300	3742000	11.2	385500	3742200	6.2
385900	3741700	6.3	384400	3742000	10.6	385600	3742200	7.3
386000	3741700	6.0	384500	3742000	10.8	385700	3742200	7.1
386100	3741700	5.7	384600	3742000	10.8	385800	3742200	6.9

ATTACHMENT H-4 LIST OF ONSITE RECEPTORS

UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)	UTM (X)	UTM (Y)	Elev. (m)
386000	3742200	6.9	385400	3742600	7.5	385800	3743000	6.9
386100	3742200	6.9	385500	3742600	7.2	385900	3743000	7.2
384400	3742300	10.3	385600	3742600	7.5	386000	3743000	8.0
384500	3742300	10.8	385700	3742600	7.1	384900	3743100	7.2
384600	3742300	10.6	385800	3742600	6.9	385000	3743100	8.4
384700	3742300	10.6	385900	3742600	6.9	385200	3743100	7.8
384800	3742300	8.4	384600	3742700	9.9	385900	3743100	7.2
384900	3742300	8.6	384700	3742700	10.2	386000	3743100	7.8
385000	3742300	8.1	384800	3742700	9.6	385000	3743200	8.4
385100	3742300	7.5	384900	3742700	9.9	385200	3743200	7.5
385200	3742300	7.6	385000	3742700	9.6	385900	3743200	7.4
385300	3742300	6.6	385100	3742700	10.2	386000	3743200	7.8
385400	3742300	6.6	385300	3742700	8.1	385200	3743300	6.9
385500	3742300	7.2	385400	3742700	7.8	385900	3743300	7.2
385600	3742300	7.2	385500	3742700	7.4	386000	3743300	7.5
385700	3742300	7.0	385600	3742700	7.2	386100	3743300	8.1
385800	3742300	7.2	385700	3742700	6.9			
386000	3742300	6.7	385800	3742700	6.9			
384400	3742400	10.3	385900	3742700	7.2			
384500	3742400	10.5	384700	3742800	9.3			
384600	3742400	10.5	384800	3742800	8.4			
384700	3742400	9.9	384900	3742800	9.4			
384800	3742400	8.5	385000	3742800	9.9			
384900	3742400	9.3	385100	3742800	9.9			
385000	3742400	8.4	385300	3742800	8.1			
385100	3742400	8.4	385400	3742800	7.8			
385200	3742400	9.9	385500	3742800	7.6			
385300	3742400	8.2	385600	3742800	7.2			
384500	3742500	10.5	385700	3742800	7.1			
384600	3742500	9.9	385800	3742800	7.0			
384700	3742500	9.8	385900	3742800	7.5			
384800	3742500	9.0	384800	3742900	7.4			
384900	3742500	9.3	384900	3742900	9.0			
385000	3742500	9.0	385000	3742900	9.3			
385100	3742500	9.0	385100	3742900	8.0			
385200	3742500	8.7	385200	3742900	8.4			
385400	3742500	7.2	385300	3742900	8.1			
385500	3742500	7.2	385400	3742900	7.6			
385600	3742500	7.2	385500	3742900	7.2			
385700	3742500	7.0	385600	3742900	7.2			
385800	3742500	7.1	385700	3742900	6.9			
384600	3742600	9.8	385800	3742900	6.9			
384700	3742600	9.6	385900	3742900	7.5			
384800	3742600	9.6	384900	3743000	8.4			
384900	3742600	9.6	385000	3743000	8.7			
385000	3742600	9.3	385200	3743000	8.1			
385100	3742600	10.0	385300	3743000	7.8			
385200	3742600	8.7	385400	3743000	7.5			

ATTACHMENT H-5 AIR DISPERSION MODELING FILES

The AERMOD and HARP2 input and output files are available upon request from the SCAQMD.

APPENDIX I

LIST OF ENVIRONMENTAL IMPACT REPORT PREPARERS

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APPENDIX I-1

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

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RESUME

Jillian D. Wong, Ph.D. — **Planning and Rules Manager**

Education
- Ph.D. Environmental Sciences, Atmospheric Reactions of VOCs, University of California, Riverside, June 2004
- M.S. Chemistry, University of California, Riverside, December 2000
- B.S. Chemistry, University of California, Riverside, June 1998

Areas of Expertise
- Air Quality Impact Analyses
- Health Risk Assessments
- Modeling for PSD, NSR
- CEQA and NEPA Document Preparation and Project Management
- Policy and Guidance/Methodology Development for CEQA and Permit Modeling

EXPERIENCE

2016 to present: Planning and Rules Manager, SCAQMD
2014 to 2016: Program Supervisor, CEQA and CEQA-IGR, SCAQMD
2008 to 2014: Air Quality Specialist, AB 2588 and Point Source Modeling, SCAQMD
2007 to 2011: Lecturer, University of California, Riverside
2006 to 2008: Senior Scientist/Project Manager, URS Corporation
2003 to 2006: Senior Environmental Analyst, Webb Associates

Dr. Wong has over 14 years of experience in both the public and private sectors and a strong academic background in environmental sciences and atmospheric chemistry. As a Planning and Rules Manager, she is responsible for overseeing the CEQA, CEQA-IGR, Socioeconomic, Meteorology, Air Quality Evaluation, and Point Source Modeling programs at SCAQMD. Dr. Wong possess a technical expertise in air quality modeling, permitting, and health risk assessments and has been called upon as a third party expert witness for various CEQA projects, as well as providing testimony at the SCAQMD's Hearing Board. As a project manager and client services manager, she managed multi-disciplinary teams to ensure environmental compliance for various projects throughout the country.

REPRESENTATIVE PROJECTS

A partial listing of Dr. Wong's project experience includes preparing or reviewing:

- **Air Quality Impact Analyses and Health Risk Assessments for:**
  Land use projects such as residential developments, commercial and industrial developments, warehouses, Specific Plans, and General Plans.
  Petroleum Refineries, Electroplating Facilities, Hazardous Waste Treatment, Storage and Disposal Facilities, Marine Terminals, Energy projects such as repowering projects and waste to energy facilities, and Gasoline Dispensing Facilities.

- **Environmental Document Preparation for:**
  Land use projects such as residential developments, commercial and industrial developments, warehouses, Specific Plans, and General Plans.
  2016 AQMP, Rail Road Expansion, Pipeline and Water Treatment Facilities, Refineries, Lead-Acid Battery Recycling Facilities, and Gasoline Dispensing Facilities.

- **Policy and Guidance/Methodology Development for:**
  AERMOD-ready Meteorological Data, Permit Modeling, Risk Assessment Procedures for Rules 1401, 1401.1, 1402, and 212.
  Currently updating the localized significance thresholds and mobile source HRA methodology.

RESUME

Danny Luong **Senior Enforcement Manager**

Education
- Master of Engineering, Chemical Engineering, California Polytechnic University, Pomona, 1986
- B.S. Chemical Engineering, University of California, San Diego, 1983

Registration
- Professional Engineer in Chemical Engineering, California

EXPERIENCE
1984 to present; Senior Enforcement Manager, South Coast Air Quality Management District

Mr. Luong has over 33 years of experience in air quality permitting, program development and implementation, and rule enforcement, including 10 years as a Senior Manager responsible for three functions: permitting activities of all petroleum refining facilities within the South Coast Air Quality Management District (SCAQMD), implementation of a market based incentive program known as REgional CLean Air Incentive Market (RECLAIM), and enforcement activities at retail gasoline dispensing facilities within SCAQMD.

Petroleum Refining

Mr. Luong is responsible for approving actions on permit applications recommended by a team of 19 engineers. This team performs engineering analyses for permit applications received from petroleum refining and fuel distribution facilities, to assure adherence to requirements imposed by local, state and federal air pollution control rules and regulations including but not limited to Title V, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), RECLAIM, New Source Review, best available control technologies (BACT), CEQA requirements, Prevention of Significant Deterioration (PSD) analysis, air modeling, and health risk assessments.

REgional CLean Air Incentive Market (RECLAIM)

Mr. Luong participated in the initial adoption and implementation of RECLAIM in 1993. He started out as a Senior Engineer leading the development of facility permits and implementation of advanced monitoring, reporting, and recordkeeping requirements. Eventually, Mr. Luong took over the position of senior manager of the program in 2006. RECLAIM is a regional market incentive based program aimed at the largest emitters of Oxides of Nitrogen (NOx) and Oxides of sulfur (SOx). Sources subject to RECLAIM are from the following industries:

- Cement
- Clay Tile
- Food and Beverage
- Glass
- Lead Acid Battery
- Metal Manufacturing and Processing
- Natural Gas Utility
- Oil and Gas Production
- Petroleum Refining
- Power Generation

Enforcement at Gasoline Dispensing Facilities

Mr. Luong leads a team of eighteen enforcement staff who are responsible for assuring compliance with all applicable requirements at approximately 3,200 retail gas stations within the SCAQMD. He also served two terms as the chair of a committee made up of staff from local air pollution districts and the California Air Resource Board responsible for development of standards for and the certification of vapor recovery systems for use at gasoline dispensing facilities to control emissions from vehicle fueling operations.

Other Duties

Mr. Luong assists provides technical support to SCAQMD's legal office, CEQA, rule development, and as well as other governmental agencies. Mr. Luong also serves as expert witness in SCAQMD Hearing Board cases and conducts public hearing.

RESUME

Tran D. Vo — **Air Quality Analysis and Compliance Supervisor**

Education
- B.S., Chemical Engineering, California State Polytechnic University, Pomona, 1984
- M.S. Master of Engineering, California State Polytechnic University, Pomona, 1986

Registration
- Professional Engineer, Mechanical Engineering, California, No. 25655

EXPERIENCE

1984 to present: Air Quality Analysis and Compliance Supervisor, South Coast Air Quality Management District (SCAQMD).

Mr. Vo has over 33 years of experience at the SCAQMD. Since year 2000, he is the engineering supervisor of the Refinery Team, consisting of three Senior Engineers and fifteen Air Quality Engineers. Mr. Vo's main duty is to review the engineering evaluation reports and permit issuance to refineries, crude terminals, product terminals, and marine terminals. He has experience in processing permits for various processes at the refineries and terminals, including crude units, cokers, fluidized catalytic cracking units (FCCUs), alkylation unit, sulfur recovery units (SRUs), hydrogen plants, storage tanks, heaters, cogeneration turbines, flares, air pollution control equipment, and others. In addition, he is also in charge of processing various Compliance Plans for refineries as required by SCAQMD, such Flare Monitoring and Recording Plans, Flare Minimization Plans, Contaminated Soil Mitigation Plans, Compliance Assurance Monitoring Plans, and others.

He has extensive experience in evaluating permit applications for compliance with New Source Review, Prevention of Significant Deterioration, Title V, Regional Clean Air Incentive Market, Health Risk Assessment, Greenhouse Gases, and other local, state, and Federal air regulations that are applicable to the refineries. Mr. Vo has conducted training courses and presentations in the areas of his expertise. He has served as witness in SCAQMD Hearing Board cases, and routinely provided technical assistance in support of SCAQMD's legal office, CEQA, Rule Development, and Compliance divisions.

REPRESENTATIVE PROJECTS

The following are some of the projects that Mr. Vo had responsibility of overseeing the permitting:

- Phase III Reformulated Fuel projects
- Major revamp of a FCCU and coker units
- Flare monitoring and compliance projects
- Installation of a new SRU
- Installation of a new hydrogen plant
- Installation of a new bio-diesel plant
- Modification of an alkylation plant
- New Crude Oil Terminal and Tank Farm project
- New Electrical Power Cogeneration projects

RESUME

Sawsan Andrawis — **Air Quality Engineer, SCAQMD**

Education
- B.S., Chemical Engineering, Cairo University, Cairo, 1978

Areas of Expertise
- Air Pollution Regulatory Compliance
- Air Pollution Permitting Processing
- Health Risk Assessment
- Refinery Unit Design
- Operating Plant Supervision

EXPERIENCE

1985 to present: Air Quality Engineer, South Coast Air Quality Management District.
1981 to 1985: Chemical Engineer, CF Braun & Co Engineers, Petrochemical Engineering & consulting
1979 to 1981: Production/Supervisor Engineer, Chemical & Trading Corporation

Ms. Andrawis has over 35 years of experience in the air pollution/refining and petrochemical plants. For the last 31 years, she has primarily been involved in issuing air permits to operate and construct and writing evaluations reports for refineries, crude terminals, product terminals and marine terminals. This involves review of refinery process equipment and related air pollution control equipment to be constructed/modified, analysis of emission potentials, determination of best available control technologies for subject equipment, determination of rule applicability and compliance, and evaluation of state and federal rule requirements, such as PSD applicability, compliance with CEQA requirements, and air quality modeling results. Over her tenure at South Coast Air Quality Management District, she has processed permit applications from all six major refineries in the region.
In the private sector, she was involved developing piping and instrumentation flow diagrams for refineries, hydraulic calculations, sizing vessels, heat exchangers, pipes. Sizing and selection of all types of control valves, pressure safety valves, flow meters and controllers

REPRESENTATIVE PROJECTS

A partial listing of Ms. Andrawis' project experience includes:

South Coast Air Quality Management District
Perform and process advanced journey-level applications for permits to construct and permits to operate. Prepare engineering evaluations to assess the compliance of the proposed construction projects with SCAQMD and Federal rules and regulations. Prepare and issue permits and compliance plans addressing the requirements of SCAQMD rules.
Prepare RECLAIM facility permits and draft Title V permits for the all the local refineries.
Testify as expert witness on issues related to ongoing appeals and variances of RECLAIM /Title V facility Permits for refineries

- **CF Braun & Co Engineers, Petrochemical Engineering & consulting:**
  Process Engineering developing Piping and Instrumentation flow diagrams for refineries, hydraulic calculations, sizing vessels, heat exchangers, pipes. Sizing and selection of all types of control valves, pressure regulators, pressure safety valves, flow meters, pneumatic transmitters and controllers
  Covered the complete field checkout of a hydrogen plant in Texas, checking piping, instruments, vessels and control valves.

Chemical & Trading Corporation:
Supervision of plant operating facilities for the production of detergents and cosmetics and quality control of finished products and packaging.

RESUME

Rafik Z. Beshai **Air Quality Engineer II, SCAQMD**

Education
- M.S., Mechanical Engineering, UCLA, 1988
- B.S., Biochemistry, UCLA, 1984

Registrations
- Registered Mechanical Engineer, California, No. M 30505

Areas of Expertise
- Regulatory Compliance
- Permit Processing
- Health Risk Assessment
- Air Emissions Testing
- Scientific Research in Air Quality/Energy

EXPERIENCE

2001 to present: Air Quality Engineer, South Coast Air Quality Management District
1998 to 2001: Project Engineer, Almega Environmental & Technical Services
1997 to 1998: Project Engineer, CTL Environmental Services
1991 to 1995: Project Engineer, Energy and Environmental Research Corporation

Mr. Beshai has over 25 years of experience in the air pollution/energy field. At the SCAQMD, Mr. Beshai has been involved in permit processing for more than 15 years. During his tenure at the SCAQMD, he has been in the Refinery Permitting team, working on Regional Clean Air Incentives Market (RECLAIM) and Title V facility permits. This involves review of refinery process equipment and related air pollution control equipment to be constructed/modified, review of applicable rules and rule requirements, analysis of emission potentials, determination of Best Available Control Technology (BACT) for the subject equipment, and evaluation of other aspects of permitting such as PSD applicability, compliance with CEQA requirements, and air quality modeling results. Mr. Beshai has processed permit applications for three of the major refineries in the region as well as for product terminals and marine terminals. In the private sector he has primarily been involved in writing evaluations, reports, and technical papers. This involved reviewing field testing results, test methods, and process details and preparing review reports for private clients and government agencies.

REPRESENTATIVE PROJECTS

A partial listing of Mr. Beshai's experiences includes:

- **South Coast Air Quality Management District:**
  Process applications for permits to construct and permits to operate. Prepare engineering evaluations to assess the compliance of the proposed construction projects with SCAQMD and Federal rules and regulations. Prepare and issue permits and compliance plans addressing the requirements of SCAQMD rules.

- **Almega Environmental & Technical Services:**
  Performed stack testing (mainly at petroleum refineries) and prepared reports for the source tests. Performed source tests in the field to measure pollutant emissions rates. Prepared reports to be submitted to clients and responsible regulatory agencies. Also, performed periodic calibration and maintenance of emission monitoring equipment.

- **CTL Environmental Services:**
  Performed stack testing at various pollutant sources in southern California, prepared the source test reports for submittal to the client and to regulatory agencies.

RESUME

Khang X. Nguyen **Senior Air Quality Engineer**

Education
- B.S., Civil Engineering, California Polytechnic State University, San Luis Obispo,1996

Areas of Expertise
- Air Quality Permitting—Petroleum Industry
- Title V and RECLAIM Programs
- New Source Review
- Federal Air Regulations
- Regulatory Compliance
- Air Modeling/Health Risk Assessment
- Emission Testing

EXPERIENCE

2001 to present: Senior Air Quality Engineer, South Coast Air Quality Management District (SCAQMD)

Mr. Nguyen has over 15 years of experience in air quality permitting, regulation and compliance including 10 years as a supervisor of a team of five permitting engineers in petroleum refining and distribution industries. Mr. Nguyen is responsible for processing permit applications, reviewing and approving engineering analyses for permit applications, and resolving issues related local, state and federal air rules and regulations including but not limited to Title V, RECLAIM, New Source Review, best available control technologies (BACT), CEQA requirements, Prevention of Significant Deterioration (PSD) analysis, air modeling, health risk assessments, etc.. Mr. Nguyen has conducted training courses in the areas of his expertise, training of new engineers, and he has served as a technical witness in SCAQMD Hearing Board cases. Mr. Nguyen regularly provides technical assistance on air pollution control technologies and regulatory requirements related to petroleum refining processes in support of SCAQMD's legal office, CEQA, rule development, compliance divisions as well as other governmental agencies.

REPRESENTATIVE PROJECTS

A partial listing of Mr. Nguyen's project experience includes:

- **Refinery Optimization, Reliability Improvement and Regulatory Compliance Projects**

These projects consist of modifications to all major equipment at three local refineries. These multi-phase projects involved a wide-range of large emission sources such as fluid catalytic cracking units (FCCU), delayed coking units, sulfur plants, flares, etc.., and their control strategies for compliance with air quality standards. Permitting activities for these projects lasted several years.

- **Refinery Flare Monitoring and Compliance Projects**

These projects were implementing by all of the local refineries to comply with SCQAMD flare emission control rule—Rule 1118. These projects included two pilot studies lasting over 2 years, starting with publication of implementation guidance documents, revuew and approval of the installation of vapor recovery systems, flaring systems, and their monitoring technologies and.

- **Reformulated Fuels Project**

Construction of new refining processes and major equipment modifications at a local refinery to facilitate the production of fuel meeting standards of California Phase II Reformulated Gasoline.

- **New Crude Oil Terminal and Tank Farm Project**

Proposed construction of a new crude oil terminal at Pier 400 in the Port of Los Angeles and an associated tank farm. The proposed facilities were designed to receive 250,000 barrels per day of crude oil from large tanker ships and store 4 million barrels of crude oil.

