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Memorandum

To	Robert Pak, Environmental Coordinator System & Special Projects CEHS 1218 S. 5th Avenue Monrovia CA 91016	Project Number: 60476389
cc:	Bill Graham, Principal AECOM 401 West A Street, Suite 1200 San Diego, CA 92101	
Subject	Air Quality Modeling Responses to CPUC Delinquency Letter dated October 8, 2015 in support of the 10-mile I-15 230-kV route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California	
From	Eric Carlson, Air Quality Project Manager Jason Paukovits, Senior Air Quality Engineer Mary Kaplan, Senior Air Quality Project Specialist	
Date	December 4, 2015	

This technical memorandum summarizes the results of revised emissions estimates, as well as dispersion modeling, performed at the request of Southern California Edison (SCE), in support of their response to the October 8, 2015 deficiency letter from the California Public Utility Commission (CPUC) (Subject: "RE: Application Deficiency Report #2 - Certificate of Public Convenience and Necessity for the Riverside Transmission Reliability Project – Application No. A.15-04-013"). To summarize, the CPUC requested that updated air quality and greenhouse gas (GHG) emissions modeling be provided for the project using current air quality models and meteorological data.

REVISED EMISSIONS ESTIMATIONS

The original modeling in the Final Environmental Impact Report (FEIR) was based on EMFAC 2007 and OFFROAD 2007. URBEMIS was not utilized in the FEIR for the air quality analysis. Utilizing as closely as possible the same methodology in the FEIR, updated emission factors (EFs) were obtained from current modeling tools, as follows:

- On-road equipment EFs from EMFAC2014; and
- Off-road equipment EFs and load factors from Appendix D: Default Data Tables of the California Emissions Estimation Model (CalEEMod) User's Guide.

Most air districts, including the South Coast Air Quality Management District (SCAQMD), recommend the use of CalEEMod to estimate emissions from land use development projects. The EFs in CalEEMod are based on the most recent OFFROAD model. However, CalEEMod was not designed for linear construction projects, such as construction of a new roadway or utility lines. Therefore, the use of off-road

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EFs from CalEEMod rather than using the actual model, is considered appropriate for the Proposed Project.

The source of the off-road EFs, Appendix D of the CalEEMod User's Guide, also provided widely used load factors for various equipment types. The respective off-road EF (selected via equipment type and size) was multiplied by the appropriate load factor, resulting in the EFs presented in the emission result tables.

Construction of the Proposed Project is anticipated to take three years to complete, beginning in 2019; for this reason, all emissions were updated based upon a 2019 fleet mix (for both on-road vehicles and off-road vehicles/equipment). The emission estimation spreadsheets were updated to reflect not only the revised EFs, but also several changes consistent with the FEIR and the anticipated project construction start year. Equipment quantity, work duration and usage time were updated to be consistent with the most recent Project Description in the FEIR. Off-road construction equipment sizes (i.e. horsepower rating) were updated consistent with those in Table 2.5-1 of the FEIR.

While methane (CH4) was included in prior inventory work, it is not included in EMFAC2014; for this reason and because its contribution to a calculated carbon dioxide equivalent (CO2e) value was at least several orders of magnitude lower than that of CO_2, methane emissions were excluded from the revised estimates. The updated emissions, from those presented in Table 3.2.3-10 of the FEIR, are provided below, with criteria pollutants presented as Table 1 and greenhouse gases presented in Table 2; these values include all mitigation prescribed in the FEIR, including AQ-14 (Restricted Activity Overlap) and AQ-19 (Tier 4 Emissions Standards for All Internal Combustion Engines/Construction Equipment [where available]).

Table 1. Summary of Revised Emissions Estimates/Comparison with Regional CEQA Thresholds

	Peak Daily Construction Emissions (lbs/day)					
	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2
August 2019 - July 2020						
RERC-Harvey Lynn/Freeman 69 kV Route	3.89	1.14	7.25	65.89	21.36	1.05
Wilderness-Jurupa-Mountain View 69 kV Route	0	0	0	0	0	0
I-15 230 kV Route (Proposed Project)	0	0	0	0	0	0
Wilderness and Wildlife Substations	0	0	0	0	0	0
Total	3.89	1.14	7.25	65.89	21.36	1.05
SCAQMD Daily Regional Significance Thresholds	100	75	550	150	55	150
Exceed Threshold (Yes/No)?	No	No	No	No	No	No
August 2020 - September 2020						
RERC-Harvey Lynn/Freeman 69 kV Route	3.89	1.14	7.25	65.89	21.36	1.05
Wilderness-Jurupa-Mountain View 69 kV Route	3.89	1.14	7.25	26.75	13.14	1.05
I-15 230 kV Route (Proposed Project)	0	0	0	0	0	0
Wilderness and Wildlife Substations	0	0	0	0	0	0
Total	7.79	2.28	14.50	92.64	34.51	2.11
SCAQMD Daily Regional Significance Thresholds	*100*	*75*	*550*	*150*	*55*	*150*
Exceed Threshold (Yes/No)?	No	No	No	No	No	No

