ATTACHMENT C

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September 15, 2014

Via Email

Rachael Koss
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Re: Review of Draft Environmental Impact Report for Valero Benicia Crude by Rail Project

Dear Ms. Koss,

Per your request, I have reviewed the Draft Environmental Impact Report ("Draft EIR") for the Valero Benicia Crude by Rail Project ("Rail Project" or "Project") published by the City of Benicia ("City") for review under the California Environmental Quality Act ("CEQA")[1] as well as studies referenced in the Draft EIR and permit files for the Valero Benicia Refinery ("Refinery") obtained from the Bay Area Air Quality Management District ("BAAQMD"). My comments focus on air quality, odor, health risks, and potential earthquake and other risks to rail transport of crude oils.
My comments rely and expand upon Dr. Phyllis Fox's July 1, 2013 comments on the Initial Study/Mitigated Negative Declaration for the Project ("Fox IS/MND Comments")[2] and her September 15, 2014 comments on the Draft EIR ("Fox Draft EIR Comments")[3] as well as the July 1, 2013 comments submitted by the Goodman Group on the IS/MND ("Goodman IS/MND Comments").[4]

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[1] City of Benicia, Valero Benicia Crude by Rail Project, Draft Environmental Impact Report, SCH # 2013052074, Use Permit Application 12PLN-00063, June 2014; http://www.ci.benicia.ca.us/index.asp?SEC={FDE9A332-542E-44C1-BBD0-A94C288675FD}.

[2] Phyllis Fox, Comments on Initial Study/Mitigated Negative Declaration for the Valero Crude by Rail Project, Benicia, California, Use Permit Application 12PLN-00063, July 1, 2013; http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report_by_Dr._Phyllis_Fox.pdf.

[3] Phyllis Fox, Comments on the Draft Environmental Impact Report (DEIR) for the Valero Benicia Crude by Rail Project, Benicia, California, September 15, 2014.

[4] Ian Goodman and Brigid Rowan, The Goodman Group, Ltd., Comments on Initial Study/Mitigated Negative Declaration (IS/MND), Valero Crude by Rail Project, Benicia, California, Use Permit

My qualifications as an environmental expert include a doctorate in Environmental Science and Engineering from the University of California Los Angeles. I am a court-recognized expert [5] with more with more than ten years of experience. I have provided expert comments on air quality in the permitting/licensing proceedings of a number of refineries and associated facilities under the federal and state Clean Air Acts and in the environmental review process under CEQA. My résumé is attached to this letter.

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Application 12PLN-00063; http://www.ci.benicia.ca.us/vertical/sites/%7B3436CBED-6A58-4FEF-BFDF-5F9331215932%7D/uploads/Report_by_the_Goodman_Group.pdf.

[5] *California Unions for Reliable Energy et al. v. Mojave Desert Air Quality Management District et al.*, 178 Cal.App.4th 1225 (Cal. App. 2009); http://resources.ca.gov/ceqa/cases/2009/California_Unions_for_Reliable_Energy_v_Mojave_Desert_Air_Quality_Management_District.pdf. (Exhibit 1)

I. Background

Valero ("Applicant") proposes to install facilities to allow the Valero Benicia Refinery ("Refinery") to receive up to 70,000 barrels per day ("bbl/day") of North American crude oil by rail. The facilities that would be installed include about 8,880 feet of new track; a new tank car unloading rack capable of unloading two parallel rows of tanks cars simultaneously; and 4,000 feet of 16-inch diameter crude oil pipeline and associated fugitive components (valves, flanges, pumps) connecting the offloading rack and an existing crude supply pipeline.[6]

The Project would affect air quality in three air basins: the San Francisco Bay Area Air Basin ("SFBAAB"), the Sacramento Valley Air Basin ("SVAB"), and the Mountain Counties Air Basin ("MCAB"). The Draft EIR analyzes the Project's effects separately for each of the four air districts having jurisdiction over portions of these air basins: the BAAQMD, where the new crude-by-rail terminal and associated facilities, would be located, and the three air districts whose air quality would be affected by emissions from the trains' diesel locomotives delivering crude oil, *i.e.,* the Sacramento Metropolitan Air Quality Management District ("SMAQMD"), the Yolo Solano Air Quality Management District ("YSAQMD") and the Placer County Air Pollution Control District ("PCAPCD").