- **New Electrical Power Cogeneration Projects**

These projects were implemented by three local refineries to increase their electrical power generation capabilities. The projects were subject to multiple regulatory requirements such as new Best Available Control Technologies, Prevention of Significant Deterioration (PSD) for Green House Gases (GHG),

RESUME

Sam Wang **Air Quality Specialist**

Education
- MS, Civil and Environmental Science and Engineering, Stanford University, CA, 2003
- B.S., Water Resources and Environmental Engineering, Tamkang University, Taipei, Taiwan, 1997

Registrations
- Certified Permit Professional (CPP, #152), SCAQMD

Certifications
- Engineer-In-Training, (California Certified #131369)
- ISO14001 Auditor

Areas of Expertise
- Air Quality Science and Engineering
- CEQA and NEPA Project Management
- Modeling and Emissions Inventory
- Health Risk Assessment
- Greenhouse Gas Studies
- Regulation and Policy Development

EXPERIENCE

2015/10 to present, SCAQMD, Air Quality Specialist
2006 to 2015: AECOM/URS Corporation; Senior Air Quality Engineer/Project Manager
2004 to 2006: CTCI, Taipei, Taiwan; Supervisor/Associate Project Manager
2002 Summer; Camp Dresser & McKee Inc. Hong Kong, China; Intern
2000 to 2001; HuiKuo Consulting Inc., Taiwan; Project Manager/ EPA Journalist
1998 to 2000; Meteorology Department, Artillery, Army, Taiwan

Mr. Wang's technical specialties include industrial air quality permitting (including NSR, PSD, RECLAIM and Title V), air quality modeling (both stationary and mobile sources), CEQA and NEPA air quality and GHG impact assessment, mobile and stationary source emissions estimations, air toxic health risk assessment/AB2588, GHG reductions, sustainable project development, regulations evaluations, and science and engineering research and support. He has performed air quality assessment for more than 20 power plant projects/clients and acted as the task or project lead for many of them and as well as various EIR/EIS projects. He has more than 15-years of experience in air quality/GHG planning and engineering field for local and international projects, primarily in California and some in Taiwan, Hong Kong, China, and other countries.

REPRESENTATIVE PROJECTS

A partial listing of Mr. Wang's project experience includes:

- **CEQA/NEPA Environmental Document Preparation for:**
  SCAQMD Rules and Regulations
  Power Plants
  Renewable Projects
  Military(DoD, Navy, Marine, and Air Force)
  Schools,
  High Speed Rail and Freeway Transportation Projects
  Airport and Port Projects
  Residential and Commercial Development
  County Projects
  Industrial Park
  Pipeline Projects
  Pharmaceutical Companies
  Charger Stadium and Sport Facilities
  Wastewater Treatment Plants
  Chemical Plants
  Petroleum Refineries
- **Air Quality Compliance Assessments, Modeling (NAAQS/CAAQS/PSD and others), and Emissions for:**
  Power Plants
  Upstream Oil Industry
- **International Projects (GHG-CDM/JI, other projects)**

RESUME

Payam Pakbin, Ph.D. **Air Quality Specialist**

Education
- B.S., Chemical Engineering, Sharif University of Technology, Tehran, Iran 2006
- MSc, Environmental Engineering, University of Southern California, 2008
- Ph.D., Environmental Engineering, University of Southern California, 2011

Research Experience
- Authored and co-authored over 20 articles in peer-reviewed journals with over 350 citations
- Presented at numerous national and international conferences

Areas of Expertise
- Air Quality
- Ambient Air Pollution Monitoring
- Remote Sensing
- Environmental Impact Assessment
- Atmospheric Chemistry
- Environmental Data Analysis
- Statistics
- Technical Writing
- Environmental Policy Analysis

EXPERIENCE

2014 to present: Air Quality Specialist, SCAQMD
2011 to 2014: Postdoctoral Scholar – Research Associate; University of Southern California

Dr. Pakbin applies mathematical, statistical, and analytical techniques, and performs data evaluation and analysis to research and survey data from 35 air monitoring network sites and numerous special monitoring projects. Reviews and analyzes a wide variety of environmental documents and assists in preparing technical analyses and recommended positions on proposed rules relating to air quality management. Develops recommendations concerning air quality management programs, plans, rules and prepared reports and correspondence.

REPRESENTATIVE PROJECTS

A partial listing of Dr. Pakbin's project experience includes:

- **2016 Air Quality Management Plan - Air Quality Evaluation:**
  Worked with managers, supervisors and other environmental professionals to develop and implement methods and techniques for the analysis and evaluation of air quality data from 35 air monitoring network sites.
  Applied various mathematical, statistical and analytical techniques to the analysis of data and prepared graphs, charts and statistical and technical summaries for the AQMP.
  Contributed to the writing of the Air Quality & Health Effects and Current Air Quality chapters of the AQMP.

- **Special Monitoring Projects:**
  Paramount Air Monitoring – Compiled study database, analyzed air monitoring data and prepared reports
  Aliso Canyon Monitoring – Analyzed air sampling data and assisted with recommending actions as a result of a natural gas leak at Southern California Gas's underground storage reservoir in Northridge, CA
  Sunshine Canyon Landfill – Analyzed air quality data from landfill VOC emissions
  Ambient Lead Monitoring at Exide Technologies – Analyzed data and prepared reports on the lead emissions at the lead battery recycling in Vernon, CA
  Beach Fire Monitoring – Evaluated the impacts of beach fire rings on the adjacent communities
  AllenCo – Assisted in design of the air monitoring to evaluate the impacts of facility operations on the nearby communities.
  Hixson – Performed air monitoring data analysis and prepared data summaries and reports

RESUME

Payam Pakbin, Ph.D. **Air Quality Specialist**

- **Air Toxic Studies**

Multiple Air Toxics Exposure Study (MATES IV)

Performed statistical and technical analysis and authored the "Ultrafine Particles and Black Carbon Measurements" and "Black Carbon Measurements at Fixed Sites" chapters of the MATES IV report.

Assisted in design and deployment of the local-scale studies, designed to monitor and characterize the impacts of large sources on nearby communities by utilizing portable platforms.

Air Toxics "Hot Spot" Program (AB 2588)

- **Carlton Forge Works**
- **Quemetco, Inc.**
- **Hixson Metal Finishing**
- **Exide Technologies**

Responsible for preparing study database, charts, graphs and study reports.

- **Monitoring and Analysis**

Provided technical support and assisted in development of Annual Monitoring Network Plan and the 5 Year Network Assessment.

Assisted in developing recommendations concerning air quality management programs, air quality monitoring network, and air pollution monitoring for special monitoring projects.

Worked with laboratory staff to develop and implement methods and techniques for the analysis and evaluation of air quality studies and plans.

Assisted in two technology demonstration projects to evaluate the capabilities of advanced Optical Remote Sensing techniques for monitoring volatile organic compounds (VOCs) and Hazardous Air Pollutants (HAPs) from refineries.

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APPENDIX I-2

CAL ENVIRO METRICS, LLC

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K. Stephen Smith

104 47th Street, Bellingham, Washington, 98229 | 213-304-1800 | stevesinla@aol.com

Professional Summary

Thirty years of professional experience preparing environmental analysis documents, with detailed knowledge of the California Environmental Quality Act (CEQA), CEQA case law, the California and Federal Clean Air Acts, and air quality analysis methodologies

Education

PH.D. | 1986 | UNIVERSITY OF CALIFORNIA – DAVIS

Major: Ecology

TEACHING CREDENTIAL | 1977 | UNIVERSITY OF CALIFORNIA – BERKELEY

Major: Early Childhood Education

B.A. | 1975 | STANFORD UNIVERSITY

First Major: Biology

Second Major: Psychology

Experience

PRESIDENT | CALENVIRO METRICS, LLC | AUGUST 2014 TO PRESENT

- Consulting services provided include:
  - Reviewing or preparing all or portions of CEQA documents and responding to comments
  - Preparing comprehensive and quantitative air quality analyses
- Clients have included South Coast Air Quality Management District, Bay Area Air Quality Management District, Tesoro Refining & Marketing Company LLC, and Phillips 66

PROGRAM SUPERVISOR | SOUTH COAST AQMD | JULY 1989 TO APRIL 2013

- Supervised the CEQA Section, responsibilities included:
  - Managed six Air Quality Specialists, assigned projects and wrote performance appraisals
  - Reviewed all CEQA documents prepared by this section for accuracy, consistency, and compliance with all relevant regulations and laws
  - Prepared CEQA documents for SCAQMD rules and regulations and permit application projects where the SCAQMD was the lead agency, including refineries, utilities, and chemical plants
  - Managed consultant contracts
- Supervised the Intergovernmental Review (IGR) Section, responsibilities included:
  - Supervised two Air Quality Specialists, assigned projects and wrote performance appraisals
  - Reviewed all work products prepared by staff for accuracy and comprehensiveness
  - Prepared comment letters as necessary to public agencies regarding the quality of the air quality analyses in their CEQA documents and suggested measures to mitigate air quality impacts

AIR QUALITY SPECIALIST | SOUTH COAST AQMD | AUGUST 1987 TO JULY 1989

- Reviewed CEQA documents prepared by other public agencies and wrote comment letters as necessary on the quality of their air quality analyses and suggested additional mitigation measures
- Prepared CEQA documents for SCAQMD rules regulating oxides of nitrogen, volatile organic compounds, and toxic air contaminants

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APPENDIX I-3

ENVIRONMENTAL AUDIT, INC

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RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

EDUCATION

M.P.H., Epidemiology, University of California, Los Angeles, 1982
B.S., Biological Science, University of Southern California, 1979
Hazardous Materials Management Certificate Program, University California, Davis and Irvine

REGISTRATION

Registered Environmental Assessor, California, No. 729

CERTIFICATION

Certified Permitting Professional, South Coast Air Quality Management District No. B4315
CARB Accredited Lead Verifier, GHG Emissions Reporting

AREAS OF EXPERTISE

Health Risk Assessments
Environmental Impact Reports/Statements
Air Quality
Environmental Auditing
Regulatory Compliance

EXPERIENCE

1986 to present:

Senior Vice President, Environmental Audit, Inc. (EAI). Responsibilities include supervision and preparation of environmental impact reports/statements, health risk assessments, feasibility studies, environmental audits and regulatory activities. Major management activities include supervision of project development, basic planning and design, compliance with local, state, regional, federal and international rules and regulations, and development of approach and materials for public presentations. Responsible for the design of air quality monitoring studies to determine indoor/outdoor impacts of various industrial activities; solid waste disposal facilities; hazardous waste treatment, storage and disposal facilities; and wastewater treatment facilities.

RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

1987 to 1997:

Guest Lecturer, University California, Irvine; Hazardous Materials Management Certificate Program for Social Ecology X498, Principles of Hazardous Materials Management and Engineering X468.2, Technologies for Management of Hazardous Waste. Responsible for presentation of class materials on toxicology and risk assessment issues associated with the management of hazardous materials and wastes. Also responsible for presentation of class materials on the use of incineration as an alternative for hazardous waste management.

1982 to 1986:

Public Health Specialist, Bright & Associates. Responsibilities included preparation of health risk assessments; evaluation of the potential impacts associated with processing various hazardous materials such as landfill disposal, transportation, spills, incineration, waste minimization and recycling; research for environmental impact reports/statements; interfacing with regulatory agencies; and preparation of environmental compliance manuals for various industries.

1981 to 1982:

Research Assistant, Department of Epidemiology, University of California, Los Angeles. Responsible for a portion of an EPA contract to study the health effects associated with the consumption of reused water in the Los Angeles area. Research involved statistical analyses of the cancer rates in various portions of Los Angeles County.

1979 to 1980:

Research Assistant, Department of Microbiology, University of California, Los Angeles. Responsible for various laboratory analyses conducted for research on the Murine Leukemia Virus.

Research Assistant, Alpha Therapeutics. Completed studies and laboratory analyses and techniques for the purification of blood clotting Factor IX.

1977 to 1979:

Environmental Technician, Department of Harbors Project, University of Southern California. Conducted research, field studies and laboratory analyses for a variety of studies on water quality, oil spills, cannery effluent, etc., in the Ports of Los Angeles, Long Beach and Marina Del Rey.

RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

REPRESENTATIVE PROJECTS

The following is illustrative of representative projects managed by Ms. Stevens based on designated areas of expertise. Additional project references are available upon request.

CEQA Documents

Industrial Projects

Reviewed the Draft EIR for the Comprehensive Groundwater Cleanup Strategy for Historical Chromium Discharges from PG&E's Hinkley Compressor Station, San Bernardino County, on behalf of the Hinkley Community Advisory Committee. The EIR evaluated complicated environmental impacts associated with the cleanup of chromium contamination in groundwater.

Prepared the Draft EIR for the Chevron El Segundo Refinery PRO Project. The proposed project included refinery modifications to optimize operations, comply with regulations, and improve operating efficiency. Major issues included air quality, greenhouse gas emissions, hazards, hydrology/water quality, noise, solid/hazardous waste, and transportation/traffic. Also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Chevron Refinery.

Prepared an EIR for the Chevron El Segundo Refinery Coke Drum Replacement Project. The proposed project included replacement of the existing coke drums with new coke drums. Major issues include construction (including LST analysis) and operational air quality impacts, GHG emissions impacts and mitigation measures, construction noise, and construction traffic impacts.

Prepared the EIR for the BP Safety, Compliance and Optimization Project at the BP Carson Refinery. The proposed project included modifications to a number of refinery units, including calculation of emissions from mobile sources. Included an inventory of both the criteria and TAC emission changes associated with the proposed project. EAI also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the BP Refinery. Major issues included air quality, hazards, noise, and traffic.

Prepared the EIR for the Ultramar Inc., Valero Wilmington Refinery Alkylation Improvement Project. The proposed project included modifications to terminate the storage, use, and transport of concentrated hydrofluoric acid at the Refinery. Major issues included air quality, hazards, hydrology/water quality, noise, and transportation/traffic. Also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Ultramar Refinery.

RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

Provided consulting services to the Alon Bakersfield Refinery for the preparation of an EIR for a Crude Rail Project. Responsibilities included drafting portions of the EIR including biological resources, cultural resources, geological resources, hydrology and water quality, hazards/hazardous materials, and transportation/traffic. Detailed analyses were provided on the transportation hazards associated with the transportation of crude by rail.

Prepared the Final EIR for the Tesoro Reliability Improvement and Regulatory Compliance Project. The lead agency for the EIR was the SCAQMD. The proposed project included refinery modifications to modernize equipment including replacing Cogeneration Units and Boilers, comply with regulations, and improve operating efficiency. Major issues included construction (including LST analysis) and operational air quality impacts, GHG emissions impacts and mitigation measures, hazards, and transportation/traffic. Assisted in the preparation of an inventory of criteria, TAC, and greenhouse gas emission changes associated with the proposed project, modeled the project emissions using the ISC model and completed a health risk assessment using the HARP HRA model to determine the potential for significant impacts.

Prepared the EIR for the issuance of a RCRA Part B Hazardous Waste Facility Operating Permit for the Industrial Services Oil Company facility, Los Angeles, California. Industrial Services is a hazardous waste transfer facility and a used oil recycler. The lead agency for this project was the DTSC. Major issues included air quality, earth resources, water quality, risk of upset, land use, traffic/circulation, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Prepared an EIR for the ConocoPhillips PM10 and NOx Reduction Project. The proposed project included modifications to comply with SCAQMD Rule 1105.1 - PM10 and Ammonia Emissions from Fluid Catalytic Cracking, SCAQMD Regulation XX – RECLAIM, and further reduce emissions of ammonia and sulfur oxides at the ConocoPhillips Los Angeles Refinery.

Provided consulting services to Alt Air for the preparation of a Negative Declaration and air quality permitting for modifications to existing refinery structures to produce renewable jet fuel and renewable diesel fuel from non-edible vegetable oil and high-quality technical beef tallow. Responsibilities included drafting the Negative Declaration, evaluation of the impacts from criteria pollutant emissions, toxic air contaminant emissions and GHG emissions, as well as preparation of a health risk assessment and evaluation of other CEQA topics.

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DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

Prepared a Negative Declaration for Phillips 66 Los Angeles Refinery Carson Plant – Crude Storage Capacity Project. The project included the installation of a crude storage tank and increasing the throughput of two existing tanks to streamline the delivery of crude by ships. The environment resources that required more extensive analysis included air quality, GHG emissions, toxic air contaminants/health risks, and hazards.

Prepared a Negative Declaration, addendum, and Subsequent Negative Declaration, for the ConocoPhillips Ultra Low Sulfur Diesel Project at its Wilmington Plant, in Los Angeles, California. The proposed project included modifications to several refinery units. An HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the ConocoPhillips Refinery.

Prepared an EIR for the Paramount Clean Fuels Project which included refinery modifications to produce cleaner-burning gasoline and ultra low sulfur diesel (ULSD) fuels. The proposed project included modifications to a number of refinery units. An HRA was also prepared for the proposed project.

Prepared the EIR and Subsequent EIR for the Ultramar Reformulated Fuels Program at the Wilmington Refinery. This project included new units and refinery modifications to produce fuels in compliance with state and federal Clean Air Act requirements. The project included modifications to the Ultramar Refinery, Olympic Tank Farm, and pipelines connecting the two facilities, as well as to the larger California oil and petroleum products distribution system. The lead agency for this project was the SCAQMD. Major issues included earth resources, air quality, water, noise, traffic/circulation, risk of upset, aesthetics, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Prepared an addendum to the Negative Declaration for the Air Liquide Hydrogen Plant at the Chevron Refinery. EAI prepared a health risk assessment in compliance with SCAQMD Rule 1401 analysis for a new flare related to the Hydrogen Plant. The project was completed by the agreed upon deadlines.

Prepared the Draft EIR for the OXY Dominguez Oil Field Project in Carson, California. The project involved the creation of a consolidated oil well and separations facility, which was comprised of up to 202 oil and gas production and injection wells, separation equipment to produce up to 6,000 barrels per day of oil and three million cubic feet of natural gas. Key environmental resources analyzed in the EIR included project criteria, toxic and GHG emissions from wells, separations equipment, fugitive components, and mobile sources; hazards/hazardous materials; hydrology and water quality; noise; and transportation and traffic.

RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

Prepared the Negative Declaration for the Polychemie Facility in Los Angeles, California. The proposed project included modifications to add new storage tanks and vessels at the facility. An HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Polychemie facility.

Prepared a Negative Declaration for the Ultramar Inc. Cogeneration Unit at the Wilmington Refinery. The project included the installation of a Cogeneration Unit to minimize the potential for power outages at the Refinery. The environmental resources that required more extensive analysis included air quality, GHG emissions, and health risk assessment.

Prepared the EIR for the issuance of a RCRA Part B Hazardous Waste Facility Operation Permit for the Exide Technologies facility, Vernon, California. Exide is a secondary lead smelter where used batteries and other lead products are recycled into lead ingots. The lead agency for this project was the DTSC. Major issues included air quality, earth resources, water quality, risk of upset, noise, traffic/circulation, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Worked as part of the project team assisting the Joint Powers Authority with the preparation of Union Pacific's Intermodal Container Terminal Facility (ICTF) EIR, which included preparing the setting, impact analyses, and mitigation measures for the following resources: aesthetics, construction emissions inventory and impact analysis, cultural resources, hydrology/water quality, hazards, land use, utilities and service systems, cumulative impacts, and alternatives.