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	Peak Daily Construction Emissions (lbs/day)					
	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2
October 2020 - May 2021						
RERC-Harvey Lynn/Freeman 69 kV Route	0	0	0	0	0	0
Wilderness-Jurupa-Mountain View 69 kV Route	3.89	1.14	7.25	65.89	21.36	1.05
I-15 230 kV Route (Proposed Project)	0	0	0	0	0	0
Wilderness and Wildlife Substations	0	0	0	0	0	0
Total	3.89	1.14	7.25	65.89	21.36	1.05
SCAQMD Daily Regional Significance Thresholds	*100*	*75*	*550*	*150*	*55*	*150*
Exceed Threshold (Yes/No)?	No	No	No	No	No	No
June 2021 - October 2021						
RERC-Harvey Lynn/Freeman 69 kV Route	0	0	0	0	0	0
Wilderness-Jurupa-Mountain View 69 kV Route	2.64	1.14	3.63	14.64	5.33	0.09
I-15 230 kV Route (Proposed Project)	1.45	0.20	8.01	17.74	5.16	0.02
Wilderness and Wildlife Substations	3.17	0.76	16.16	56.92	17.00	0.04
Total	7.27	2.10	27.80	89.29	27.50	0.15
SCAQMD Daily Regional Significance Thresholds	*100*	*75*	*550*	*150*	*55*	*150*
Exceed Threshold (Yes/No)?	No	No	No	No	No	No
November 2021 - May 2022						
RERC-Harvey Lynn/Freeman 69 kV Route	0	0	0	0	0	0
Wilderness-Jurupa-Mountain View 69 kV Route	0	0	0	0	0	0
I-15 230 kV Route (Proposed Project)	31.64	2.69	34.56	64.13	26.70	0.11
Wilderness and Wildlife Substations	3.17	0.76	16.16	56.92	17.00	0.04
Total	34.81	3.45	50.71	121.05	43.70	0.15
SCAQMD Daily Regional Significance Thresholds	*100*	*75*	*550*	*150*	*55*	*150*
Exceed Threshold (Yes/No)?	No	No	No	No	No	No

Table 2. Summary of GHG Emissions Estimates/Comparison with SCAQMD Thresholds

	Peak Year GHG Emissions (metric tons/year)		
Emission Source	CO_2	CH_4	CO_2e [1]
Construction Equipment/Employee Commuting	1,048.90	0.00	1,048.90
SCAQMD Interim GHG Significance Threshold (Industrial Projects)			10,000
Exceed Threshold (Yes/No)?			No

Note: CO_2e = carbon dioxide equivalent

LOCALIZED SIGNIFICANCE THRESHOLDS AND DISPERSION MODELING

AECOM performed the dispersion modeling in general accordance with the South Coast Air Quality Management District (SCAQMD) guidance for localized significance thresholds (SCLST) (acronym modified so as not to be confused with a similar project acronym for lattice steel tower [LST]). The prior analysis was based on the SCLST screening tables and modeling of localized emissions from SCREEN3.

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In place of SCLST tables and SCREEN3, air dispersion modeling was conducted to examine maximum short term impacts near the Louis Vandermolen Fundamental Elementary School and surrounding residential housing. The Louis Vandermolen Fundamental Elementary School was chosen for this updated evaluation since it is a sensitive receptor location close to the 230-kV transmission line of interest (I-15 230-kV). From Table 2.5.-1 of the FEIR, the estimated production per day for the Install Conductor & OPGW phase is approximately 0.3 miles per day. Since short term emissions are no more than 24 hours, construction of 0.30 miles closest to the school (around transmission pole JB7) was evaluated.

Model Selection

Selection of the appropriate dispersion model for use in the analysis is based on the available meteorological input data, the physical characteristics of the emissions that are to be simulated, the land use designation in the vicinity of the source under consideration, and the complexity of the nearby terrain.

The Environmental Protection Agency (EPA) recommends the use of the American Meteorological Society/EPA Regulatory Model (AERMOD) modeling system for use in modeling multi-source emissions and was used for this analysis. AERMOD can account for plume downwash, stack tip downwash, and point, area, and volume sources. AERMOD also has the ability to simulate impacts at both flat and complex terrain receptors.