II. The Project Description Is Inadequate and the Draft EIR's Analyses Are Not Adequately Supported

The Draft EIR fails to provide all information necessary to adequately describe the Project and support its conclusions regarding the Project's impacts. Missing from the Draft EIR are, for example:

- A construction schedule specifying the duration and potential overlap of each construction phase (*e.g.*, clearing, grading, terminal construction, paving), the number of equipment on site for each construction phase, the number of construction workers for each phase, etc.;
- A disclosure of baseline crude oil receipts by pipeline, barges, and tanker trucks;
- A disclosure of the currently imported crude oil slate at the Refinery and an adequate description of the Project's potential for changing this crude oil slate (as discussed in detail in the Fox Draft EIR Comments); and
- Modeling files supporting the results of the health risk assessment presented in the Draft EIR, Table 4.19 (*see* Comment V.A).

[6] Draft EIR, pp. ES-1 to ES-4.

Without this information, the Draft EIR fails to fulfill its mandate as an informational document under CEQA.

III. The Draft EIR Underestimates Project Construction Emissions and Fails to Identify and Mitigate Significant Impacts on Air Quality due to NOx Emissions

Project construction would result in engine exhaust emissions generated by on-site construction equipment, haul trucks, and construction worker commuter vehicles. The Draft EIR finds that impacts associated with Project construction-related engine exhaust emissions would be less than significant.[7] To arrive at this conclusion, the Draft EIR compares estimates of average daily exhaust emissions during construction in pounds per day ("lbs/day") to the BAAQMD's quantitative daily significance thresholds recommended in the air district's 2009 *Revised Draft Options and Justification Report*, and, finding that emission estimates for all criteria pollutants would be less than the respective significance thresholds, determines that Project construction emissions are less than significant.[8] When analyzing the underlying analyses, it quickly becomes apparent that the Draft EIR relies on an inappropriate methodology to arrive at the daily emission estimates it compares to the BAAQMD's significance thresholds.

A. The Draft EIR's Methodology to Estimate Emissions Is Incorrect

For quantification of construction emissions, the BAAQMD's current CEQA Guidelines[9], which were updated in 2012, specifically recommend:

> BAAQMD recommends using URBEMIS to quantify construction emissions for proposed land use development projects and the Roadway Construction Emissions Model (RoadMod) for proposed linear projects such as, new roadway, roadway widening, or pipeline installation.[10]

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[7] Draft EIR, p. 4.1-15.

[8] *Ibid*.

[9] BAAQMD, California Environmental Quality Act Air Quality Guidelines, updated May 2012 (hereafter "BAAQMD 2012 CEQA Guidelines"); http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. (Exhibit 2)

[10] BAAQMD 2012 CEQA Guidelines, p. 8-1.

Since publication of the BAAQMD's 2012 CEQA Guidelines, the recommended model, URBEMIS, has been superseded by the exclusive use of the California Emissions Estimator Model ("CalEEMod") and the BAAQMD now recommends:

> On July 31, 2013, the California Air Pollution Control Officers Association (CAPCOA) released CalEEMod 2013.2. This land use model can be downloaded from www.caleemod.com. From this point forward, the BAAQMD will no longer support the use of Urbemis. Please perform all future analyses using CalEEMod.[11]

The CalEEMod website provides the following description of the model:

> CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operations (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use…
>
> The model was developed in collaboration with the air districts of California. Default data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions.