Prepared a Mitigated Negative Declaration for the Hixson Metal Finishing Risk Reduction Project, in Newport Beach, California. The proposed project consisted of on-site tank, spray booth, and oven relocation; installation of additional air pollution control systems; construction of permanent total enclosures; installation of covers on wastewater treatment tanks, preparation and implementation of an improved housekeeping and dust minimization plan, and improvements to the Facility's electrical system. The overall focus of the project was to reduce the Facility's emissions associated with anodizing, testing, plating, and coating operations for aerospace and defense industries.

Prepared a Subsequent Negative Declaration for the proposed re-start of mining operations for the Molycorp Mountain Pass mining facility. The proposed project included modifications to mining operations to improve the efficiency of the operation and extraction of rare earth elements, as well as a 49.9 MW Cogeneration facility to increase operational efficiency. Prepared an inventory of

criteria, TAC, and greenhouse gas emission changes associated with the proposed project for stationary and mobile sources, modeled the project emissions, and completed a health risk assessment to determine the potential for significant impacts. GHG emission impacts and mitigation measures were developed. Major issues included aesthetics, air quality, greenhouse gas emissions, biological resources, hazards, noise, and transportation/traffic.

Prepared a Negative Declaration for the BP Carson Refinery, Maintenance Shop Project. The project consisted of the construction of a new maintenance shop for the BP Refinery, on about 15 acres of land located within the City of Carson, to replace an existing maintenance building and various refinery support functions adjacent to other office buildings. The lead agency for this project was the City of Carson. Major issues included air quality, hazards/hazardous materials, noise, and transportation/traffic.

Air Agencies/Control Districts

Prepared the EIR for the SCAQMD 2003, 2007, 2012, and 2016 Air Quality Management Plans (AQMPs). The AQMPs provide control measures and strategies to reduce air emissions and allow the South Coast Air Basin to comply with state and federal ambient air quality standards. The lead agency for these projects was the SCAQMD. Major issues included air quality, energy, hazards and hazardous materials, hydrology and water quality, and solid and hazardous wastes.

Prepared the EIR for the BAAQMD 2010 and 2017 Clean Air Plans (CAPs). The 2010 and 2017 CAPs provided control measures and strategies to reduce air emissions and allow the BAAQMD to develop a control strategy to reduce ozone, particulate matter, air toxics and greenhouse gas emissions in an integrated plan. The lead agency for these projects was the BAAQMD. Major issues included air quality, energy, hazards and hazardous materials, hydrology and water quality, transportation and traffic, and utilities and services systems

Prepared various CEQA documents for BAAQMD 2005 Ozone Strategy and various rules and regulations. The 2005 Ozone Strategy identified control measures needed to reduce emissions and comply with ozone ambient air quality standards. Major issues included air quality, hazards and hazardous materials, hydrology and water quality, and utilities. Also assisted in the preparation of various CEQA documents for proposed new and modified BAAQMD rules and regulations.

Prepared the EIR for the BAAQMD's Proposed Regulation 12, Rule 12 - Flares at Petroleum Refineries and Regulation 8 - Organic Compounds, Rule 2 -

Miscellaneous Operations. The proposed project evaluated the impacts associated with implementing measures to control emissions from flaring events. EAI prepared the environmental setting, impacts and mitigation measures for potentially significant air quality and hazard impacts identified for the proposed rule.

Prepared the EIR for the proposed changes to the BAAQMD's Air Toxics New Source Review Program. The proposed changes in the program resulted in the adoption of a new District Regulation 2, Rule 5 - New Source Review of Toxic Air Contaminants, and amendments to several existing District rules and the Manual of Procedures (MOP). EAI prepared the environmental, setting, impacts and mitigation measures for the emission control measures that could be imposed as part of the new rules and procedures. The EIR was completed within agreed upon deadlines.

Prepared a Negative Declaration for the BAAQMD's proposed amendments to Regulation 8, Rule 44 - Marine Vessel Loading Terminals, and Rule 46 - Marine Tank Vessel to Marine Tank Vessel Loading. The proposed project evaluated the impacts associated with implementing measures to control VOC emissions associated with the transfer of organic materials. The Negative Declaration was completed within agreed upon deadlines.

Prepared the EIR for the Proposed Amendments to the BAAQMD's NSR and Title V Permitting Regulations. The BAAQMD proposed amendments to update its NSR and Title V regulations to include new U.S. EPA requirements for PM2.5, GHG emissions, as well as other regulations. Prepared the NOP/IS as well as the Draft EIR. The environmental resources evaluated in the Draft EIR included air quality and GHG impacts.

Prepared the EIR for the 8-Hour Ozone Rate of Progress Plan for the Sacramento Federal Nonattainment Area. EAI used the appropriate motor vehicle emission factors and vehicle planning assumptions in the SACMET model, as developed by Sacramento Area Council of Governments for the purpose of developing travel demand forecasts for the Sacramento region. The data were used to determine the potential for significant impacts associated with implementation of the 8-Hour Ozone Rate of Progress Plan and alternatives. EAI prepared the environmental setting, impacts and mitigation measures for potentially significant air quality and transportation and traffic impacts.

Prepared the Negative Declaration for the proposed adoption of BAAQMD's Regulation 12, Rule 13: Metal Melting and Processing Operations, and Draft Regulation 12, Rule 14: Metal Recycling and Shredding Operations. The proposed amendments further reduced emissions of PM, VOCs, and toxic air contaminants from metal melting and process operations and metal recycling and

shredding operations. Prepared the Negative Declaration which emphasized impacts on air quality and GHG impacts.

Prepared a Negative Declaration for proposed amendments to BAAQMD's Regulation 9, Rule 10 – Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries. The proposed amendments would implement Further Study Measure 14 (FS-14) from the Bay Area 2005 Ozone Strategy and would tighten emissions limits from boilers, steam, generators, and process heaters at petroleum refineries. The environmental analyses included detailed review of air quality impacts, GHG emissions, TAC emissions, and hazards.

Prepared a Negative Declaration for the BAAQMD's proposed amendments to drycleaning regulations including Regulation 11, Rule 16 – Perchloroethylene (Perc) and Synthetic Solvent Dry Cleaning Operations, Regulation 8, Rule 17 – Non-halogenated Solvent Dry Cleaning Operations, Regulation 2, Rule 1 – Permits, General Requirements, and Regulation 8, Rule 27 – Synthetic Solvent Dry Cleaning Operations. The lead agency for this Negative Declaration was the BAAQMD. The Negative Declaration evaluated impacts associated with prohibiting new installations and relocations of dry cleaning equipment using Perc and phasing out the use of Perc as a solvent in existing dry cleaning equipment. The environmental analyses included detailed review of air quality impacts, TAC emissions, hazards, and hydrology/water quality

School Districts

Prepared CEQA documents including EIRs, Negative Declarations and CEQA exemptions for a number of schools in the Menifee Union School District, Beverly Hills School District, Desert Sands Unified School District, Pasadena Unified School District, Colton Joint Unified School District, Perris Union High School District, and the Huntington Beach Unified High School District. EIRs included school modernization projects (where contamination and historical buildings were involved) as well as the development of proposed new schools. The Negative Declarations evaluated the impacts of a new school site and related health impacts, traffic impacts, land use impacts on adjacent residents, biological impacts, cultural impacts, among other environmental impacts.

Health Risk Assessments

Prepared the HRA for a film reproduction company with laboratories in various locations to determine if emissions of toxic air contaminants would require Proposition 65 notification.

Conducted source testing for an automobile manufacturer to determine if paint products would require Proposition 65 notification.

Prepared the AB2588 HRAs for a number of refineries in the SCAQMD. These HRAs followed the California Air Pollution Control Officers Association (CAPCOA) guidelines. The HRAs included calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways. The HRAs were performed using CAPCOA guidelines to determine compliance with SCAQMD rules, determine the level of impacts under the California Environmental Quality Act (CEQA) and were approved by the SCAQMD.

Prepared the HRA to determine appropriate soil clean up levels for residual lead concentrations at a former paint manufacturing plant located in Los Angeles, California. The risk assessment estimated exposure via multipathways to lead and determined the blood lead concentration following site clean up. The HRA was approved by the lead agency and used as the basis for establishing clean up levels for lead.

Prepared the AB2588 HRA for the Petro-Diamond Marine Terminal located in the Port of Long Beach, California. This HRA included emissions associated with the storage of petroleum products and combustion emissions from heaters. The HRA included calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways.

Air Quality

Work completed includes the preparation of air quality analyses, air quality permit applications for facilities that include petroleum refineries, paint and coating manufacturers, hazardous waste treatment facilities, defense contractors, cement terminals, marine terminals, and vehicle manufacturing and import facilities.

RESUME

DEBRA BRIGHT STEVENS
Principal - Senior Vice President, Environmental Audit, Inc.

Environmental Auditing

Work completed has included environmental due diligence audits, regulatory compliance audits, and Phase I property transfer audits.

Regulatory Compliance

Work completed has included the preparation and submittal of conditional use and zone change permit applications, air quality permit to construct applications, sanitation district permit applications, and working with local agencies to modify existing operations.

GRANTS AND TRAINEESHIPS

Public Health Service Grant, 1981-1982, UCLA
Public Health Service Traineeship, 1980-1982, UCLA

PUBLICATIONS

Cancer Incidence in Recycled Water Areas of Los Angeles County, 1972-78. Regents of the University of California, Los Angeles, California, (1982).

Acid Rain. Journal, People to People Environmental Control Delegation to People's Republic of China, 100 pp. (with Donald B. Bright), (1985).

ADVISORY POSITIONS

Member, Advisory Council, California State University, Fullerton, School of Natural Sciences and Mathematics.

Environmental Quality Affairs Citizens Advisory Committee, City of Newport Beach, 2009 through 2012. Chairperson 2011-2012

Environmental Quality Affairs Committee, City of Newport Beach since January 2013.

RESUME

MARCIA R. BAVERMAN
Project Manager, Environmental Audit, Inc.

EDUCATION

B.S., Chemical Engineering with Mathematics Minor, San Jose State University, 1984

REGISTRATION

Registered Chemical Engineer, California, No. 5089

CERTIFICATION

CARB Accredited Lead Verifier, Oil and Gas Specialist, Process Emissions Specialist, Greenhouse Gas Reporting, No. H-15-010
Former Certified OSHA 501Trainer

AREAS OF EXPERTISE

Air Quality
Environmental Document Preparation
Hazardous Waste Management
Policy Manual Preparation
Environmental and Safety and Health Auditing
Regulatory Compliance

EXPERIENCE

present:
Project Manager/Senior Engineer, Environmental Audit, Inc. (EAI). Responsibilities include project management, air dispersion modeling, health risk assessment preparation, CEQA document preparation, emission inventories development for industrial facilities, air and wastewater permit application preparation, conducting compliance audits for industrial facilities, environmental report preparation to provide support to environmental litigation, expert testimony, and addressing RCRA compliance issues.

1993 to 1999
Loss Control Specialist, Staff Engineer, Environmental Specialist, Unocal Corporation. Responsibilities included air emission inventory audit resolution, agency negotiations to minimize level-of-effort in underground storage tank remediation, regulation interpretation, hazardous waste management compliance, training, site safety officer, policy manual preparation, project management, contractor management, compliance and management systems auditing, participation in Western States Petroleum Association regulatory reform task forces, and environmental issues resolution.

1992 to 1993
Partner, Environment. Responsibilities included compliance auditing, environmental Phase I and Phase II assessments, third-party document review, and agency liaison for clients. Responsibilities also included all aspects of managing small firm including marketing, accounting, clerical, purchasing, and subcontractor management.

1986 to 1992
Staff, Project, and Senior Engineer: Safety Officer; Project Manager; Corporate Board Member, M.B. Gilbert Associates. Responsibilities included environmental compliance auditing, environmental Phase I and Phase II assessments, technical consultation to attorneys, safety training provider, OSHA program requirements implementation, and environmental document preparation including Spill Prevention, Control and Countermeasure Plans; Part B Hazardous Waste Storage Facility Permit Applications; Contingency Plans; Waste Minimization Plans, and Emergency Preparedness Plans. Responsibilities also included researching, writing, and publishing award-winning environmental education booklet for the California Department of Real Estate.

1985 to 1986
Industrial Hygienist, Project Manager, Med-Tox Associates. Responsibilities included indoor air monitoring, contractor oversight, building inspections, industrial hygiene monitoring for air contaminants and noise, and training.

1980 to 1982
Internships in Environmental Quality and Safety Engineering, Qualifications and Standards Engineering, and Facilities Engineering, General Electric. Responsibilities included preparation of Environmental Protection Agency required documents, Material Safety Data Sheet management, revision and preparation of updated safety operating procedure manual for chemical cleaning operations, training on noise pollution and hearing conservation. Additional responsibilities included operating a data acquisition computer during seismic qualification of nuclear control room safety-related parts, and collecting and analyzing data obtained from ambient conditions monitoring in a metallurgical stress laboratory.

REPRESENTATIVE PROJECTS

The following is illustrative of representative projects managed by Ms. Baverman based on designated areas of expertise. Additional project references are available upon request.

Air Quality

Work completed includes the calculation and preparation of emission inventories for criteria pollutants, toxic air contaminants, and greenhouse gases; preparation of air permit applications; analysis of emission inventories for conformity to emission budgets and

CEQA significance determinations; preparation of health risk assessments of facility and project emissions; preparation of air quality assessments; and, justification of reported air emissions for emission fees for facilities that include petroleum refineries, electroplating facilities, hazardous waste treatment facilities, defense contractors, military installations, marine terminals, engine manufacturers, paper products manufacturers, pesticide manufacturers, religious facilities, housing developments, and federal facilities. Performed air quality impacts analysis using multiple versions of the EMFAC emissions model for mobile sources, multiple versions of the URBEMIS emissions model for new development projects, emissions modeling using the U.S. EPA ISCST3 and AERMOD dispersion modeling software and CALINE for mobile sources, health risk assessment modeling software including ACE2588, HARP, and IRAPView.

CEQA Documents

Industrial Projects

Prepared the Draft EIR for the Chevron El Segundo Refinery PRO Project. The proposed project included refinery modifications to optimize operations, comply with regulations, and improve operating efficiency. Major issues included air quality, greenhouse gas emissions, hazards, hydrology/water quality, noise, solid/hazardous waste, and transportation/traffic. Also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Chevron Refinery.

Prepared an EIR for the Chevron El Segundo Refinery Coke Drum Replacement Project. The proposed project included replacement of the existing coke drums with new coke drums. Major issues include construction (including LST analysis) and operational air quality impacts, GHG emissions impacts and mitigation measures, construction noise, and construction traffic impacts.

Prepared the EIR for the BP Safety, Compliance and Optimization Project at the BP Carson Refinery. The proposed project included modifications to a number of refinery units, including calculation of emissions from mobile sources. Included an inventory of both the criteria and TAC emission changes associated with the proposed project. EAI also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the BP Refinery. Major issues included air quality, hazards, noise, and traffic.

Prepared the EIR for the Ultramar Inc., Valero Wilmington Refinery Alkylation Improvement Project. The proposed project included modifications to terminate the storage, use, and transport of concentrated hydrofluoric acid at the Refinery. Major issues included air quality, hazards, hydrology/water quality, noise, and

transportation/traffic. Also completed an HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Ultramar Refinery.

Provided consulting services to the Alon Bakersfield Refinery for the preparation of an EIR for a Crude Rail Project. Responsibilities included drafting portions of the EIR including biological resources, cultural resources, geological resources, hydrology and water quality, hazards/hazardous materials, and transportation/traffic. Detailed analyses were provided on the transportation hazards associated with the transportation of crude by rail.

Provided consulting services to the Mitsubishi Cement Corporations Facility in Long Beach for the preparation of an EIR for the MCC Cement FacilityModification Project. Responsibilities included drafting portions of the EIR including air quality. Detailed analyses were provided on air quality associated with the proposed project.

Prepared the Final EIR for the Tesoro Reliability Improvement and Regulatory Compliance Project. The lead agency for the EIR was the SCAQMD. The proposed project included refinery modifications to modernize equipment including replacing Cogeneration Units and Boilers, comply with regulations, and improve operating efficiency. Major issues included construction (including LST analysis) and operational air quality impacts, GHG emissions impacts and mitigation measures, hazards, and transportation/traffic. Assisted in the preparation of an inventory of criteria, TAC, and greenhouse gas emission changes associated with the proposed project, modeled the project emissions using the ISC model and completed a health risk assessment using the HARP HRA model to determine the potential for significant impacts.

Prepared the EIR for the issuance of a RCRA Part B Hazardous Waste Facility Operating Permit for the Industrial Services Oil Company facility, Los Angeles, California. Industrial Services is a hazardous waste transfer facility and a used oil recycler. The lead agency for this project was the DTSC. Major issues included air quality, earth resources, water quality, risk of upset, land use, traffic/circulation, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Prepared an EIR for the ConocoPhillips PM10 and NOx Reduction Project. The proposed project included modifications to comply with SCAQMD Rule 1105.1 - PM10 and Ammonia Emissions from Fluid Catalytic Cracking, SCAQMD Regulation XX – RECLAIM, and further reduce emissions of ammonia and sulfur oxides at the ConocoPhillips Los Angeles Refinery.

Provided consulting services to Alt Air for the preparation of a Negative Declaration and air quality permitting for modifications to existing refinery structures to produce renewable jet fuel and renewable diesel fuel from non-edible vegetable oil and high-

quality technical beef tallow. Responsibilities included drafting the Negative Declaration, evaluation of the impacts from criteria pollutant emissions, toxic air contaminant emissions and GHG emissions, as well as preparation of a health risk assessment and evaluation of other CEQA topics.

Prepared a Negative Declaration for Phillips 66 Los Angeles Refinery Carson Plant – Crude Storage Capacity Project. The project included the installation of a crude storage tank and increasing the throughput of two existing tanks to streamline the delivery of crude by ships. The environment resources that required more extensive analysis included air quality, GHG emissions, toxic air contaminants/health risks, and hazards.

Prepared a Negative Declaration, addendum, and Subsequent Negative Declaration, for the ConocoPhillips Ultra Low Sulfur Diesel Project at its Wilmington Plant, in Los Angeles, California. The proposed project included modifications to several refinery units. An HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the ConocoPhillips Refinery.

Prepared an EIR for the Paramount Clean Fuels Project which included refinery modifications to produce cleaner-burning gasoline and ultra low sulfur diesel (ULSD) fuels. The proposed project included modifications to a number of refinery units. An HRA was also prepared for the proposed project.

Prepared the EIR and Subsequent EIR for the Ultramar Reformulated Fuels Program at the Wilmington Refinery. This project included new units and refinery modifications to produce fuels in compliance with state and federal Clean Air Act requirements. The project included modifications to the Ultramar Refinery, Olympic Tank Farm, and pipelines connecting the two facilities, as well as to the larger California oil and petroleum products distribution system. The lead agency for this project was the SCAQMD. Major issues included earth resources, air quality, water, noise, traffic/circulation, risk of upset, aesthetics, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Prepared an addendum to the Negative Declaration for the Air Liquide Hydrogen Plant at the Chevron Refinery. EAI prepared a health risk assessment in compliance with SCAQMD Rule 1401 analysis for a new flare related to the Hydrogen Plant. The project was completed by the agreed upon deadlines.