The version numbers of the AERMOD model and pre-processors that were used include:

- AERMAP version 11103
- AERMOD version 15181

Meteorological Data

AERMOD-ready hourly meteorological data was obtained from the South Coast Air Quality Management District (SCAQMD). Following guidelines the Riverside Municipal Airport was selected as the meteorological data site to be used for the project. A wind rose for this airport is provided in Figure 1.

Sources

The construction of the transmission poles is comprised of the following emission sources:

- Off Road Vehicles (Construction Equipment Tailpipe Emissions)
- Helicopter
- Earthmoving Activities (Fugitive Dust)

Because construction will be limited to only standard working hours, modeling assumed the following operating schedule, conservatively including operation during the lunch hour:

- Weekdays: 6AM – 6PM - all emission sources
- Weekends: No activity

General source set up followed the SCAQMD's *Final Localized Significance Threshold Methodology*.

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Volume Sources

It has been assumed that emissions from the off-road vehicles, along with emissions from the helicopter, are best characterized by volume sources.

Emission rates for construction activities over a distance of approximately 0.3 miles were developed. It is assumed that over a given 24-hour period, 0.3 miles of the proposed transmission line can be constructed. Exhaust emissions from the construction equipment are treated as a set of 144 adjacent elevated volume sources that cover approximately 0.3 miles. These sources are illustrated in Figure 2. The release height is assumed to be 5 meters per volume source. This represents the mid-range of the expected plume rise from frequently used construction equipment during daytime atmospheric conditions. As previously stated, all construction exhaust emissions are assumed to take place over the 12-hour period between 6am and 6pm.

The source characterization of the helicopter is based on a line of 48 volume sources at the center of the 144 adjacent construction vehicle volume sources with a length of side of 10 meters and an initial vertical dimension of 6.1 meters per volume source. This represents expected dimensions of the helicopter. The helicopter volume source can be seen in the center of the 144-volume source box in Figure 2.

Area Source

Fugitive dust emissions are treated as a ground-based rectangular area source covering the maximum daily 0.3 mile construction zone. An initial vertical dimension of one meter is assumed to represent vertical spread of the emissions. As with the construction equipment, all fugitive dust emissions are assumed to take place over the 12-hour period between 6am and 6pm. This area source is illustrated in Figure 3.

Receptors

Receptors were placed over areas immediately adjacent to the closest transmission pole to the Louis Vandermolen Fundamental Elementary School – covering the school and nearby residential housing. This receptor grid contained 25-meter spacing between each receptor. The receptor grid can be seen in Figure 4.

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Figure 1: Riverside Municipal Airport Wind Rose (2008-2012)