Thus, the model is well suited to quantify emissions occurring during the construction phase of the Project and has been specifically recommended by BAAQMD as well as used by other agencies to estimate construction emissions for other refinery crude-by-rail projects. [12] Yet, instead of using this BAAQMD-recommended computer model for estimating construction emissions, the Draft EIR prepared separate emission

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[11] BAAQMD, CalEEMod Release, Update August 5, 2013, website last updated January 16, 2014; http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES.aspx. (Exhibit 3)

[12] *See*, for example, the Recirculated Draft EIR for the WesPac Pittsburg Energy Infrastructure Project, July 2013 (hereafter "WesPac Recirculated Draft EIR", Appendix C "Emission Estimation and Modeling Protocol"; http://www.ci.pittsburg.ca.us/Modules/ShowDocument.aspx?documentid=5646. (Exhibit 4) ("As recommended by BAAQMD (A. Kirk, personal communication, February 25, 2013), the California Emissions Estimator Model (CalEEMod) (version 2011.1) was used to quantify the construction emissions associated with the proposed project and Alternative 1."); and the Draft EIR for the Phillips 66 Rail Spur Extension Project in Santa Maria, November 2013, "Air Emission Calculations; http://www.slocounty.ca.gov/Assets/PL/Santa+Maria+Refinery+Rail+Project/Draft+EIR-Phillips+66+Rail+Spur+Extension+Project+(November+2013)/Appendices/Appendix+B+-+Air+Emission+Calculations.pdf. (Exhibit 5)

calculations for each of the various emission sources vehicle and construction equipment exhaust of reactive organic gases ("ROG"), carbon monoxide ("CO"), nitrogen oxides ("NOx"), sulfur dioxide ("SOx"), particulate matter equal to or smaller than 10 micrometers ("PM10") and equal to or smaller than 2.5 micrometers ("PM2.5"); and fugitive ROG emissions from architectural coatings and asphalt paving.[13] The Draft EIR provides no explanation for why it did not use CalEEMod (yet, its calculations relied on several factors from the CalEEMod User's Manual[14] as well as default factors from URBEMIS[15]).

The Draft EIR also prepared spreadsheets for fugitive dust PM10 and PM2.5 emissions from soil handling, bulldozing, grading, and entrained road dust from vehicle movement on paved and unpaved roads, for which BAAQMD did not establish significance thresholds. Instead the BAAQMD recommends implementation of a number of basic mitigation measures to control fugitive dust.

Specifically, in order to compute construction emissions, the Draft EIR calculated the total emissions for each criteria pollutant that would occur over the entire 25-week construction period and then divided these emissions by the number of days construction would occur (175 days[16]) to arrive at "average daily" emissions in pounds per day ("lbs/day"). This methodology is inconsistent with the methodology incorporated into CalEEMod and, therefore, contrary to the BAAQMD's CEQA Guidelines which clearly intend that environmental review documents compare daily construction emissions as determined with the current agency-recommended models to the respective daily thresholds of significance.

By default, CalEEMod assumes seven construction phases including site preparation, demolition, grading, building construction, architectural coating, and paving; the user can add or delete phases and specify schedules.[17] Emission sources during these phases include off-road construction equipment exhaust; fugitive dust from material movement, demolition, and off-site paved roads; on-road exhaust emissions from worker trips, vendor trips, and haul trucks; and emissions from

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[13] *See* Draft EIR, Appendix E.1 "Construction Emissions."

[14] *See* Draft EIR, Appx. E.1, "Coating Coverage" and "Fugitive VOC Emission Factor" for emissions from architectural coatings and "Fugitive VOC Emission Factor" for emissions from paving.

[15] Draft EIR, Appx. E.1, "URBEMIS Material Delivery Truck Default Trip Length" and "Truck Capacity."

[16] (25 weeks)(7 days/week) = 175 days.