Prepared the Draft EIR for the OXY Dominguez Oil Field Project in Carson, California. The project involved the creation of a consolidated oil well and separations facility, which was comprised of up to 202 oil and gas production and injection wells, separation equipment to produce up to 6,000 barrels per day of oil and three million cubic feet of natural gas. Key environmental resources analyzed in the EIR included project criteria, toxic and GHG emissions from wells, separations equipment, fugitive components, and

mobile sources; hazards/hazardous materials; hydrology and water quality; noise; and transportation and traffic.

Prepared the Negative Declaration for the Polychemie Facility in Los Angeles, California. The proposed project included modifications to add new storage tanks and vessels at the facility. An HRA under the SCAQMD Rule 1401 requirements for the modifications to stationary sources at the Polychemie facility.

Prepared a Negative Declaration for the Ultramar Inc. Cogeneration Unit at the Wilmington Refinery. The project included the installation of a Cogeneration Unit to minimize the potential for power outages at the Refinery. The environmental resources that required more extensive analysis included air quality, GHG emissions, and health risk assessment.

Prepared the EIR for the issuance of a RCRA Part B Hazardous Waste Facility Operation Permit for the Exide Technologies facility, Vernon, California. Exide is a secondary lead smelter where used batteries and other lead products are recycled into lead ingots. The lead agency for this project was the DTSC. Major issues included air quality, earth resources, water quality, risk of upset, noise, traffic/circulation, and human health. Also prepared a health risk assessment to address the health impacts of toxic air contaminants.

Prepared a Mitigated Negative Declaration for the Hixson Metal Finishing Risk Reduction Project, in Newport Beach, California. The proposed project consisted of on-site tank, spray booth, and oven relocation; installation of additional air pollution control systems; construction of permanent total enclosures; installation of covers on wastewater treatment tanks, preparation and implementation of an improved housekeeping and dust minimization plan, and improvements to the Facility's electrical system. The overall focus of the project was to reduce the Facility's emissions associated with anodizing, testing, plating, and coating operations for aerospace and defense industries.

Prepared a Subsequent Negative Declaration for the proposed re-start of mining operations for the Molycorp Mountain Pass mining facility. The proposed project included modifications to mining operations to improve the efficiency of the operation and extraction of rare earth elements, as well as a 49.9 MW Cogeneration facility to increase operational efficiency. Prepared an inventory of criteria, TAC, and greenhouse gas emission changes associated with the proposed project for stationary and mobile sources, modeled the project emissions, and completed a health risk assessment to determine the potential for significant impacts. GHG emission impacts and mitigation measures were developed. Major issues included aesthetics, air quality, greenhouse gas emissions, biological resources, hazards, noise, and transportation/traffic.

Prepared a Negative Declaration for the BP Carson Refinery, Maintenance Shop Project. The project consisted of the construction of a new maintenance shop for the BP Refinery, on about 15 acres of land located within the City of Carson, to replace an existing maintenance building and various refinery support functions adjacent to other office buildings. The lead agency for this project was the City of Carson. Major issues included air quality, hazards/hazardous materials, noise, and transportation/traffic.

Air Agencies/Control Districts

Prepared the EIR for the SCAQMD 2003, 2007, 2012, and 2016 Air Quality Management Plans (AQMPs). The AQMPs provide control measures and strategies to reduce air emissions and allow the South Coast Air Basin to comply with state and federal ambient air quality standards. The lead agency for these projects was the SCAQMD. Major issues included air quality, energy, hazards and hazardous materials, hydrology and water quality, and solid and hazardous wastes.

Prepared the EIR for the BAAQMD 2010 and 2017 Clean Air Plans (CAPs). The 2010 and 2017 CAPs provided control measures and strategies to reduce air emissions and allow the BAAQMD to develop a control strategy to reduce ozone, particulate matter, air toxics and greenhouse gas emissions in an integrated plan. The lead agency for these projects was the BAAQMD. Major issues included air quality, energy, hazards and hazardous materials, hydrology and water quality, transportation and traffic, and utilities and services systems

Prepared various CEQA documents for BAAQMD 2005 Ozone Strategy and various rules and regulations. The 2005 Ozone Strategy identified control measures needed to reduce emissions and comply with ozone ambient air quality standards. Major issues included air quality, hazards and hazardous materials, hydrology and water quality, and utilities. Also assisted in the preparation of various CEQA documents for proposed new and modified BAAQMD rules and regulations.

Prepared a Negative Declaration for the BAAQMD's proposed amendments to Regulation 8, Rule 44 - Marine Vessel Loading Terminals, and Rule 46 - Marine Tank Vessel to Marine Tank Vessel Loading. The proposed project evaluated the impacts associated with implementing measures to control VOC emissions associated with the transfer of organic materials. The Negative Declaration was completed within agreed upon deadlines.

School Districts

Prepared CEQA documents including EIRs, Negative Declarations and CEQA exemptions for a number of schools in the Menifee Union School District, Beverly Hills

School District, Desert Sands Unified School District, Pasadena Unified School District, Colton Joint Unified School District, Perris Union High School District, and the Huntington Beach Unified High School District. EIRs included school modernization projects (where contamination and historical buildings were involved) as well as the development of proposed new schools. The Negative Declarations evaluated the impacts of a new school site and related health impacts, traffic impacts, land use impacts on adjacent residents, biological impacts, cultural impacts, among other environmental impacts.

Other Environmental Document Preparation

- **Naval Facilities in California and Nevada**

  Prepared the Spill Prevention Control and Countermeasure Plans for 7 Naval facilities in California and Nevada. Prepared a Part B permit application for hazardous waste treatment and storage facility at a Naval Air Station in California.

- **Purified Water Products Facility, Los Angeles, California**

  Evaluated wastewater treatment plant at a purified water resin regeneration facility in Los Angeles, California. Recommended plant modifications, prepared operations manual, negotiated alternative wastewater disposal during 180-day disconnection from the industrial sewer, and managed 24-hour per day operation of plant during the disconnection.

- **Industrial Lighting Manufacturer, Wilmington, California**

  Review design of wastewater treatment system for an industrial lighting manufacturer in Wilmington, California. Additional responsibilities included writing operations manual, training personnel on operation and monitoring procedures, and performing startup activities for washing system connected to wastewater treatment system.

- **Toyota Motor Sales, U.S.A., Inc. Facilities**

  Prepared operations manuals for wastewater treatment facilities, stormwater management plans, and Spill Prevention Control and Countermeasure Plans at automobile import, engine design, and manufacturing facilities.

Hazardous Waste Management

- **Unocal Corporation, Brea, California**

  Provided in-house consulting to approximately 100 field personnel on hazardous waste regulations in 45 states. Prepared and presented Resource Conservation and Recovery Act required hazardous waste management training. Coordinated and prepared submittals required for hazardous waste generation in California.

- **Furniture Manufacturing Facility, Vernon, California**

  Provided technical expertise to attorneys on hazardous waste characterization and management regulations during preliminary hearing for alleged hazardous waste management violations related to activities at a furniture manufacturing facility in Vernon, California. Managed remediation activities associated with electroplating operations.

Site Remediation Management

- **Champion Oil, Dominguez Oil Field, Dominguez Hills, CA**

  Delineated drilling mud sump contamination, oversaw landfarming remediation of excavated material.

- **Various Active and Former Service Stations, Orange County, CA**

  Managed remediation activities including quarterly groundwater sampling, soil excavation, vapor extraction, groundwater treatment, and underground storage tank removal at 40 service stations throughout Orange County. Interfaced with agency representatives from the Santa Ana Regional Water Quality Control Board, Orange County Health Care Agency, and Fire Departments in Fullerton, Santa Ana, Orange, Garden Grove, and Buena Park.

- **Unocal Redevelopment of Imperial Golf Course, Brea, Fullerton, and Placentia, CA**

  Provided technical and regulatory support during the closure and redevelopment of the Imperial Golf Course into a 700+ housing development. Activities included site safety officer, routine environmental audits of contractors, and technical support for oil well abandonment contaminant issues.

Policy Manual Preparation

- **Unocal Corporation, Brea, California**

  Prepared Loss Control Policy manual for environmental and real estate group of Unocal. Revised and produced Contractor Loss Control Policy Handbook issued to the group's contractors.

- **Jet Propulsion Laboratory, Fort Irwin, California**

  Prepared Environmental Protection Policy and Procedures Manual for Goldstone Deep Space Communications Complex, For Irwin, California.

Environmental and Safety and Health Auditing

Work completed has included environmental due diligence audits, regulatory compliance audits, and Phase 1 property transfer audits. Conducted audits for NASA, military installations, circuit board manufacturers, banks, geothermal energy production facilities, property redevelopment projects.

Regulatory Compliance

Work completed has included preparing city permit applications to construct remediation facilities; sanitation district permit applications; working with local agencies to modify existing operations; and, developing and presenting training to comply with the Toxic Substances Control Act, asbestos management and abatement activities, and Hazardous Waste Operations and Emergency Response regulations.

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Resume

MICHAEL M. CHOI
Engineer, Environmental Audit, Inc.

EDUCATION

University of California, Los Angeles, June 2002
B.S., Chemical Engineering with an emphasis in **Bioengineering**.

Certifications

40 Hour HAZWOPER

AREAS OF EXPERTISE

Emissions Inventory Preparation (including State and Federal GHG Reports)
Dispersion Analysis and Modeling
Health Risk Assessment
AERMOD
Industrial Source Complex Dispersion Model (ISCST3)
Hotspots Analysis and Reporting Program (HARP)
Hotspots Analysis and Reporting Program 2 (HARP2)
Industrial Risk Assessment Program (IRAP)
Motor Vehicle Emissions Inventory Model (Emfac)
Transportation and Land Use Programs Model (Urbemis)
Air Emissions Reporting Program (AER)
California Emissions Estimator Model (CalEEMod)

EXPERIENCE

2004 – Present
Air Quality Specialist, Environmental Audit, Inc. Placentia, Ca.
Primary responsibilities include dispersion analysis, modeling, and risk assessment for Health Risk Assessments (HRA), updating air emissions inventories (including State and Federal GHG reports), toxics evaluations (i.e., Propositon 65, Rule 1401), criteria pollutant evaluations (Rule 1303), and South Coast Air Quality Management District (SCAQMD) Permit Applications. Other responsibilities include research, evaluation of data, and preparation of California Environmental Quality Act (CEQA) documents such as Environmental Impact Reports (EIR), wastewater sampling, and co-authoring maintenance/safety protocols and other environmental documents.

2002 – 2003
Process Engineer, ISU Petasys America, Sylmar, Ca.
Managed the inner layer production lines of a printed circuit board manufacturing plant. Assisted in the implementation of environmental and safety policies.

Resume

Designated as an emergency contingency team leader. Trouble-shooting mechanical and process issues that arise in a quick-turn manufacturing environment.

Aug. 2002 - Oct. 2002
Validation Technician, Physicians Formula (Pierre Fabre), Industry, Ca.
Responsible for testing, collecting data, and finalizing reports for Physicians Formula's cleaning protocol in accordance with good manufacturing practices and Food and Drug Administration regulations.

Jun. 2000 – Sep. 2000
Programmer, The National Institute of Transplantation, Los Angeles, Ca.
Co-designer of The National Institute of Transplantation's Study Manager. An application used to keeps track of thousands of kidney donor/recipient records in the western United States. End user software and hardware tech-support.

1998 - 2000
Computer Coder, UCLA Center for Health Sciences (Division of Digestive Diseases), Los Angeles, Ca.
Specialized in digital histological/endoscopic imaging and color enhancement. Images were used for various international symposiums. Developed new imaging and color techniques used in a gastrointestinal atlas. Created and maintained multiple databases, including the main patient database. Maintained and upgraded computer hardware and software.

REPRESENTATIVE PROJECTS

Mr. Choi has been involved in air quality issues since 2004 and has continually worked on air quality issues since that time. Work completed includes the preparation of air quality analyses, air quality permit applications for facilities that include petroleum refineries, cement terminals, and marine terminals. The following is illustrative of representative projects Mr. Choi was involved in based on designated areas of expertise. Additional project references are available upon request.

Refinery-Specific Projects

Prepared emission inventories, HRA, and an EIR for modifications to the Tesoro Refinery in Wilmington, California. The project involved the replacement of existing equipment with new modernized equipment, including new cogeneration systems and boilers. Emission inventories were developed for GHGs, criteria pollutants, and toxic air contaminants. An HRA was prepared following CAPCOA guidelines, including calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways. The HRAs were used to determine the level of impacts under the CEQA and were approved by the SCAQMD. GHG

and criteria pollutant emissions inventories were also developed to determine the potential magnitude of the proposed project changes.

Prepared emission inventories, HRA, and an EIR for modifications to the Chevron El Segundo Refinery PRO Project. The proposed project included refinery modifications to optimize operations, comply with regulations, and improve operating efficiency. Prepared an inventory of criteria, TAC, and greenhouse gas emission changes associated with the proposed project, modeled the project emissions using the ISC model and completed a health risk assessment using the HARP HRA model to determine the potential for significant impacts.

Prepared the emission inventories, HRAs, and EIR for the installation of air pollution control equipment at the ConocoPhillips Los Angeles Refinery. The project included a wet gas scrubber and wet electrostatic precipitator to comply with SCAQMD Rule 1105.1 – Reduction of PM10 and Ammonia Emissions from Fluid Catalytic Cracking Units, and a selective catalytic reduction unit on Boiler 7 to reduce NOx emissions. Prepared an inventory of criteria, TAC, and greenhouse gas emission changes associated with the proposed project, modeled the project emissions using the ISC model and completed a health risk assessment using the HARP HRA model to determine the potential for significant impacts.

Prepared the emission inventories, HRA, and CEQA documents for the Ultramar Inc. Olympic Tank farm located in Long Beach, California. The project involved the relocation of the storage at the Marine Terminal to the Olympic Tank farm. Criteria and toxic pollutant emissions inventories were developed to determine the potential magnitude of the proposed project changes. HRAs were prepared, following CAPCOA guidelines, that included calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways to determine compliance with SCAQMD rules, determine the level of impacts under the CEQA and were approved by the SCAQMD.

Prepared the EIR for the Safety, Compliance and Optimization Project at the BP Carson Refinery. This project included refinery modifications to enhance safety, control emissions and to optimize operations of certain refinery units. Criteria and toxic emission inventories were developed to determine the magnitude of project impacts. An HRA was prepared following CAPCOA guidelines, including calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways.

Prepared an addendum to the Negative Declaration for the Air Liquide Hydrogen Plant at the Chevron Refinery. EAI prepared a health risk assessment in compliance with SCAQMD Rule 1401 analysis for a new flare related to the Hydrogen Plant.

Additionally, involved in ongoing industrial projects at Refineries.

Environmental Impact Reports

Work completed includes the preparation of Environmental Impact Reports (EIRs) and Negative Declarations for multiple refinery, terminal, and pipeline modifications at facilities in Southern California, cogeneration plants at a paper products manufacturer, and a mineral mine. Document preparation included environmental topics (e.g., aesthetics, air quality, hazards, noise, traffic, hydrology and water quality, etc.) impact analyses, calculation of emissions, preparation of health risk assessments for toxic air contaminants, and compliance with ambient air quality standards. Prepared technical analyses on behalf of the project applicant to support EIRs prepared by the lead agency for marine terminal operations and petroleum pipelines.

Assisted in the preparation the EIRs for the South Coast Air Quality Management District (SCAQMD) 2007, 2012, and 2016 Air Quality Management Plans (AQMPs) as well as EIRs and Negative Declarations for various Air Districts throughout the state for District Attainment Plans and proposed Rules. The AQMPs and Attainment Plans provide control measures and strategies to reduce air emissions and allow the Air Districts to comply with state and federal ambient air quality standards. The lead agency for these projects was the SCAQMD, Bay Area Air Quality Management District, Sacramento Metropolitans Air Quality Management District, and San Joaquin Valley Air Pollution Control District. Major issues included air quality, energy, hazards and hazardous materials, hydrology and water quality, and solid and hazardous wastes.

Air Quality Projects

Prepared an inventory of TACs for facilities using default engineering assumptions, modeled the emissions using the ISCST3 and AERMOD models and completed a SCAQMD Rule 1401 and 1303 analyses associated with modifications to the facilities using the IRAP and CARB HARP models.

Emission Inventories/Health Risk Assessments

Prepared emission inventories of criteria and toxic air contaminants for a hazardous waste incineration project proposed for the City of Vernon, California. Included the preparation of an HRA to address the health impacts of toxic air contaminants via multipathways. The HRA was approved by the California Environmental Protection Agency (Cal-EPA), the California Air Resources Board (CARB), and the SCAQMD.

Prepared a Negative Declaration for proposed modifications to SCAQMD permits for the PetroDiamond Marine Terminal in the Port of Long Beach. The document included the preparation of an emissions inventory for the proposed Terminal modifications.

Prepared vehicle emissions inventory to support the Rate of Progress Plan EIR for the Sacramento Air Quality Management District. Prepared emission inventory using the EMFAC model revised to specifically reflect the projected fleet characteristics during key analysis years.

Prepared the AER for a paper mill from 2004 to 2017.

Consultant for a GHG verification program for a paper mill from 2010-2017.

Consultant for a GHG verification program for a petroleum terminal from 2012-2016.

Prepared the AER for Shell Los Angeles Refinery from 2005 to 2007.

Greenhouse Gas (GHG) Experience

Prepared emission inventories, HRA, and an EIR for modifications to the Tesoro Refinery in Wilmington, California. The project involved the replacement of existing equipment with new modernized equipment, including new cogeneration systems and boilers. Emission inventories were developed for GHGs, criteria pollutants, and toxic air contaminants. An HRA was prepared following California Air Pollution Control Officer's Association (CAPCOA) guidelines, including calculation of carcinogenic risk and evaluation of non-carcinogenic impacts via multipathways. The HRAs were used to determine the level of impacts under CEQA and were approved by the SCAQMD. GHG and criteria pollutant emissions inventories were also developed to determine the potential magnitude of the proposed project changes.

Prepared emission inventories, HRA, and an EIR for modifications to the Chevron El Segundo Refinery PRO Project. The proposed project included refinery modifications to optimize operations, comply with regulations, and improve operating efficiency. Prepared an inventory of criteria, TAC, and GHG emission changes associated with the proposed project, modeled the project emissions using the Industrial Source Complex model and completed an HRA using the HARP HRA model to determine the potential for significant impacts.

Consultant to a paper mill for their GHG verification program. Instituted a sampling plan and a GHG verification training program for the facility. Acting third party reviewer for annual GHG verification reports (state and federal).

Resume

MICHAEL M. CHOI
Engineer, Environmental Audit, Inc.

Consultant to a petroleum terminal for their GHG verification program. Assisted in developing a sampling plan and a GHG verification training program for the terminal. Provide periodic reviews of the GHG verification plan.

Regulatory Compliance

Prepared air quality permit applications, sanitation district applications, and worked with local agencies to modify permits for existing operations. Conducted wastewater sampling.