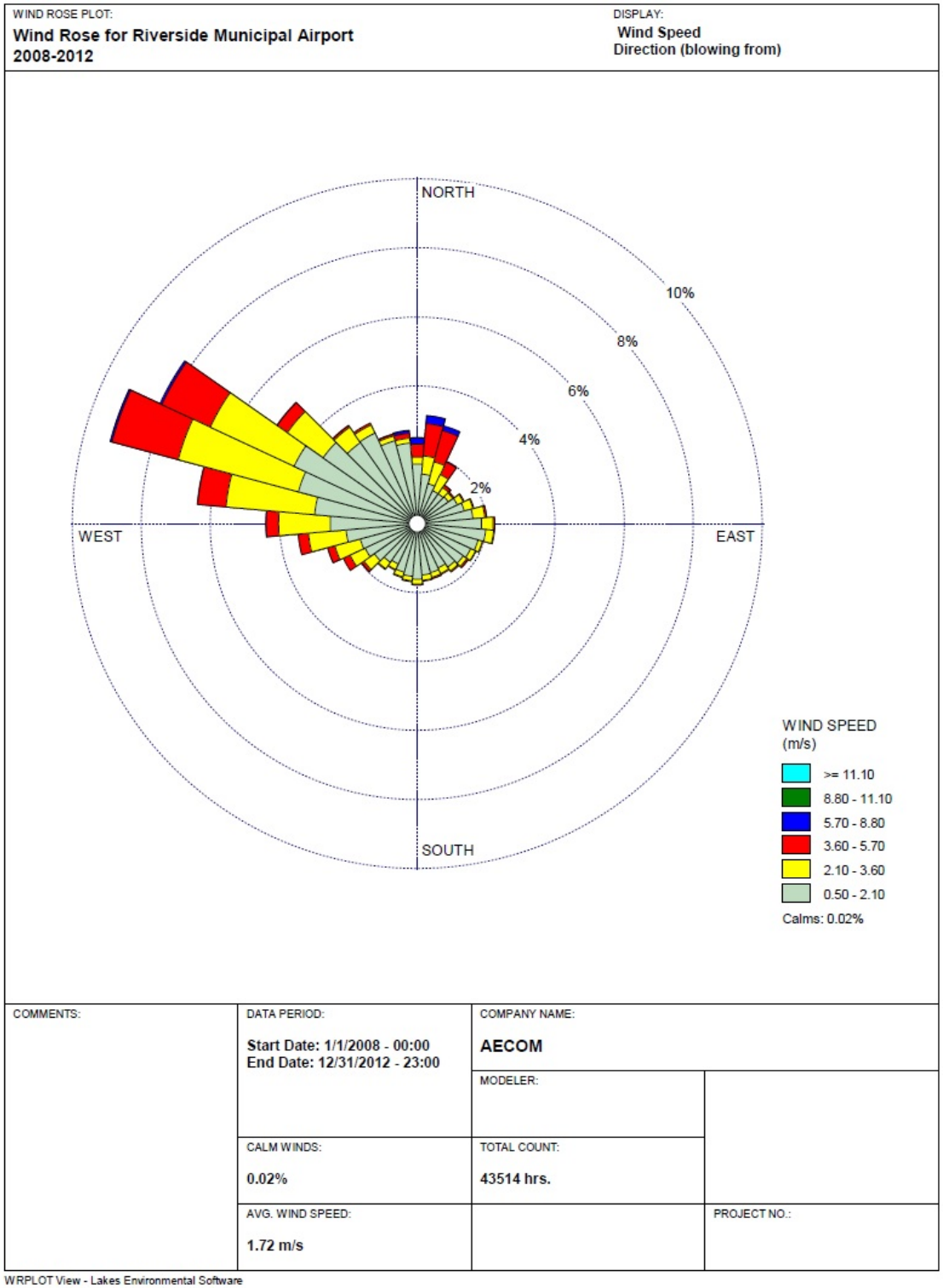

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Figure 2: Volume Sources Set-Up

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Figure 3: Area Source Set-Up

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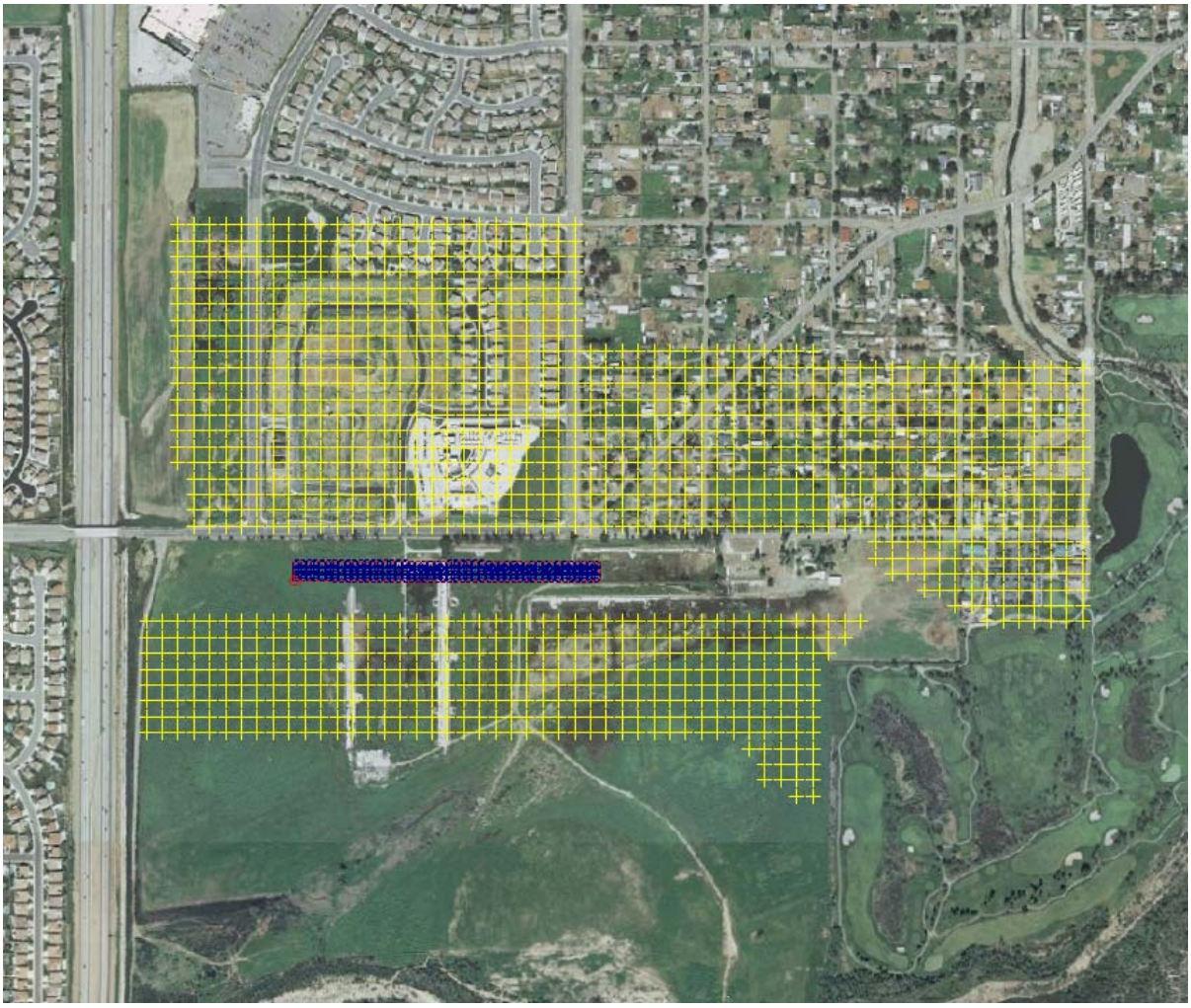
Figure 4: Receptor Grid