[17] CAPCOA, California Emissions Estimator Model, User's Guide, Version 2013.2, July 2013, p. 25; http://www.aqmd.gov/docs/default-source/caleemod/usersguide.pdf?sfvrsn=2. (Exhibit 6)

architectural coatings and asphalt paving.[18] For each of these phases, CalEEMod provides maximum daily emissions as follows:

> Since construction phases may or may not overlap in time, the maximum daily construction emissions will not necessarily be the sum of all possible daily emissions. CalEEMod therefore calculates the *maximum daily emissions for each construction phase*. The program will then add together the maximum daily emissions for each construction phase that overlaps in time. Finally *the program will report the highest of these combined overlapping phases as a daily maximum*. For fugitive dust calculations during grading, the maximum amount of acres graded in a day is determined by the number of grading equipment which is assumed to operate for 8 hours.[19]

Thus, the Draft EIR's approach to determine "average daily" construction emissions is inconsistent with the BAAQMD's guidance to determine maximum daily construction emissions and, consequently, substantially underestimates emissions on a short-term basis because it does not take into account that daily emissions during the various, potentially overlapping construction phases may vary considerably.

The Draft EIR apparently confuses the BAAQMD's significance thresholds, which are stated as "average daily" thresholds, with the BAAQMD-recommended approach to estimate daily construction emissions.[20] The BAAQMD established quantitative daily significance thresholds for construction to maintain or achieve attainment with the federal ambient air quality standards in the San Francisco Bay Area Air Basin ("SFBAAB"). (Ambient air quality standards have been established to protect health due to both long-term and short-term exposure to pollutants concentrations in ambient air; depending on the pollutant, short-term ambient air quality standards are established on a 1-hour, 3-hour, 8-hour, or 24-hour basis.) The BAAQMD's significance thresholds were based on the offset requirement limits under the federal Clean Air Act New Source Review ("NSR") requirements for NOx and ROG as ozone precursors for which the SFBAAB is currently in nonattainment (10 tons/year) and the federal NSR Significant Emission Rate limits for PM10 (15 tons/year) and PM2.5 (10 tons/year) for

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[18] *Ibid*, pp. 25-27.

[19] CAPCOA, California Emissions Estimator Model, User's Guide, Appendix A, Calculation Details for CalEEMod, revised July 2013, CalEEMod v.2013.2, *emphasis* added; http://www.aqmd.gov/caleemod/doc/AppendixA.pdf. (Exhibit 7)

[20] BAAQMD, California Environmental Quality Act Thresholds of Significance, Revised Draft Options and Justification Report, October 2009, pp. 25-27; http://baaqmd.gov/~/media/Files/%20Planning%20and%20Research/CEQA/Revised%20Draft%20CEQA%20Thresholds%20%20Justification%20Report%20Oct%202009.ashx. (Exhibit 8)

which the SFBAAB is also in nonattainment.[21] These NSR requirements were established on an annual basis because they apply to stationary sources which mostly continually emit pollutants. To establish short-term significance thresholds, which are appropriate for "the short-term intermittent nature of construction activities", the BAAQMD then converted these limits to "annual average daily" significance thresholds, which are not to be exceeded.[22]

The consequences of this "averaging" approach become acutely apparent when considering ROG emissions from architectural coating or asphalt paving, which occur only for a few days or weeks, possibly even at the same time. ROG and NOx emissions are precursors to ground-level ozone formation through a complex series of chemical reactions between these pollutants in the presence of sunlight. The most substantial NOx and ROG emissions would likely occur when heavy-duty equipment is operating during the grading phase and cut-and-fill activities. The national ambient air quality standard for ozone is set as an 8-hour average (0.075 parts per million ("ppm")); the state ozone ambient air quality standards are set as 1-hour (0.09 ppm) and 8-hour (0.07 ppm) averages.[23] Thus, contributions to ozone formation from ROG precursors that occur on a short-term basis, such as from architectural coating or asphalt paving, are important to consider. Averaging ROG emissions from architectural coatings over the entire construction period of 175 days (25 weeks) severely underestimates the Project's contribution to short-term ozone formation.