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APPENDIX I-4

ASHWORTH LEININGER GROUP

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EVERARD ASHWORTH, QEP, CEPA

Principal

Ev has over 30 years of professional experience in air quality and related environmental disciplines. This experience includes new facility siting and permitting, securing emission reduction credits from stationary and mobile sources, air quality permitting, criteria and air toxic emission inventory assessment, air pollution control, air toxic health risk assessment, environmental impact assessment, environmental compliance auditing, air quality planning and policy analysis, agency negotiation, and program management. Ev routinely assists clients in crafting and implementing complex air permit applications to demonstrate compliance with new source review requirements for attainment and non-attainment pollutants, and the alphabet soup of New Source Performance Standards, National Emission Standards for hazardous Air Pollutants, and other Clean Air Act permitting and regulatory programs. Ev has provided expert testimony in connection with variances and orders of abatement before local air pollution control hearing boards, on State Implementation Plan, Emission Reduction Credit, and feasibility of control programs in court proceedings, and has assisted legal counsel in settlement of Federal Clean Air Act and California civil proceedings. Representative project experience is presented below:

PROJECT EXPERIENCE

Greenhouse Gas Consulting

- **Hawaiian Electric Company – Strategic GHG Consulting Services:** Served as project manager for strategic analysis of potential GHG compliance issues, including design and execution of GHG inventories, critical analysis of the design and implementation of cap-and-trade programs, comparison of alternative carbon tax incentive programs, and technical feasibility/cost of GHG mitigation measures. [Dates: 2006-2009. Project owner: HECO, Honolulu, HI. Employer: ALG. Position: Project manager]

- **Big West of California - Clean Fuels Project:** Served as project manager for the proposed expansion of the Big West of California Clean Fuels Project, which included analysis of GHG inventory, impacts and potential mitigation measures. Coordinated with client, legal counsel, technical consultants, and agency staff; provided technical reviews of GHG analyses. [Dates: 2006-2009. Project owner: Big West of California, LLC, Bakersfield, CA. Employer: ALG. Position: Project manager]

- **Confidential Clients - GHG reduction strategy:** Advised multiple industrial clients and trade associations on development of internal GHG reduction policies and strategies to position companies for national, regional, state and local GHG inventory and reduction programs. Provided technical counsel on GHG inventory programs, development of energy efficiency projects, documentation of GHG reductions since 1990 relative to state and national targets, and identification of GHG trading opportunities. [Dates: 2006-2009. Project owner: Confidential. Employer: ALG. Position: Project manager]

Expert Witness Services

- **Confidential Client – Technical Analysis of a BACT Determination:** Provided expert witness services in connection with the Best Available Control Technology (BACT) determination for a roasting operation located within EPA Region 9. Provided written technical analyses for submittal to EPA Region 9, participated in settlement discussions with EPA Region 9, and assisted in resolution of the enforcement action brought by the U.S. Environmental Protection Agency. [Dates: 2004-2005. Project owner: Confidential; work performed for Morrison & Foerster, LLP, San Francisco. Employer: ALG. Position: Project manager]

- **Air Transport Association – Expert Witness Services:** Provided expert witness services in support of litigation initiated by the Air Transport Association regarding the technical adequacy of the Nonattainment Plan (NAP) developed by the Texas Natural Resources Control Commission to address exceedances of the federal ozone standard. Developed analyses regarding the technical feasibility of 100% conversion of Ground Support Equipment (GSE) to electric power; provided testimony on this research. [Dates: 2002-2003. Project owner: Air Transport Association of America, Washington DC; work performed for Beveridge and Diamond, PC, Washington DC. Employer: ALG. Position: Project manager]

- **City of El Paso – Expert Witness Services:** Provided expert witness services in support of litigation initiated by the City of El Paso regarding the air quality impacts of heavy-duty diesel on-road equipment associated with modifications to right-of-ways over the Rio Grande River. Developed technical analyses regarding the emissions of diesel particulates and the potential health impacts of these emissions; provided testimony on this research. [Dates: 2002-2004. Project owner: City of El Paso, El Paso, Texas; work performed for Bickerstaff, Heath, et al., Austin Texas. Employer: ALG. Position: Project manager]

- **Confidential Clients – EPA Section 114 Investigations:** Assisted numerous clients and their legal counsel in preparing responses to EPA Section 114 inquiries regarding the air quality compliance status of clients' operations under the Federal Clean Air Act. Analyses include compliance assessment relative to New Source Performance Standards, Prevention of Significant Deterioration, NESHAPs (Subpart FF), New Source Review, BACT requirements and local air pollution control district regulations approved as part of the State Implementation Plan. [Dates: 2002-2012. Project owners: Confidential; work performed for Beveridge and Diamond, PC, Washington DC, Morrison & Foerster, San Francisco, Morgan Lewis & Backius, Los Angeles, Sheppard Mullin, Los Angeles . Employer: ALG. Position: Project manager]

- **Confidential Client – Expert Witness Services:** Provided expert witness services in defense of a the largest environmental enforcement matter brought by the California Department of Justice that alleged violations of air permit requirements under EPA PSD permits and local district prohibitory rules. Prepared emissions inventory and impact analyses to quantify alleged exceedances and potential impacts on residents and workers nearby a variety of industrial facilities. Assisted in analyses of retrofit control equipment design and installations, and provided technical assistance to Morrison & Foerster, LLP, legal counsel for the defendant.

[Dates: 2007-2009. Project owner: Confidential; work performed for Morrison & Foerster, San Francisco. Employer: ALG. Position: Project manager]

- **Manufacturing, Commercial, and Trade Associations – ARB and Local Air District Administrative Proceedings:** Provide expert witness/technical analyses on behalf of a broad spectrum of manufacturing, commercial clients and trade associations and their legal counsel before California Air Resources Board, local air districts, and Hearing Board proceedings, rulemakings and enforcement matters. Provided technical analyses of criteria and air toxic emissions inventories, ambient air quality and incremental health risk impact analyses, Best Available Control Technology/Reasonably Available Control Technology/Best Available Retrofit Control Technology studies, emission offset studies and excess emission mitigation plans, and critiques of agency-approved emission and impact models, modeling protocols, and control programs relative to federal and state Clean Air Act requirements. [Dates: 2002-2012; California Ski Industry Association, San Francisco; Airlines For America, Washington, DC, California Steel Industries, Inc, Fontana, California; Owens-Brockway Glass Container Corporation, Vernon, California; Big West of California, Bakersfield California; Employer: ALG. Position: Project manager].

Air Quality Permitting – New Source Review

- **Mountain Utilities – Power Plant Permitting:** Served as project manager for the permitting of an existing 5.8 MW diesel fired power plant operated by Mountain Utilities in a remote alpine environment. Directed air quality impact analyses, assisted facility staff in securing retrofit Selective Catalytic Control (SCR) technology for Tier 0 engines, coordinated with facility staff and the local air pollution control district to secure permits to operate within a compressed period of time. Assisted legal counsel in resolution of all US Environmental Protection Agency permitting issues under the PSD program. Subsequently assisted MU staff on securing authorities to construct for new Tier 1 and Tier 2 replacement engines, including installation of Verified Diesel Emission Control Systems. [Dates: 200-2003. Project Owner: Mountain Utilities; work performed for the Law Offices of Robert C. Goodman. Position: Project manager].

- **Kirkwood Public Utilities District – Replacement Power Plant Permitting:** Serviced as project manager for the permitting of a replacement power plant following the total destruction of the existing power plant. Directed air quality impact analyses and health risk assessments, BACT analyses, PSD avoidance and securing local agency permit approvals. Provided lead technical role in public advocacy, and expert witness in administrative proceeding brought to set aside permit approvals. [Date: 2009-2013. Project Owner: Kirkwood Public Utilities District, Kirkwood, CA; Employer: ALG. Position: Project manager]

- **Confidential Client, Bio-Technology – Air Quality Permitting and Compliance Services:** Served as project manager for the relocation of a biotechnology manufacturing and research center in Southern California. Directed emission studies, BACT analyses, health risk assessments, prepared permit applications and technical studies, and negotiated permitting terms and conditions. Researched and selected innovative pollution control technology to reduce VOC and acid gas emissions by 99%, and NOx emissions by 90% and avoided emis-

sion offset requirements. Secured permits within an expedited schedule. [Dates: 2010-2012. Project Owner: Confidential. Employer: ALG. Position: Project manager.]

- **Confidential Client, Petroleum Refining Company – Air Quality Permitting and Compliance Services:** Provided ongoing permitting and air quality compliance services to major refineries located in Los Angeles, San Francisco, and San Joaquin Valley. Directed the preparation of air permit applications to support the permitting of new and modified sources within the refinery, including gas fired compressors and combustion turbines, refinery heaters and boilers, and conversion units, provided compliance assistance relative to NSPS, NESHAPS, MACT, and state/local regulatory requirements for integration into existing permits and Title V operating permits. Provided senior management with assessments of potential impact of existing and future legislative/regulatory requirements and air quality management plans on refinery projects. Assisted in the settlement of enforcement actions brought by the US Environmental Protection Agency for alleged violations of Clean Air Act requirements. Audited operations, and developed compliance programs for use in certifying compliance under Title V Operating Permits. [Dates: 1998-present. Project owners: Shell Refinery, Martinez CA, Texaco/Motiva Refinery, Bakersfield, CA; Big West of California, LLC, Bakersfield CA, BP Carson, Carson CA, Texaco Refinery, Los Angeles, Tesoro Refinery, Los Angeles, Chevron Refinery, El Segundo, Exxon-Mobil Refinery, Torrance, CA. Employer: ALG. Position: Project manager.]

- **Confidential Client, Public Utility – PSD and NSR Permitting:** Served as technical consultant in the resolution of alleged violation of U.S. EPA Prevention of Significant Deterioration (PSD) and local New Source Review (NSR) rule violation. Provided engineering, emissions studies and ambient impact analyses and assisted outside legal counsel in these technical areas in the settlement of enforcement actions brought by the U.S. Environmental Protection Agency and local air pollution control agency for alleged construction of a "major source" without securing necessary permit approvals. [Dates: 1999-2001. Project Owner: Confidential; work performed for the Law Offices of Robert C. Goodman. Employer: ALG. Position: Project manager].

- **Ball-Foster Glass Container Co., LLC – Facility Expansion:** Directed the environmental permitting of a proposed expansion to an existing glass container manufacturing facility. Prepared technical air quality impact analyses included as part of the Environmental Impact Report prepared for the project. Prepared all necessary air permit applications for a new oxy-fuel furnace and associated glass container manufacturing lines, which included BACT, RECLAIM, new source review and air toxic impact analyses. Assisted in technical negotiations with local land use and air pollution control agency staff. [Dates: 1998-2000; Project Owner: Ball-Foster Glass Container Co., LLC, El Monte, CA. Employer: ALG. Position: Project manager.]

- **Owens Brockway – Air Permitting Assistance**: Provided ongoing air permitting and compliance assistance for the revision of Title V/RECLAIM operating permit for a container glass manufacturing facility in Vernon California. Work products included permitting of new/modified equipment, development and approval of new monitoring conditions for in-

clusion in the facility's Title V permit, assistance in securing, assistance in securing administrative variances to support improvements to pollution control equipment, and development of emission inventories. [Dates: 2006-present; Project Owner: Owens-Brockway Glass Container Co., Inc. Vernon, CA. Employer: ALG. Position: Project manager.]

- **Confidential Glass Manufacturing Facility – Air Permitting and Compliance Assistance:** Provided ongoing air permitting and compliance assistance for the revision of Title V/RECLAIM operating permit for a flat glass manufacturing facility in Los Angeles, California. Work products included revision of the facility's Title V permit, permitting of new/modified equipment; preparation of compliance assessments for legal counsel, negotiation of revised permit terms and conditions, technical assistance to resolve local agency enforcement actions. [Dates: 2006-2009. Project Owner: Confidential; work performed for Beveridge and Diamond, PC, San Francisco, CA. Employer: ALG. Position: Project manager.]

- **California Steel Inc. – Reheat Furnace Efficiency Upgrade:** Managed the environmental permitting of a new, highly efficient natural gas reheat furnace at a steel finishing facility in Fontana, California. Designed an air quality permitting strategy to assure no net emissions increase in PM10/PM2.5, thus avoiding the need to secure Emission Reduction Credits that are otherwise unavailable in the South Coast Air Quality Management District. Negotiated a new BACT control limits based on the use of Selective Catalytic Control (SCR) technology on a high temperature exhaust stream. Directed ambient impact analyses and health risk assessments to demonstrate compliance with local air district new source review requirements. Negotiated permit terms and conditions, and developed compliance protocols for implementation by facility staff. [Dates: 2009-2011. Project Owner: California Steel Industries, Inc., Fontana, CA; work performed in conjunction with Shepard Mullin, et al. Los Angeles, CA. Employer: ALG. Position: Project manager.]

PUBLICATIONS

Ev has authored numerous articles on air permitting, air toxic emission inventory and impact analysis and environmental compliance issues associated with industrial operations in California and the Western United States. He has chaired, lectured, and participated in technical symposia on environmental and air quality permitting and compliance issues. He has also lectures on air quality permitting and compliance matters with EPA OAQPS, EPA Region 9, California Air Resources Board, and local air agency staff at symposia and technical meetings. Ev has also provided focused PSD/NSR training as applied to refineries located in the South Coast AQMD under contract to the Western States Petroleum Association. He has also lectured and trained environmental compliance staff on NSR/PSD at LARC and LARW, as well as other clients located throughout California.

PROFESSIONAL MEMBERSHIPS

Air and Waste Management Association; Institute of Professional Environmental Practice; Auditing Roundtable; Board of Environmental Health & Safety Auditor Certifications.

REGISTRATIONS

- Certified Professional Environmental Auditor, Number 361
- Qualified Environmental Professional, Number 1960001
- Registered Environmental Assessor, Number 01560

EDUCATION

- B.A. Chemistry, 1978
  Clark University; National Science Foundation Research Scholar

BART LEININGER

Principal

Bart has over 27 years of professional experience in air quality and related environmental disciplines. This experience includes air quality permitting, criteria and air toxic emission inventory assessment, air pollution control, environmental impact assessment, NSPS/NESHAP/MACT compliance assistance, CERCLA/EPCRA Reporting, NPDES permitting, land use permitting, environmental compliance auditing, agency negotiation, and program development and management. Representative project experience is presented below:

PROJECT EXPERIENCE

- **Confidential Refinery Client – Major Refinery Expansion Permitting:** Provided technical assistance in preparing applications and negotiating permit terms for New Source Review/Prevention of Significant Deterioration (NSR/PSD) permits for a major refinery expansion. Assisted with environmental impact assessments, air emission calculations, Best Available Control Technology (BACT) investigations and analyses.

- **ExxonMobil Production Company – New Oil and Gas Facility Permitting:** Provided technical assistance in securing NSR/PSD permits for a multi-billion dollar development in Santa Barbara County. Prepared permit applications, environmental impact assessments, air emission inventories, Best Available Control Technology (BACT) analyses, and negotiated permit terms with local permitting agencies and EPA.

- **Confidential Refinery Clients – NSR/PSD Permitting and NSPS/NESHAP Compliance:** Assisted confidential refinery clients in the resolution of Notices of Violation concerning plant control equipment. Assisted technical staff in the engineering analyses and permitting documents for refinery expansion projects. Expedited permitting approvals to meet crucial project schedule and avoid costly downtime. Additionally, assisted clients in upgrading compliance programs related to New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAP) Subpart FF, and Maximum Achievable Control Technology (MACT) standards.

- **Westates Carbon - Arizona, Inc. – PSD and NESHAP Subpart FF Permitting:** Provided technical assistance in obtaining Prevention of Significant Deterioration (PSD) and NESHAP Subpart FF permits from EPA for a carbon regeneration facility. Reviewed technical analyses to confirm compliance with federal requirements.

- **Confidential Refinery and Oil and Gas Clients – Environmental Management System Development:** Assisted refinery and oil and gas clients in the development of Environmental Management Systems (EMS). Developed electronic recordkeeping tools, which eliminated outside consulting assistance in the preparation of routine reports. Developed procedures to improve accountability and reduce compliance exposures. Model program resulted in no enforcement by EPA following a subsequent Consent Decree compliance audit.

- **Kirkwood Gas & Electric – Control System Evaluation and Permitting:** Assisted in the design and installation of a selective catalytic control system for an internal combustion engine application. Assisted in preparing permit applications and negotiating the terms and conditions of the final permit. Identified acceptable permit limits to reduce the burden of recordkeeping and reporting.

Air Quality Compliance Auditing/Program Development

- **Confidential Refinery Clients – Air Compliance Audits:** Performed numerous comprehensive air quality compliance assessments to support certifications under the Title V Federal Operating Permits Program. The assessments included detailed compliance reviews relative to federal emission standards, including NSPS, NESHAP, and MACT requirements; state and local rules and regulations; and facility permits. Worked closely with the facility environmental compliance staff to identify corrective actions that could be implemented to correct potential non-compliance.

- **Confidential Oil & Gas Client – Air Compliance Audits:** Assisted the corporate environmental audit team to review compliance with federal, state, and local air quality regulations. Performed detailed review of compliance with applicable air permits and provided recommendations to correct past deficiencies.

- **Confidential Refinery Clients – NSPS and NESHAP Subpart FF Compliance Program Development:** Prepared NSPS and NESHAP Subpart FF compliance manuals for petroleum refineries. Developed recordkeeping and applicability determination tools to streamline compliance requirements for facility staff.

- **Confidential Refinery Clients – MACT Compliance Strategy:** Prepared applicability analyses and compliance strategies for the Petroleum Refinery NESHAPs (MACT I and II). Developed specific compliance tools to assist refinery staff in addressing their obligations under the MACT.

- **ExxonMobil Production Company – Compliance Program Development:** Managed compliance program for both onshore and offshore facilities. Devised look-up tables and compliance matrices to assist field personnel in understanding requirements. As a result of this assistance, no Notices of Violation were issued during a four-year period.

- **Confidential Client – VOC RACT Analyses:** Provided technical support to a confidential client in determining its compliance status relative to volatile organic compound (VOC) Reasonable Available Control Technology (RACT). Performed a compliance assessment and recommended strategies to bring facility operations into compliance quickly, without costly upgrades.

- **Confidential Refinery Client – PSD Lookback Assessments:** Assisted legal counsel in reviewing past facility modifications to assure that all changes had been properly permitted under PSD. Identified projects that potentially triggered PSD permitting, and performed net emission increase calculations to assess each project's significance. Worked with legal counsel to develop strategies to resolve potential PSD issues, including implementation of equipment/facility emission limits to avoid PSD.

Litigation Support/Resolution

- **Confidential Clients – Expert Witness Testimony and Support:** Assisted several clients and their legal counsels as an expert witness in environmental compliance matters. Testified in court regarding Benzene Waste NESHAP compliance to support a three quarters of a billion dollar indemnification claim. This testimony was key in settling the matter between the plaintiff and respondent.

- **Confidential Clients – EPA Section 114 Investigations:** Assisted numerous clients and their legal counsels in preparing responses to EPA Section 114 inquiries regarding the air quality compliance status of clients' operations under the Federal Clean Air Act. Analyses include compliance assessment relative to federal emission standards and permitting requirements, BACT requirements and local air pollution control district regulations approved as part of the State Implementation Plan. Assisted clients in follow-up audits by the EPA to verify compliance with Consent Decrees and other settlements.

- **Confidential Clients – NESHAP Subpart FF Litigation Support:** Assisted clients and their legal counsels in responding to enforcement inquiries relative to the Benzene Waste NESHAP. Assisted counsel in assessing compliance, developing and implementing corrective action plans, and supporting negotiations for settlement agreements. Performed or assisted with numerous audits, as required by these Consent Decrees.