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Background Monitoring Data

Recent monitoring data are available from the Mira Loma monitor in Riverside County, CA (summarized in Table 2). This monitor is situated approximately 3.5 miles to the northeast of the Louis Vandermolen Fundamental Elementary School in a suburban setting similar to the proposed Project and is the most representative background monitor available for the analysis. While the nitrogen dioxide (NO_2) data capture is below what would be required for Federal permitting requirements, the capture percent was deemed adequate for the purposed for this evaluation. Maximum concentrations over the most recent 3 year period (2012-2014) were taken and summed with the maximum modeled concentrations for comparisons against the construction thresholds.

Table 2: Mira Loma Monitor – Background Concentrations

Monitor	Pollutant	Averaging Period	Year	Annual Data Capture		Maximum Monitor Concentration	Design Concentration (3-year Maximum)	Units
				Hours	%			
Mira Loma (ID: 06-065-8005)	CO	1 Hour	2012	7811	89	2.1	2.8	ppm
			2013	7859	90	2.2		
			2014	7974	91	2.8		
		8 Hour	2012	8227	94	1.9	2.4	ppm
			2013	8296	95	1.8		
			2014	8450	96	2.4		
	NO2	1 Hour	2012	6614	75	60.7	60.7	ppb
			2013	7660	87	53.7		
			2014	7933	91	57.7		

Results / Conclusion

Most of the construction of the Proposed Project is within residential/commercial areas in Riverside. As previously stated, the focus of the updated model evaluation was on modeled maximum concentrations on and nearby the Louis Vandermolen Fundamental Elementary School.

Table 3 below presents the maximum localized emissions during a single day of construction that may potentially impact the school and nearby residences. As Table 3 indicates, modeled concentrations are below the LST Thresholds for all pollutants but PM_{10}.

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Table 3: Modeling Results

Single Pole Construction	CO		NO_2*	PM_{10}	$PM_{2.5}$
	Averaging Time				
	1-Hour	8-Hour	1-Hour	24-Hour	
Maximum Modeled Concentration (µg/m³)	145.01	34.97	32.06	40.13	8.46
Maximum Modeled Concentration (ppmv)	0.13	0.03	0.02	---	---
Background Concentration (ppmv)	2.80	2.40	0.06	N/A	N/A
Total Concentration (ppm or µg/m³)	2.93	2.43	0.08	40.13	8.46
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m³	µg/m³
Significant Impact?	No	No	No	Yes	No

* EPA default NO_X to NO_2 conversion rates of 0.8 (1-hour NO_2) applied to modeled NO_x concentrations.

References

California Public Utility Commission (CPUC), 2015. Deficiency letter with subject: "RE: Application Deficiency Report #2 - Certificate of Public Convenience and Necessity for the Riverside Transmission Reliability Project – Application No. A.15-04-013". October 8.

South Coast Air Quality Management District (SCAQMD). 2008. *Final Localized Significance Threshold Methodology*. Available at http://www.aqmd.gov/docs/default-source/cega/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf. Accessed November 24, 2015.

SCAQMD. 2015. Table 1. Meteorological Sites. Available at http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-1. Accessed November 24, 2015.

Supporting e-Documentation (as PDFs):

Attachment 1: Emissions Calculations

Attachment 2: Modeling Output Files