In sum, the Draft EIR's "averaging" approach is improper to assess potential impacts from construction activities on compliance with short-term ambient air quality standards. Consequently, the Draft EIR cannot demonstrate that Project construction emissions would not "[r]esult in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including emissions which exceed quantitative threshold for ozone precursors)" or "[v]iolate any air quality standard or contribute substantially to an existing or projected air quality violation." The Draft EIR should be revised to evaluate daily construction emissions using CaEEMod in compliance with BAAQMD guidance.

In addition to the above methodological error in determining daily construction emissions, the Draft EIR also substantially underestimates emissions from several sources.

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[21] Draft EIR, Table 4.1-2.

[22] BAAQMD, Revised Draft Options and Justification Report, pp. 25-27.

[23] CARB, Ambient Air Quality Standards, June 4, 2013; http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. (Exhibit 9)

1. Construction Worker Commuter Vehicles

First, the Draft EIR states that the construction workforce would include workers conducting activities inside the Refinery in and around the Project site and estimates the total workforce to include 121 construction workers per day over the construction period.[24] Assuming that construction workers would not carpool (also assumed by the Draft EIR), this results in 242 one-way commuter trips per day and 42,350 one-way commuter trips for the 175-day construction period, not accounting for off-site lunch trips. In contrast, the Draft EIR's emission estimates assume 22,760 one-way commuter trips[25], a little more than half.

Second, the Draft EIR assumes that all construction workers would drive gasoline-powered passenger vehicles (EMFAC2011 vehicle class LDA-GAS). However, construction workers often drive large pickup trucks including light-duty to light-heavy-duty trucks. According to the EMFAC2011 model developed by the California Air Resources Board ("CARB") and relied upon by the Draft EIR to determine emission factors, these vehicles have considerably higher fleet-average emission factors, as summarized in Table 1 below for four pollutants in pounds per 1000 miles traveled ("lbs/1000 miles). The top row for gasoline-powered passenger cars (LDA-GAS) are the same emission factors relied upon by the Draft EIR.

Table 1: Emission factors for passenger cars and light-duty to light-heavy duty trucks (lbs/1000 miles)[1]

EMFAC2011 Vehicle Class[2]	Description	Examples	ROG	NOx	PM10	PM2.5
LDA - GAS	Passenger Cars	Prius (GAS) VW Passat (DSL)	0.54	0.45	0.11	0.05
LDA - DSL			0.13	1.59	0.19	0.13
LDT1 - GAS	Light-Duty Trucks (0-3,750 lbs)	Ford Ranger Toyota Tacoma Dodge Dakota GMC Canyon	1.26	1.05	0.11	0.05
LDT1 - DSL			0.22	1.98	0.29	0.21
LDT2 - GAS	Light-Duty Trucks (3,751-5,750 lbs)		0.62	0.79	0.10	0.04
LDT2 - DSL			0.17	1.93	0.24	0.17
LHD1 - GAS	Light-Heavy-Duty Trucks (8,501-10,000 lbs)	Dodge Ram 2500 Ford F-250	1.87	2.86	0.11	0.05
LHD1 - DSL			0.57	10.71	0.33	0.20
LHD2 - GAS	Light-Heavy-Duty Trucks (10,001-14,000 lbs)	Dodge Ram 3500 Ford F-350	2.06	2.87	0.11	0.05
LHD2 - DSL			0.51	9.71	0.34	0.20

1 Emission factors based on EMFAC2011 model run for BAAQMD, Year: 2013, Season: Annual, Vehicle Classification: EMFAC2007 Categories; calculated as: (total pollutant emissions in tons/day) / (vehicle miles traveled/day) × (2000 lbs/ton) × (1000)

2 GAS = gasoline; DSL = diesel

[24] Draft EIR, p. 3-25.