- **Confidential Refinery Clients – NSR Consent Decree Support:** Assisted refinery clients in negotiating the terms of and complying with EPA Consent Decrees. Assisted clients in developing compliance tracking tools, securing permits from state and local air quality enforcement agencies, conducting audits, and providing technical and strategic consulting for complying with these agreements.

- **Confidential Client – CERCLA 104(e) Investigation:** Assisted client and its legal counsel in preparing documentation to the EPA concerning reportable releases under CERCLA and EPCRA. Provided engineering assistance to review existing data and quantified potential releases of reportable quantities. Based on technical analyses performed, reduced potential violations by approximately 50%.

Rule Development/Negotiations

- **Western States Petroleum Association – Rule Development:** Served as a Western States Petroleum Association Chairman of a technical subcommittee. Participated in the negotiated rulemaking with EPA on the Outer Continental Shelf (OCS) Air Regulations. Participated in numerous rulemakings with State and local agencies on environmental matters affecting oil and gas clients.

Air Quality Permitting – Title V Operating Permits

- **Confidential Refinery Clients – Title V Permitting:** Provided technical support to confidential clients in the development of the Title V corporate permitting strategy. Identified potential compliance issues and worked with client in entering settlement agreements to facilitate Title V permit approvals. Streamlined compliance to minimize the compliance burden associated with Title V compliance certification reviews.

- **Confidential Oil and Gas Clients – Title V Permit Development:** Prepared numerous Title V Permit applications for an oil and gas clients. Tasks included preparation of applications, identification of applicable requirements, preparation of criteria and toxic emission inventories, performance of facility compliance assessments, and preparation of certification materials for client management review.

General Environmental Support

- **Confidential Client – Environmental Impact Report Preparation/Negotiation:** Assisted a confidential client in preparing analyses to support the development of the project Environmental Impact Report (EIR). Confirmed the project's compliance with air quality compliance requirements, and identified mitigation measures to minimize potential impacts to land use resources.

- **Confidential Industrial Client – NPDES Permitting:** Designed an NPDES compliance program for a confidential industrial client in Southern California. In addition, developed permit applications and negotiated permit terms with EPA for discharge permits. Expedited consistency approval by State regulatory authorities to assure that the permits were issued on time. Identified facility upgrades to minimize enforcement exposure from unlawful discharges.

- **Confidential Industrial Client – EPCRA Form R Reporting:** Assisted client's legal counsel in litigation with EPA for past Form R reporting violations. Prepared Form R documentation, and provided technical support to reduce potential fines by several hundred thousand dollars. Developed a compliance program to assure that future violations do not occur.

- **Confidential Industrial Client – EPCRA Form R Reporting:** Reviewed client's Form R reports to assure technical accuracy. Recommended changes to client's Form R reporting procedures to reduce report preparation time, and improve quantification methods. Currently prepares Form R reports for over 20 facilities.

REGISTRATIONS

- Professional Engineer – States of Utah, Louisiana, and Florida

EDUCATION

- B.S.Mechanical Engineering, 1989
  Brigham Young University
  Summa Cum Laude

- M.B.A. General Management, 1993
  University of California, Los Angeles

MICHAEL D. WALLER, P.E.

Senior Engineer

Michael is a chemical engineer with over 15 years of experience in air quality and related environmental disciplines. This experience includes environmental compliance auditing, permitting (NSR, PSD and Title V), air toxic health risk assessment, NSPS/NESHAP/MACT applicability analysis, emissions inventories, greenhouse gas reporting/verification, RECLAIM reporting, TRI reporting, wastewater surcharge statements, storm water plans, oil spill plans and the development and implementation of environmental management systems. Michael is a registered Professional Engineer (Chemical Engineering), is a Certified Permitting Professional (CPP) in the South Coast Air Quality Management District (SCAQMD), and is also accredited by the California Air Resources Board (CARB) as a Lead Verifier under the AB32 greenhouse gas inventory program (Oil and Gas Systems and Process Emissions sector specialist). Michael routinely coordinates environmental compliance assistance at several petroleum refineries, petroleum terminals and other manufacturing industries; his representative project experience is presented below.

PROJECT EXPERIENCE

Greenhouse Gas Reporting and Verification

- **Multiple Locations**: Directed and assisted with the verification of multiple California Air Resources Board (CARB) Greenhouse Gas (GHG) emissions reports for refineries, cement plants, and other general stationary combustion sources. Coordinated with CARB GHG staff to ensure appropriate reporting and verification principles were implemented as well as to clarify ill-defined portions of the regulation. [Dates: 2010 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Lead Verifier]

Air Quality Permitting

- **Confidential Petroleum Refineries and Distribution Terminals**: Provided long-term permitting and air quality compliance support to several major refineries and distribution terminals. Directed/prepared permit applications supporting new/modified process units, marine terminals, loading systems, vapor recovery systems, storage tanks, remediation equipment and thermal oxidizer control systems including: NSR/PSD compliance demonstration, BACT analysis, RECLAIM, emissions offsetting, health risk assessment and other local and federal rule requirements. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Petroleum Refineries and Distribution Terminals: – Draft Title V Permit Review:** Assisted large petroleum refinery and distribution terminal obtain initial Title V permits; reviewed and evaluated permit conditions to evaluate compliance with applicable federally-enforceable rule requirements; assisted in the development of appropriate operating procedures necessary to certify compliance with federally-enforceable rules and permit conditions; prepared permit applications to correct permitting discrepancies. [Dates: 2000 to 2009; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Paint Manufacturing Facility – Draft Title V Permit Review and Certification**: Assisted large paint manufacturing facility obtain its initial Title V permit; performed air quality audit to evaluate compliance with applicable federally-enforceable rule requirements; directed the development of appropriate operating procedures necessary to certify compliance with federally-enforceable rules and permit conditions; prepared permit applications to correct permitting discrepancies. [Dates: 2003 to 2006; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer]

- **Confidential Manufacturing Facilities:** Directed/prepared numerous major source, synthetic minor and minor source permit applications including: NSR/PSD review, BACT analysis, RECLAIM, emissions offsetting, health risk assessment and other local and federal rule requirements. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

Environmental Compliance Analysis and Environmental Management Systems

- **Confidential Petroleum/Chemical Distribution Terminals – Clean Air Act Compliance Assessments and Management Tools:** Directed/performed compliance assessments for refined petroleum and chemical distribution terminals to confirm compliance with NSPS Subpart XX (Standards of Performance For Bulk Gasoline Terminals), Gasoline Distribution MACT (Subpart R), Gasoline Distribution GACT (Subpart BBBBBB), Organic Liquids Distribution (non-Gasoline) MACT (Subpart EEEE), Site Remediation MACT (Subpart GGGGG) and local air district requirements. Coordinated facility compliance efforts and corrective actions, as necessary, to improve implementation and overall compliance assurance. Directed/prepared environmental management system compliance protocols (inclusive of local and federal requirements) for petroleum and chemical storage tanks, fugitive components, loading/unloading racks, IC engines and soil/groundwater remediation activities, etc. Coordinated with local and federal rule development, enforcement and permitting staff to ensure complete and appropriate compliance demonstrations were implemented. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Petroleum Refineries – Clean Air Act Compliance Assessments:** Performed compliance assessments for petroleum refining clients to confirm compliance with NSR, PSD, NSPS, NESHAP/MACT control standards as well as monitoring, record-keeping and reporting requirements. Coordinated with refinery management and technical staff to implement corrective actions, as necessary, to improve implementation and overall compliance assurance. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Petroleum Refineries – PSD Assessments**: Assisted petroleum refineries review past and present projects to ensure that all projects were properly permitted or exempted under the Federal PSD program; performed facility net emission increase calculations to assess each project's significance under PSD applicability requirements. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Manufacturing Facilities – Clean Air Act Compliance Assessments and Environmental Management Systems:** Directed/performed compliance assessments for multiple facilities throughout the nation determining compliance requirements of Federal NSPS, NESHAP and MACT, as well as other state and local air district requirements. Directed/prepared corporate environmental management systems (inclusive of local and federal requirements) including: environmental calendar, reference materials, forms and detailed summary of applicable regulatory requirements. Performed environmental compliance audits, based on these corporate environmental management systems, in California, Missouri, Michigan, Texas, Kansas and Arkansas to review site records, equipment permitting, best management practices and general implementation of the environmental management system. Coordinated compliance efforts and corrective actions, as necessary, to improve the overall compliance assurance. [Dates: 2000 to 2007; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Paperboard Manufacturing Company – Storm Water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasure (SPCC) Plan**: Audited multiple facilities to determine compliance with the California Industrial Activities Storm Water General Permit as well as the Federal Spill Prevention Control and Countermeasure (SPCC) requirements; prepared combined Storm Water and SPCC plans identifying appropriate Best Management Practices (BMPs); establishing appropriate storm water sampling points and identifying potential spill sources and containment measures. [Dates: 2000 to 2007; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

Emissions Inventories and Environmental Reporting Assistance

- **Confidential Petroleum/Chemical Distribution Terminals – Annual Emissions, AB2588 and EPCRA (TRI) Inventories**: Directed/prepared numerous Annual Emissions, AB2588 and TRI inventory reports; performed facility audits to identify all sources of reportable emissions; compiled and analyzed data to support submission using Microsoft Excel and EPA Tanks software; documented all assumptions and calculations as necessary to support these inventories. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Manufacturing Facilities – Annual Emissions, AB2588 and EPCRA (TRI) Inventories**: Directed/prepared numerous Annual Emissions, AB2588 and TRI inventory reports; performed facility audits to identify all sources of reportable emissions; compiled and analyzed data to support submission using Microsoft Excel; documented all assumptions and calculations as necessary to support these inventories. [Dates: 2000 to 2007; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

Electronic Automated Tools and Spreadsheet Expertise

- **Confidential Petroleum Refinery – Permit Application Tracking Tool**: Designed and developed an electronic database tracking tool to facilitate tracking the status of permit applications submitted to the AQMD. This tool facilitated tracking of the ~200 pending permit applications and provided detail on: permit application description/purpose, facility engineer assigned to the project, AQMD engineer assigned to the project, permit application fees paid, project priority, outstanding data needs required to complete permit processing, etc. [Dates: 2006 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Manufacturing Facilities – Throughput and Emission Tracking Tool:** Designed customized computerized recordkeeping tools to enable tracking of throughput and emissions relative to permitted and other regulatory limits. [Dates: 2000 to 2007; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

- **Confidential Petroleum Refinery – Pre-construction PSD/NSR Engineering Analysis Tool:** Designed and developed pre-construction engineering review tool to assist the facility determine whether PSD and NSR requirements would be met given the proposed project design; tool includes engineering summary sheet, PSD and NSR calculations. [Dates: 2000 to Present; Project Owner: Confidential; Employer: Ashworth Leininger Group – Camarillo, CA; Position: Engineer, Senior Engineer]

EDUCATION

B.S. Chemical Engineering, 2000
Brigham Young University (BYU)

CERTIFICATIONS/REGISTRATIONS

- Professional Engineer; Chemical Engineering – State of California & State of Florida
- Certified Permitting Professional (CPP) – South Coast Air Quality Management District
- California Air Resources Board accredited Lead Verifier for the AB32 mandatory Greenhouse Gas reporting program, with Oil and Gas Systems and Process Emissions sector specialist accreditations

AFFILIATIONS

- Air & Waste Management Association (AWMA)
- Western States Petroleum Association (WSPA)

MARK GRUBER

Senior Environmental Scientist

Mark has over 20 years of professional experience carrying out ambient air quality and health risk and other toxic chemical exposure assessments, including development of emission inventories, computer air dispersion modeling, environmental sampling, map production, installation and operation of meteorological stations, air permit evaluation, and research. He has also prepared permit applications and assisted with compliance issues for facilities in various regulatory agencies. Mark is accredited by the California Air Resources Board as a Lead Verifier under the AB32 greenhouse gas inventory program, and is a sector specialist in Transactions, Oil and Gas Systems, and Process Emissions. Representative project experience is presented below:

PROJECT EXPERIENCE

Emissions Inventories and Dispersion Modeling

- **Modeling for Environmental Impact Report:** Performed dispersion modeling of criteria and toxic pollutants from stationary and mobile sources to support an Environmental Impact Report for a large scale refinery modification project in southern California, including a complete health risk assessment. Coordinated with SCAQMD staff to ensure modeling was consistent with District guidelines.

- **Health Risk Assessments, Northern California Refinery:** Performed health risk assessments of toxic chemical emissions from diesel internal combustion engines, storage tanks, and fugitive pipeline components to support multiple Bay Area AQMD permit applications. Drafted HRA reports and developed all maps and figures using geographic information systems and graphics software.

- **Health Risk Assessment, Southern California Produce Fumigation Facility:** Performed a health risk assessment of toxic chemical emissions from a proposed produce fumigation facility in southern California, in support of a permit application for the facility.

- **LNG Project:** Performed dispersion modeling of criteria pollutants from a proposed LNG transportation project. Modeling included screening and refined analyses. Drafted report of modeling results and developed all maps and figures using geographic information systems and graphics software.

- **NO_2 Modeling, Southern California Printing Facility:** Performed dispersion modeling of NO_2 emissions from an afterburner in support of a permit application to modify a natural gas throughput limit. Identified potential sites for background NO_2 ambient air data and added background data to modeling results to demonstrate compliance with SCAQMD Rule 1303 requirements.

- **Toxic Chemical Dispersion Modeling, Nut Pasteurization Facility:** Performed dispersion modeling of Toxic Chemical Emissions from a nut pasteurization facility in Texas. Emission sources included a scrubber and storage warehouse. Modeling results were compared to Effect Screening Levels to demonstrate that the project would not result in significant health impacts to the surrounding community.

- **Annual Emission Reports, SCAQMD:** Prepared Annual Emission Reports (AERs) for several facilities in the South Coast Air Quality Management District (SCAQMD). Calculated emissions from onsite sources and prepared documentation for all calculations.

- **Oil and Gas Operations, Bridgeport, IL:** Developed an inventory of hydrogen sulfide emission sources in the vicinity of Bridgeport and Petrolia, Illinois. Sources included wells, storage tanks, fugitive sources, wastewater storage, and flares. Performed dispersion modeling using the AERMOD dispersion model to quantify the impact of those emissions in the towns of Bridgeport and Petrolia. Created isopleth maps and frequency-of-exposure maps as part of a report summarizing the work. Used GIS software to integrate aerial photographs into the exposure maps and to aid in the identification and location of emission sources.

- **Primary Zinc Smelter, Blackwell, OK:** Developed an emission inventory of particulate matter, zinc, arsenic, lead and cadmium emissions from sources at a primary zinc smelter in Blackwell, Oklahoma. Performed dispersion modeling to assess historical exposure to particulate matter and heavy metals in the town of Blackwell using the AERMOD dispersion model. Integrated meteorological data from a local meteorological station into the dispersion modeling.

- **Petroleum Refineries, Corpus Christi, TX:** Prepared emission source parameter information and performed dispersion modeling of benzene emissions from a group of petroleum refineries situated along the ship channel in Corpus Christi, Texas. Modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Created isopleths maps showing the historical impact of benzene in the city of Corpus Christi for several years from the 1970s to the 1990s.

- **Longhorn Army Ammunition Plant, Karnack, TX:** Developed a historical toxic chemical emissions inventory for sources at the Longhorn Army Ammunition Plant in Karnack, Texas. Sources included rocket engine test stations and open burning of explosives. Performed dispersion modeling using the Industrial Source Complex Short Term dispersion model (ISCST-3) and the INPUFF dispersion model. Integrated the output from the two models and created isopleth maps showing the impact of toxic chemical emissions on the town of Karnack.

- **Drum Reclamation Facility, Chicago, IL:** Developed an inventory of VOC emission sources at a drum reclamation facility in Chicago, Illinois. Performed dispersion modeling of VOCs and dioxins from sources at the facility using the AERMOD dispersion model. Generated isopleth maps to illustrate the impact of those chemicals on the nearby community.

- **Wood Treatment Facility, Pennsylvania:** Developed a historical emissions inventory of toxic chemical emissions at a creosote wood treating facility in Pennsylvania. Performed dispersion modeling using the AERMOD dispersion model. Generated isopleth maps to show the impact of those chemicals on the nearby community from the 1970s to the 1990s.

- **Formosa Plastics Corporation, Point Comfort, TX:** Performed dispersion modeling of ethylene dichloride and vinyl chloride from sources at the Formosa Plastics Corporation in Point Comfort, Texas. Modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Generated isopleth maps to illustrate the impact of those chemicals on the town of Point Comfort.

- **Odessa Petrochemical Complex, Odessa, TX:** Conducted an air dispersion modeling study of atmospheric emissions of benzene, styrene, total hydrocarbons, and hydrogen sulfide from sources located within the Odessa petrochemical complex. Modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Generated isopleth maps to illustrate the impact of those chemicals on the city of Odessa.

- **Petroleum Coke Storage and Loading facilities, San Pedro, CA:** Developed an inventory of particulate matter and polycyclic aromatic hydrocarbon (PAHs) emissions from sources related to petroleum coke storage and loading operations in the Port of Los Angeles and the Port of Long Beach, California. Performed dispersion modeling to determine the ambient air concentrations and deposition rate of those pollutants on the surrounding neighborhoods. Modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Generated isopleth maps to present the results of the modeling.

- **Landfill and Sewage Treatment Plant, New Orleans, LA:** Modeled emissions of VOCs and particulate matter from emission sources associated with the East Bank Sewage Treatment Plant and the adjacent landfill in New Orleans, Louisiana. Determined VOC emission rates from the landfill using the Landfill Gas Emissions Model developed by the EPA. Dispersion modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Generated isopleth maps to present the results of the modeling.

- **Secondary Lead Smelter, El Florido, Mexico:** Developed an inventory of lead emissions from sources associated with a secondary lead smelter in El Florido, Baja California, Mexico. Installed and maintained a meteorological station to record data over a two-year period. Performed dispersion modeling of lead emissions using the Industrial Source Complex Short Term dispersion model (ISCST-3) and the local meteorological data. Generated isopleth maps to present the results of the modeling.

- **Coke Production Facilities, Birmingham, AL:** Developed an inventory of benzene and VOC emissions from coke production facilities in Birmingham, Alabama. Used GIS software to create basemaps of the neighborhoods surrounding the facilities. Performed dispersion modeling to determine the ambient air concentrations of benzene and VOCs in the surrounding neighborhoods. Modeling was performed using the Industrial Source Complex Short Term dispersion model (ISCST-3). Generated isopleth maps to present the results of the modeling.

- **Upset Modeling, Lake Charles, LA:** Performed dispersion modeling of sulfur dioxide emissions during an upset at a refinery in Lake Charles, Louisiana using the CALPUFF dispersion model. Generated isopleth maps to present the results of the modeling.

- **Upset Modeling, St. Gabriel, LA:** Performed dispersion modeling of an ammonia release resulting from a line rupture at a chemical plant in St. Gabriel, Louisiana. Modeling was performed with the SLAB dense gas dispersion model. Evaluated meteorological data from several sites to determine the appropriate meteorological conditions to input into the model. Created a map defining the limits of the odor threshold exceedence for ammonia downwind of the plant following the release.

- **Rocket Engine Development and Testing Facility, CA:** Developed a comprehensive historical emissions inventory of sources at a rocket engine testing facility and associated rocket engine manufacturing facilities in California. An uncertainty analysis was incorporated into the emissions inventory to quantify the uncertainty associated with the emissions calculations.

- **Houston Ship Channel, TX:** Acquired sulfur dioxide emissions data from the regulatory agency database for several dozen industrial facilities located along the Houston Ship Channel in Houston, Texas. Performed dispersion modeling to assess the extent of the impact of facility emissions on the surrounding neighborhoods.

AB32 Greenhouse Gas Verifications

- **Confidential Clients in Various Industries:** Performed audits of greenhouse gas emission reports as a Lead Verifier per the requirements of the Mandatory Greenhouse Gas Reporting rule associated with Assembly Bill 32 (AB32). Tasks included site visits, evaluation of greenhouse gas emitting equipment, review and analysis of emission calculations and documentation, and creation of Verification Reports summarizing the audit findings. Facilities audited include the following categories: general stationary combustion, electricity generation, and refinery.

Permitting

- **Manufacturing Plant, Southern California:** Prepared permit applications for various operations in a manufacturing plant in southern California, including foundry operations, paint booths, and a liquefied petroleum gas (LPG) tank. Identified strategies to eliminate emission increases associated with equipment modifications to expedite permit approval and minimize costs.

- **Refinery Integration Project California:** Performed dispersion modeling in support of a permit application and environmental impact report for the integration of two refineries. Performed a health risk assessment to quantify cancer risk and chronic and acute exposures resulting from the project. Determined criteria pollutant impact and compared to ambient air quality standards.

- **Bulk Petroleum Fuel Storage and Loading Terminal, Washington:** Prepared a permit application to modify truck and marine load rack throughput and storage tank service. Calculated VOC emissions from facility sources including storage tanks, marine loading and truck loading racks, tank degassing, tank painting, and fugitives from pipeline components. Reviewed and evaluated local, state, and federal regulations in terms of the implications to the project.

- **Bulk Petroleum Fuel Storage and Loading Terminals, Hawaii:** Prepared Title V permit renewal applications for several bulk loading terminals in Hawaii. Applications included calculations of facility-wide air emissions and federal and state rule applicability evaluations.

- **Bulk Petroleum Fuel Storage and Loading Terminal, Southern California:** Prepared a permit application to increase throughput in a petroleum product storage tank. Calculated VOC and HAP emission increases associated with the additional throughput and identified exemptions to offset requirements. Performed a Tier I Risk Assessment to evaluate risk associated with toxic air contaminant emissions.

Environmental Compliance Assistance

- **Bulk Petroleum Fuel Storage and Loading Terminals:** Prepared semi-annual compliance reports for bulk loading terminals in California, Oregon, Washington, and Hawaii for the 40 CFR 63 Subpart BBBBBB regulation (National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities).

- **Manufacturing Plant, Southern California:** Performed an environmental audit to assess compliance with South Coast Air Quality Management District (SCAQMD) air regulations, and developed strategies to achieve compliance where deviations were found. Assisted in reporting of deviations and preparation of permit applications. Evaluated RECLAIM emission calculations and assisted in RECLAIM reporting and corrections.

Permit Evaluations

- **Bulk Petroleum Fuel Storage and Loading Terminals, CA:** Reviewed and evaluated draft Title V permit applications for multiple facilities and provided comments and identified necessary corrections and modifications of equipment descriptions and permit conditions. Performed a comprehensive District and Federal rule applicability evaluation for the facilities.

- **Semiconductor Manufacturer, Rio Rancho, NM:** Performed a comprehensive review of an air permit application for a semiconductor manufacturer in Rio Rancho, New Mexico. Evaluated emission calculations and performed statistical analyses of emission rates based on source sampling results.

- **Rock and Sand Mining Operation, Santa Clarita, CA:** Evaluated an Environmental Impact Report for a proposed rock and sand mining operation near Santa Clarita, CA. Reviewed air emission calculations and recommended modifications and additions.

Environmental Monitoring

- **Hobbs, NM:** Developed a sampling plan and cost estimate to perform environmental sampling at several homes near a former tank battery in Hobbs, New Mexico. Collected soil, house dust, and indoor and ambient air samples and coordinated with the analytical laboratories. Measured ambient air concentrations of mercury using a portable analyzer. Installed a meteorological station to collect meteorological data for the duration of the project. Wrote a comprehensive report describing the sampling procedures and presenting the analytical results.

- **Fallon, NV:** Developed a sampling plan and cost estimate to perform ambient air sampling in Fallon, Nevada. Installed ambient air monitoring stations at two sites and a meteorological station at one of the sites. Collected 24-hour samples of VOCs, semi-volatile organic chemicals, and particulate matter at each site for a seven-day period. Measured ambient air concentrations of mercury using a portable analyzer.

- **Heavy Metals around Primary Zinc Smelters:** Researched and acquired historical ambient air monitoring data related to heavy metals and particulate matter in the vicinity of primary zinc smelters throughout the United States. Prepared spreadsheets presenting the data and comparing the results.

- **Palos Verdes, CA:** Prepared a sampling plan and detailed cost estimate for an ambient air monitoring project in the vicinity of the former Palos Verdes Landfill in Palos Verdes, California. The chemicals of interest were VOCs.

- **Burbank, CA:** Collected 24-hour indoor air samples from several homes in Burbank, California, using PVC filters and pumps. Samples were analyzed for hexavalent chromium concentrations at a local analytical laboratory.

EDUCATION

B.A. Physical Geography, 1993
University of California, Los Angeles (UCLA)

Graduate Studies, Physical Geography, 1993-1995
University of California, Los Angeles (UCLA)

CERTIFICATIONS

California Air Resources Board accredited Lead Verifier for the AB32 mandatory greenhouse gas reporting program, with sector specialist accreditations in Transactions, Oil and Gas Systems, and Process Emissions (Executive Order H-10-055).

SCOTT JOHNSON
Senior Environmental Scientist

ASHWORTH LEININGER GROUP

Scott has more than 25 years experience in the fields of air quality management, environmental assessment, and land use planning. This experience includes air quality and land use permitting, environmental assessment under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), air quality monitoring, preparation of facility and area-wide emissions inventories, air toxic health risk assessment, evaluation of air pollutant control technologies, air quality planning and policy analysis, environmental compliance, and training.

PROFESSIONAL EXPERIENCE

Ashworth Leininger Group, Camarillo, California
Senior Environmental Scientist, 2006 to present

Serve as project manager and senior staff for clients in the areas of air permitting, environmental assessment under CEQA/NEPA, legislative and regulatory assessment, environmental compliance/training, and litigation support.

Ventura County Air Pollution Control District, Ventura, California
Manager – Air Quality Programs, 1993 to 2006

Managed the District's Monitoring and Planning Divisions, responsible for developing plans to improve air quality, conducting ambient air quality monitoring, reviewing projects under the California Environmental Quality Act, and transportation planning. Served on state/federal environmental policy committees, ensured compliance with federal/state administrative procedures, and delivered public presentations. Prepared first plan to show attainment of the federal ozone standard in Ventura County, which was achieved three years early.

Ventura County District Attorney's Office, Ventura, California Law
Clerk – Consumer and Environmental Protection Division, 2000

Assisted staff attorneys in conducting legal research, preparing motions, and preparing pre-filing analyses for consumer fraud and environmental protection cases.

Santa Barbara County Air Pollution Control District, Santa Barbara, California
Air Quality Engineer III, 1991 to 1993

Determined feasibility of controls on vehicle fleets in Santa Barbara County as emission offsets for new industrial facilities. Represented the District on state committees related to emission offsets and mobile source controls, and advised staff on permit decisions based on District rules.

Updated January 7, 2009

University of California at Santa Barbara, Santa Barbara, California
Adjunct Instructor, 1989 to 1992

Taught courses in air quality and environmental management systems.

ENSR Consulting and Engineering, Camarillo, California
Senior Project Manager, 1990 to 1991

Managed air toxics risk assessment projects for aerospace and oil industry clients, and assessed air quality impacts for major facilities in Southern California. Also analyzed pending legislation and regulations for private clients, and made presentations to clients.

Santa Barbara County Air Pollution Control District, Santa Barbara, California
Air Quality Engineering Supervisor, 1988 to 1990

Supervised the District's Rule Development Section, responsible for preparing regulations to improve air quality, conducting public workshops, complying with federal/state administrative procedures, and making recommendations to the District Board.

Jacobs Engineering Group Inc., Santa Barbara, California
Project Manager, 1986 to 1988

Provided air quality permit engineering support for oil and gas development projects, and planning/engineering support for the Santa Barbara County Air Quality Attainment Plan.

Ventura County Air Pollution Control District, Ventura, California
Senior/Associate/Assistant Air Quality Specialist, 1978 to 1986

Managed the District's Planning Section and Air Monitoring Sections, responsible for air quality planning, transportation planning, environmental review, and ambient air quality monitoring. Served on state/federal environmental policy committees, and delivered public presentations.

EDUCATION

Ventura College of Law, Ventura, California
Juris Doctor – with high honors (second in class), 2002

University of California, Santa Barbara, California
Graduate Studies – Electrical and Computer Engineering (Coursework in digital design, computer architecture, sequential machines, and automata theory.)

University of California, Santa Barbara, California
Bachelor of Arts in Economics and Political Science – with honors

PROFESSIONAL AFFILIATIONS

State Bar of California
Active Member, No. 220028 – Admitted 2002

Ventura County Bar Association
Member, 2000 to Present; Citations Editorial Board, 2003

Air and Waste Management Association
Member, 1983 to 1998, 2002 to present

Served as Software Review Editor for Association's publications; course instructor; Vice Chair, Training Division (1996-1998); Chair, Information Technology Committee (1993-1996); conference/session chair or vice chair for numerous conferences.

Ventura County Air Pollution Control District Advisory Committee
Member, 1986 to 1993 (Committee advised District Board on proposed rules.)

Ventura County Clean Air Fund Advisory Committee
Member, 1992 to 1993 (Committee advised District Board on project funding from endowment fund established by 3M.)

APPENDIX I-5

ITERIS

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SEAN T. DALY, AICP, PTP
Senior Transportation Planner

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EDUCATION
- MA, City Planning, University of Pennsylvania, 2002
- BA, Geography, University of California, Los Angeles, Minor in Public Policy, 1998

REGISTRATIONS
- American Institute of Certified Planners (AICP), #021297
- Professional Transportation Planner (PTP), #23

YEARS OF EXPERIENCE 16

CORE COMPETENCIES
- Transportation Planning
- Traffic Engineering
- Goods Movement

AFFILIATIONS
- American Planning Association, Transportation Planning Division, Louisiana Chapter Professional Development Officer
- Institute of Transportation Engineers (ITE)
- American Society of Civil Engineers (ASCE)

Mr. Daly serves as a Senior Transportation Planner of Iteris' Transportation Systems division and has been with the firm since July 2006. Mr. Daly has 16 years of public sector and professional consulting experience in the field of transportation planning. He has worked on wide range of transportation planning activities on the local, regional, state, and federal level. Mr. Daly has expertise in various aspects of transportation planning and traffic engineering including traffic impact analysis; multimodal transportation studies; intersection and corridor analysis; analytics; transportation finance; state and federal transportation planning; and the regional travel demand model process.

Project Experience

South Bay Measure R Highway Program – Los Angeles County, CA
Mr. Daly was instrumental in developing the South Bay Measure R Implementation Plan. The Implementation Plan identifies the ongoing process of allocating $900 million in Measure R county sales tax revenue to fund projects that improve highway operations over a 30-year period in the South Bay area of Los Angeles County. This included a process to identify and evaluate eligible projects, estimate cost and schedule, and enable a consensus-driven decision making process to allocate funding. The Implementation Plan also included other sources of funding to be leveraged with Measure R funds, assess system performance in the future with the entire program of projects constructed, and establishing a nexus of non-highway projects to the highway system operations. In the second phase of this project, Iteris is performing a program management role, conducting annual updates to the Implementation Plan and programming a new year of funding, monitoring individual project progress and making recommendations for project corrections if one is delayed. The project began in 2010 and is ongoing.

Port of Los Angeles and Port of Long Beach Environmental Impact Reports/Statements – Los Angeles, CA
Mr. Daly has provided technical and analytical support for a variety of San Pedro Bay Ports transportation studies. These include the TRAPAC, Middle Harbor and SR-47 Expressway, APL Terminal environmental impact reports and the ongoing environmental impact reports for the Yang Ming and Everport terminals. Mr. Daly's duties Included model development and validation, traffic analysis, air quality reporting (vehicle miles traveled, vehicle hours traveled), and environmental impact report preparation and authoring. Mr. Daly has been involved in San Pedro Bay port area studies since 2006.

Long Beach 2030 Context-Sensitive Mobility Element – Long Beach, CA
This update to the General Plan identifies the programs and policies necessary to meet the needs of the City through the year 2030. It includes the development of a transit overlay as well as bicycle and pedestrian elements. Particular attention was paid to preservation of neighborhoods and the creation of pedestrian-friendly commercial districts. Alternative

land use plans were tested with a travel demand model, which was being designed to reflect transit mode splits associated with transit service improvements and transit-oriented development standards. The project began in 2007 and was completed in 2013.

Gateway Cities Sustainable Communities Strategy Initial Study – Paramount, CA

Mr. Daly was part of a multidisciplinary team that performed the initial study to recommend a course of action a council of governments to meet its requirements under CA Senate Bill 375. As part of the 2009 effort, Iteris provided analysis of the role of transportation in greenhouse gas emissions. Strategies to reduce vehicle miles traveled and associate greenhouse gas emissions were analyzed for their potential to reduce emissions. This provided benchmarks for the twenty-eight cities of the Gateway Cities Council of Governments to determine if city-led actions had the ability to reach region-wide greenhouse gas emission reduction targets.

Climate Action Plan Vehicle Miles Traveled Analysis – Various Cities

Mr. Daly served as task leader for vehicle miles traveled analysis for the Climate Action Plans of the County of Los Angeles and the Cities of Los Angeles, La Canada Flintridge, Industry, and Inglewood. As part of the greenhouse gas inventory for on-road transportation, the vehicle miles traveled of trips originating or destined for the jurisdictions was calculated using the regional travel demand model, with additional off-model, local street estimates. To estimate the ability to reduce vehicle miles traveled, city policies related to transportation were reviewed and Mr. Daly worked with the Cities to develop strategies to further reduce greenhouse gas emissions from transportation sources by assessing and quantifying the greenhouse gas reduction potential of various policies, projects, and programs. The Inglewood Energy and Climate Action Plan project received the Award of Merit in the Innovation in Green Community Planning category at the 2014 APA LA Awards.

Spanish Fork Community Planning Assistance Team – Spanish Fork, UT

As part of the American Planning Association's Community Planning Assistance Team Program, Mr. Daly was part of a multidisciplinary team of expert planning professionals paired the City of Spanish Fork, UT, a community facing difficulties in revitalizing its historic downtown. The historic anchor throughout the city's growth has been Main Street, which is now Spanish Fork's historical downtown area. Spanish Fork's downtown, similar to the downtowns of many small Utah communities, consists of five city blocks along a state highway transportation corridor, and is surrounded by a traditional grid network. The rapid population growth and (sub) urbanization of Spanish Fork has taken a toll on the historic center, specifically on Main Street, as most of the development has occurred on the edges of the city and along nearby highway interchanges. The team conducted meetings, walking tours, and workshops with town officials, business owners, and residents, culminating in a presentation and final report of recommendations. As the team's transportation planner, Mr. Daly focused on coordinating with UDOT, generated infrastructure improvement scenarios, and determining ways to improve parking conditions and community linkages. The final recommendation included the reconfiguration of Main Street to include a Heritage Trail—a linear park connecting public space throughout the Main Street corridor which could celebrate the unique cultural heritage of the area with relocated statues and interpretive elements for the goal of reinforcing the identity of the historic downtown as a destination.

I-605 Hot Spots and Gateway Cities Strategic Transportation Plan – Los Angeles County, CA

Mr. Daly was involved in the transportation planning for Metro in association with the Gateway Cities Council of Governments (GCCOG) on both the Hot Spot Feasibility Study and the Strategic Transportation Plan. These major projects are funded by Measure R and they are analyzing congestion improvement alternatives in the GCCOG for the various congestion "Hot Spots." As part of these efforts Mr. Daly was involved goal setting, performance measurement and assessment of how projects interact and affect one another through travel demand model development and application,

SEAN T. DALY, AICP, PTP
Senior Transportation Planner

arterial studies, freeway analysis, multi-modal transportation studies, and crash studies. Initial alternatives include improvements to freeway to freeway interchanges, additional general purpose lanes, and arterial improvements. Three of the "Hot Spots" projects advanced to the next phase of project development as Project Study Reports (PSRs).

Jordan Downs Specific Plan and EIR – Watts, CA

Task leader for transportation studies used in preparation of the Master Plan for the Jordan Downs public housing complex located in Watts, for the Housing Authority of the City of Los Angeles (HACLA). The Specific Plan includes the addition of approximately 1,100 residential units to the current 700 residential units, along with school site expansion, park and recreational facilities, mixed-use development, and retail and light industrial development. The project includes annexation of adjacent county land, and a multi-phase development plan. Iteris is continuing its work for HACLA with the traffic/transportation Environmental Impact Report technical study which led to the funding of the extension of Century Boulevard to Alameda Street. The project began in 2009 and was completed in 2011.

Southern California International Gateway Environmental Impact Report – Los Angeles, CA

Mr. Daly managed the traffic/circulation section of the environmental impact report for a near-dock intermodal transfer facility located by the Ports of Los Angeles and Long Beach. The environmental study examined how the project would shift up to 10,000 future drayage truck trips per day from the regional highway system to a local network of streets and intersections. The effort included the transfer of the Port Area Model from the TranPLAN to the TransCAD software program currently used by the Southern California Association of Governments for its regional travel demand model, model development and validation, traffic analysis, air quality reporting (vehicle miles traveled, vehicle hours traveled), and environmental impact report preparation and authoring. Mr. Daly's involvement began in 2008. The project was approved in 2013.

Commonwealth of Massachusetts Long-Range Transportation Plan – Boston, MA

Mr. Daly was a contributing author to the 2005 20-year Commonwealth of Massachusetts Long-Range Transportation Plan chapters: Mobility for Transport of People and Goods and Funding Improvement to the Transportation System.

Boston Region Metropolitan Planning Organization Transportation Improvement Program – Boston, MA

Mr. Daly was the manager of the Boston Region Metropolitan Planning Organization's 2005 and 2006 Transportation Improvement Programs (TIP). In his role as TIP manager, he was responsible for budget, scheduling, supervision of support activities, data collection, intergovernmental coordination, production, and all presentations to the MPO policy board, and local and regional interest groups and organizations. Mr. Daly integrated the outreach activities and environmental justice analysis to provide a direct link between citizen participation and the regional transportation planning decision-making process.

United States Department of Transportation, Washington, DC. Transportation Specialist - Federal Railroad Administration

Mr. Daly prepared financial and performance indicator analysis of Amtrak for 2003 reauthorization legislation. He reevaluated United States passenger rail system by service types and researched present and historic structure of United States passenger rail for policy evaluation briefings to the FRA administrator, Secretary of Transportation and Congress.

DINA SALEH

Assistant Transportation Planner

EDUCATION

- BS, Civil Engineering, University of California, Irvine, 2014

YEARS OF EXPERIENCE 3

CORE COMPETENCIES

- Transportation Planning
- Traffic Engineering & Operations
- ITS Planning & Design
- ITS Evaluation

AFFILIATIONS

- Institute of Transportation Engineers (ITE)

Ms. Saleh has served as an Assistant Transportation Engineer for Iteris' Transportation Systems division since June 2014. She has participated in and provided support for the development of analysis for roadway modification projects, existing and future intersection traffic operations for land developments, Intelligent Transportation Systems (ITS), Traffic Management Centers (TMC), and parking studies. Ms. Saleh's software experience includes Synchro, Traffix, and AutoCAD. She is also well versed with design standards, HCM, MUTCD, AASHTO, and the California Highway Design Manual.

Project Experience

Countywide Intelligent Transportation Systems (ITS) Inventory Data Collection, Los Angeles County Metropolitan Transportation Authority (Metro) – Los Angeles, CA

Ms. Saleh assisted in creating a database for Los Angeles County agencies' Intelligent Transportation Systems (ITS). Metro will use the database to monitor progress and track countywide ITS technology development as they are planned and implemented. While public agencies and consultations can access the database as a baseline for field inventory and verification. Ms. Saleh was responsible for developing a data collection approach and methodology to collect extensive ITS inventory data utilizing various media and outreach strategies. Metro will use the provided inventory and database to recommend arterial improvements by incorporating ITS devices and using technology to increase roadway network efficiency. The project began in September 2014 and is ongoing.

Santa Monica TMC Staffing for California Incline Construction – City of Santa Monica, CA

Ms. Saleh served as a Project Engineer in operating the City of Santa Monica's Transportation Management Center during California Incline closure. Ms. Saleh was responsible for coordinating with Santa Monica Police Department, Public Works Department, and Parking Department in performing plans and strategies to maintain consistent traffic flow within the city's busy downtown area, such as lane closures or restrictions, staff deployment for traffic control, and signal timing adjustments in response to current traffic and parking conditions. The project began in April 2015 and is ongoing.

Pasadena TMC Staffing for Special Events – City of Pasadena, CA

Ms. Saleh assisted in TMC Staffing for Special Events project in City of Pasadena. The tasks include managing the traffic during special events such as game (football & soccer), music events, fireworks (New Year Eve's & 4th of July) and Parade organized at the Rose Bowl Stadium. The Rose Bowl is 18th largest stadium in the world, the 12th largest stadium in the United States, and the 11th largest NCAA stadium. The traffic will be managed through the use of existing CCTV cameras (Analog, Digital and HD Digital), CMS signs (portable and fixed), timing modifications via Siemens' i2, McCain's QuicNet Pro v2.0 and TransCore's SCATS, and close

coordination with the Rose Bowl's Command Post managed by Pasadena Police Department (PPD). In addition, Iteris is developing a TMC Operations Manual for Special Events that can be used as a guideline by TMC Staff for managing the traffic before, during and after the event. The project started in June 2015 and is ongoing.

South Bay Cities Council of Government (SBCCOG) Measure "R" Highway Program – South Bay, CA

Ms. Saleh assisted in the development of the South Bay Measure R Implementation Plan Update. The Implementation Plan identifies the ongoing process of allocating $900 million in Measure R county sales tax revenue to fund projects that improve highway operations over a 30-year period in the South Bay area of Los Angeles County. This included a process to identify and evaluate eligible projects, estimate cost and schedule, and enable a consensus-driven decision making process to allocate funding. The Implementation Plan Update also included other sources of funding to be leveraged with Measure R funds, assess system performance in the future with the entire program of projects constructed, and establishing a nexus of non-highway projects to the highway system operations. In the second phase of this project, Iteris is performing a program management role with programming a new year of funding, monitoring individual project progress and making recommendations for project corrections if one is delayed. The project began in 2010 and is ongoing.

Metro Orange Line (MOL) Speed Improvements Study - Los Angeles County, CA

Ms. Saleh assisted to evaluate current operations of the MOL in order to provide potential recommendations for improved bus speeds and reliability. Tasks include reviewing the operating characteristics of the MOL by conducting "line rides" to understand the issues from an operator's and passenger's perspective. Rides are being conducted from each end of the route for several days during multiple time periods. Field diagnostics will also be completed at all grade crossings. In addition, an assessment of accident history will be performed to identify accident hot-spots along the corridor, paying special attention to the types of accidents that occur and what the accidents are attributed to. Upon completion of the field reviews, the Iteris team will review each crossing along the MOL to determine if the current operating speed through the crossing should be increased, or remain at 10 mph, and what recommended changes would entail in order to allow for increased speed operations. The project began in August 2015 and is ongoing.

Cajalco Road Widening – Riverside County, CA

Ms. Saleh assisted with the Travel Demand Modeling for the traffic operations at intersections, arterial roadway segments, freeway segments, and ramps. Ms. Saleh evaluated multiple alternatives that propose the widening of existing Cajalco Road between I-15 and I-215 in Riverside County. The project began in September 2011 and is ongoing.

City of Los Angeles Bike Plan Traffic Impact Analysis – City of Los Angeles, CA

Ms. Saleh assisted with the preparation of Traffic Impact Analysis memorandums that assessed the impact of bike lane implementation along several corridors within the City. Some vital tasks performed included intersection analysis using Synchro and future traffic volume development. The project began in January 2014 and completed March 2015.

City of Rialto Traffic Impact Fee Study – Rialto, CA

Ms. Saleh assisted in traffic model validation for the Citywide focused model being developed as part of the project in order to assess future traffic operations at intersections and arterial roadway segments assuming build-out of the General Plan. Her development of a Citywide Synchro network consisting of 50 intersections was a key part of the project. The project began in September 2013 and was completed September 2015.

Starbucks with Drive through Traffic Impact Analysis – Glendora, CA

Ms. Saleh assisted in preparation of a Traffic Impact Analysis for the proposed Starbucks coffee house with a drive through window in the City of Glendora. Some vital tasks included intersection analysis and detailed analysis of internal traffic circulation on the site. Queues at existing Starbucks drive through site in City of Glendora were counted to determine projected queues at the proposed project. The project began in July 2014 and completed in October 2014.

DINA SALEH
Assistant Transportation Planner

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Pasadena Playhouse Parking Study – Pasadena, CA
Ms. Saleh assisted in preparation of a study assessing future parking variability in the Playhouse District of the City of Pasadena. Tasks included developing on-street and off-street parking utilization figures and parking capacity analysis per block. The project began in November 2013 and completed in October 2014.

Mancara Robinson Ranch Traffic Impact Analysis – Santa Clarita, CA
Ms. Saleh assisted in preparation of Traffic Impact Analysis for the new housing development. Tasks included developing the Synchro network for intersection analysis and generating future vehicle trips that would add to the roadway network using ITE trip generation rates. The project began in July 2014 and completed in November 2014.

APPENDIX I-6

NAVCON

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Navcon
Engineering
Network
Noise & Vibration Consultants

701 W. Las Palmas Dr., Fullerton, CA 92835
Phone 714.441.3488 ; Fax 714.441.3487
webinfo@navcon.com ; www.navcon.com

January 2017

Navcon Engineering Network

Navcon Engineering Network, a California Corporation is celebrating its 30th year of business. The company is located in Fullerton, CA and specializes in noise and vibration consulting (measurement, analysis and control), technical trainings, hot line technical support and the distribution of hardware and software systems for the noise and vibration community.

Navcon Engineering Facilities

The Navcon facility includes a fully equipped 1200 sq. ft. noise and vibration laboratory, training room and offices. A center post auto lift is used for conducting automotive modal tests and chassis tuning on prototype vehicles and race cars. A portable gantry crane and 4 post lift are used for conducting GVTs on military stores and larger commercial and industrial products. The laboratory features a 1 ton portable gantry crane and 7 ton T-slot table for simulated fixed boundary condition structural tests. Navcon has full access to a semi-anechoic chamber for conducting product noise tests (26' L x 19' W x 15' H, 2’ wedges, 140 Hz cut-off with a 10 dBA background sound pressure level).

Navcon Engineering Instrumentation & Software

Navcon has invested more than one million dollars in test and analysis instrumentation and technical software. The data acquisition systems (Qty. 9) are based upon Data Physics and Agilent multi-channel dynamic signal analyzers. Following is a partial list of our test instrumentation:

- Environmental Noise Monitors (6)
- Sound Level Meters (8)
- Acoustic Intensity Systems & Probes (6)
- Acoustical Array Microphones (16)
- General Purpose Microphones (26)
- Low Noise Microphones (4)
- Blast Microphones (6)
- Head & Torso Simulator (1)
- Floor Tapping Machine (1)
- Polytec Scanning Laser Vibrometer (1)
- Polytec Single Point Laser Vibrometers (3)
- Long Stroke Model Shakers (2)
- Modal Thrusters (11)
- Instrumented Hammers (17)
- General Purpose Accelerometers (15)
- Seismic & Industrial Accelerometers (16)
- Shock Accelerometers (16)
- Structural Accelerometers (64)

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Network
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webinfo@navcon.com ; www.navcon.com

Navcon has a wide range of technical software for environmental acoustics, indoor noise assessments, room acoustics, sound insulation, material sound absorption, underwater acoustics, duct/muffler noise assessment, modal testing, finite element analysis, finite element pretest analysis, FEM-test model correlation, FE model updating, shock response spectrum analysis and more.

Navcon Engineering Technical Trainings

Approximately 100 engineers and technicians attend Navcon seminars every year.

- *Environmental Noise Seminar* (www.navcon.com/Outdoor.htm), April 11-12, 2017; October 17-18, 2017
- *SoundPLAN User Training* (www.navcon.com/SoundPLANTraining.htm), April 13-14, 2017; Oct. 19-20, 2017
- *Hands On Modal Testing Seminar* (www.navcon.com/HandsOnModal.htm), March 21-24, 2017; July 18-21, 2017, Nov. 14-17, 2017
- *Validation and Updating of FE Models Seminar*, (www.navcon.com/AdvancedModal.htm), July 24-26, 2017

Navcon also presents 2 to 3 in-house trainings every year on special topics including acoustic intensity, noise modeling, noise control and vibration control.

Navcon Engineering Hot Line Support

Navcon currently has more than 250 noise and vibration companies and consultants under contract for Hot Line Support (phone-in, email and web-based). The contracts include software technical support, noise modeling, modal testing and general noise and vibration support.

Navcon Engineering Product Distribution

Navcon distributes a variety of hardware and software products to the noise and vibration community. In addition to the distribution of the products, Navcon engineers also provide technical support and training on the products. Some of the products distributed by Navcon include:

- *SoundPLAN* – Software for environmental noise modeling (industrial plants, entertainment facilities, arterial traffic, aircraft, railroads, indoor to outdoor noise, ...)

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Noise & Vibration Consultants

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- *INSUL* – Software for predicting the sound insulation of walls, floors, ceilings and windows
- IRIS Software & Hardware – A system for capturing & analyzing room impulse responses in 3D
- *dBSea* - A software tool for the prediction of underwater noise in a variety of environments
- *Zorba* - Sound insulation prediction Software
- *SIDLAB* – A software and hardware solution for the analysis and measurement of sound generation and propagation inside duct networks
- *AIMAP* – Software for mapping acoustic intensity and sound pressure data
- SRS – Software for calculating Shock Response Spectra
- *ME'scope* – Software for modal testing and operational deflection shape analysis
- *FEMtools* – A software package for both the vibration test engineer and finite element analyst including features for pretest analysis, FEM-Test correlation, FE model updating, optimization and scripting
- *APS Dynamics* – Shakers for modal, seismic and component testing.
- *Data Physics* – Dynamic signal analyzers for noise and vibration testing

Navcon Engineering Industries Served

In the 1980's and early 1990's many of Navcon's contracts were with the United States Navy and their suppliers. The projects involved noise and vibration control on both surface ships and submarines. Navcon also consulted for most every US, Japanese, and Korean automobile and truck manufacturer working on problems such as wind rush, cabin noise, steering wheel vibration, body shake, etc. As time went on Navcon applied the technology to a variety of other industries working with companies manufacturing disk drives, printers & plotters, sporting goods (e.g., baseball bats, golf clubs, tennis rackets), medical instruments, roller coasters, industrial compressors, aircraft (private and commercial), ... the list is extensive.

Navcon began working on environmental noise projects in 1989. The first projects were conducted for west coast oil refineries. The work included generating three dimensional computer noise models of the refineries, conducting community noise surveys, preparing noise impact assessments for new equipment and processes, designing noise control plans and developing specific noise mitigation measures. Over the years Navcon has conducted similar projects

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throughout the United States and South America for power plants, gas plants, mining operations, oil and gas pumping stations, wind farms, airports, shipping ports, rail systems, road system, housing developments, schools, shopping centers, etc.

Navcon Engineering Principals

The Navcon principals are James Steedman and Hans Forschner. They began working together in 1991. James had already formed Navcon Engineering (1987) and Hans was employed by Braunstein & Berndt in Germany. The first project involved a noise impact assessment of a light rail system. They conducted environmental noise surveys along the rail right of way and developed a three dimensional noise model of a light rail system and the surrounding communities. They also investigated noise mitigation measured including tuned absorbers for the train wheels, rail noise barriers and track side noise barriers. Ultimately, the rail organization chose to construct noise barrier and selected Navcon to optimize the design. The project was very successful and Navcon was asked to conduct similar projects for the rail organization and they were also contracted to serve as an expert witness for other rail expansion projects. Hans joined Navcon full time in 1995.

James B. Steedman, President Navcon Engineering Network

James Steedman, founder and President of Navcon Engineering, received his bachelors and master's degrees from the University of Cincinnati where he concentrated on modal testing and acoustic intensity. He has consulted in the field of noise and vibration measurement, analysis and control since 1978 working in both the commercial and military sectors. He has traveled worldwide, consulting and presenting courses on acoustic intensity, environmental noise, modal testing, and noise & vibration control. Jim has also served as Expert Witness in numerous lawsuits involving noise and vibration impact, personal injury and property damage.

Mr. Steedman attended the University of Cincinnati (UC) from 1972 – 1981. As a graduate student he worked as a Research Associate in the UC Structural Dynamics Research Laboratory (1977 – 1981) where his principal focus was modal testing and acoustic intensity. He began consulting as a graduate student working for companies such as U.S. Steel (machine tool vibration), Ford Motor Company (dynamic balancing), Nuclear Plant suppliers (seismic

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qualification using modal testing methods) and the Anatrol Corp (acoustic intensity software development) among others.

Education:

- BSME, University of Cincinnati 1977, Concentration: Acoustics & Vibration
- MSME, University of Cincinnati, 1979, Concentration: Modal Testing & Acoustic Intensity
- Post Masters Studies, University of Cincinnati, 1979-1981, Concentration: Modal Testing, Noise and Vibration Control

Employment History:

Mr. Steedman has worked for 3 companies since leaving the University of Cincinnati in 1981. His job responsibilities have included noise & vibration consulting, project management and corporate management.

- 1981-1984, Dynamics Manager, National Technical Systems, Fullerton, CA
- 1984-1986, Founder & President, Anatrol West Corporation, Brea, CA
- 1986 – present, Founder & President, Navcon Engineering Network, Fullerton, CA

Principal Lecturer – Seminars & Workshops:

Mr. Steedman has been the principal lecturer for numerous noise & vibration seminars and workshops. Over twenty five hundred engineers & technicians have attended his trainings since founding Navcon in 1987. He has lectured through the following organizations:

- Navcon Engineering - Acoustic Intensity, Environmental Noise, Noise Modeling, Modal Testing and the Validation & Updating of Finite Element Models
- Structural Measurement Systems - Acoustic Intensity & Modal Testing
- Genrad – Acoustic Intensity
- Institute of Environmental Sciences - Modal Testing

Principal Beta Engineer:

Mr. Steedman has served as the principal Beta engineer for several companies manufacturing hardware & software for the noise & vibration community. He has been tasked with product specification, flowcharting and user interface.

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- Agilent Technologies / Hewlett Packard
- Dactron, Inc.
- Data Physics Corporation
- Dynamic Measurements, Inc
- Stanford Research Systems
- Structural Measurement Systems
- Vibrant Technology

Hans Forschner, (Dipl. Ing.) Senior Acoustical Specialist

Hans Forschner has 30 years' experience conducting noise surveys and developing noise models for environmental impact studies, noise planning and noise control purposes. He has conducted environmental noise impact and assessments for highway, rail and high speed rail systems, industrial facilities, petrochemical plants (e.g., Chevron, Tesoro, Paramount, Exxon Mobil), gas plants (e.g., Praxair, Air Products), power plants (SCE, PGE), substations (Alstom, GE), geothermal plants, mining operation, co-generation facilities, wind energy project and theme parks such as Disneyland, Southern California Adventure, Universal Studios Orlando, SeaWorld San Diego, SeaWorld Orlando and Bush Garden Williamsburg. Hans also has 25 years of experience teaching environmental noise seminars, acoustic intensity theory and applications and national and international software training courses on interior and outdoor noise modeling.

Education

Bachelors and Master's Degrees in Applied Physics from the University of Applied Sciences Stuttgart

Professional Affiliations

Member of DEGA - German Acoustic Society

Employment History:

Navcon Engineering Network, Senior Acoustical Engineer (May 1995 to present). Hans has conducted noise & vibration control and environmental noise projects for a variety of industries, applications and products over the past 22 years. He is a principal instructor for Navcon's noise

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seminars and trainings including acoustic intensity, environmental noise, noise modeling and special applications. He also provides hot line technical support for more than 250 Navon customers.

Braunstein & Berndt, Backnang (Germany), Acoustical Engineer, 1989 to 1995: Hans conducted environmental impact studies for German State DOT's including highway projects A5, A6, A8 and B30. Other projects included light rail and high speed rail studies which were conducted for cities, counties and the German Railway Administration. He generated three dimensional noise models of existing and proposed traffic alignments, conducted noise impact evaluations and assessments and optimized noise barrier configurations and designs. The noise control optimizations included various options such as embankments, embankments & barriers, galleries, tunnels, and combination of active and passive noise control (e.g., treatment of windows). He supported the development of the SoundPLAN software including the management and guidance of software programmers and customer hotline support and training.

Bender & Stahl (Germany), Traffic Noise Engineer, 1987 to 1989: Hans conducted environmental impact studies for DOT's and Cities for highways and road projects A81 A8, A9 ... The studies included noise measurement surveys, the modeling of existing and/or proposed traffic noise sources, noise impact evaluations and assessment and the optimization of noise barriers and windows. Several of the city noise planning projects involved the measurement of the pre-existing noise environment, the modeling of future development and the definition of noise criteria for industrial sites. Hans conducted noise measurement surveys on highway tunnels to evaluate noise problems around the tunnels. He developed a noise prediction methodology to predict the noise radiated from tunnel portals and to evaluate noise control measures.

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APPENDIX I-7

QUEST CONSULTANTS

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See Appendix C for Resumes

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APPENDIX I-8

PETROTECH CONSULTANTS, LLC

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See Appendix F for Resume

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