[25] *See* Draft EIR, Appx. E.1, "Equipment and Vehicle Activity Rate Data": (11,380 Total Project Workers) × (2 one-way trips/worker) = 22,760 worker trips.

As demonstrated by Table 1, emission factors for passenger cars and light-duty and light-heavy-duty vehicles are dramatically different, with diesel-powered vehicles having substantially higher NOx, PM10 and PM2.5 emissions but lower ROG emissions than gasoline-powered vehicles and trucks having considerably higher emissions than passenger cars. Clearly, the unsubstantiated assumption that all construction workers would commute in gasoline-powered passenger vehicles leads to a substantial underestimate of commuter vehicle emissions. Table 2 below shows a comparison of the Draft EIR's emission estimates for the Project's construction worker commuter vehicles (Row 1a) and my revised estimates based on 121 construction workers per day and assuming various mixes of vehicles classes and otherwise relying on the Draft EIR's assumptions (Rows 1b through 5).

Table 2: Emissions estimates for various construction worker commuter vehicle fleet mixes (lbs/day)

Row	Construction worker commuter vehicle fleet mix	ROG	NOx	PM10	PM2.5
1a*	Draft EIR: 100% gasoline passenger cars (LDA-GAS)[1]	0.88	0.72	0.50	0.15
1b**	121 construction workers per day: 100% gasoline passenger cars (LDA-GAS)[1]	1.63	1.35	0.32	0.14
2**	Average of 50% gasoline and 50% diesel passenger cars[2]	1.05	3.19	0.47	0.27
3**	Average of 50% gasoline passenger cars and 50% gasoline and diesel trucks all categories[3]	4.22	10.27	0.87	0.47
4**	Average of 50% gasoline and diesel passenger cars and 50% gasoline and diesel trucks all categories[4]	4.76	18.09	1.51	0.88
5**	Average of all gasoline and diesel vehicles[5]	23.89	101.87	5.80	3.45

* Calculated as: (emission factor for LDA-GAS in lbs/mile) × (11,380 worker trips/project) × (one-way trip length: 12.4 miles) × (2 trips/worker/day) / (175 days/project)

** Calculated as: (applicable emission factor from Table 1 in lbs/1000 miles) × (one-way trip length: 12.4 miles) × (2 trips/worker/day) × (121 workers/day)

Row 2: Emission factor: Average [(LDA-GAS) + (LDA-DSL)]

Row 3: Emission factor: Average [(LDA-GAS) + Average (LDT1-GAS)+(LDT1-DSL)+ (LDT2-GAS)+(LDT2-DSL)+(LHD1-GAS)+ (LHD1-DSL)+(LHD2-GAS)+(LHD2-DSL)]

Row 4: Emission factor: Average {[Average (LDA-GAS)+(LDA-DSL)] + [Average (LDT1-GAS)+(LDT1-DSL)+ (LDT2-GAS)+(LDT2-DSL)+(LHD1-GAS)+ (LHD1-DSL)+(LHD2-GAS)+(LHD2-DSL)]}

Row 5: Emission factor: Average [(LDA-GAS)+(LDA-DSL)+(LDT1-GAS)+(LDT1-DSL)+(LDT2-GAS)+(LDT2-DSL) +(LHD1-GAS)+ (LHD1-DSL)+(LHD2-GAS)+(LHD2-DSL)]

As shown in Table 2, when adjusting the number of construction workers commuting to the site to 121 workers per day and otherwise relying on the Draft EIR's assumptions including emission factors, emissions from 100 percent gasoline-powered passenger cars are 86 percent higher for ROG[26] and NOx[27] (compare Row 1a and 1b). Assuming that 50 percent of the construction workers would drive diesel-powered passenger vehicles (no trucks), would increase NOx emissions from 0.72 lbs/day

[26] (1.63)/(0.88)=1.86.

[27] (1.35)/(0.72)=1.86.

(Row 1a) to 3.19 lbs/day (Row 2); the difference of 2.7 lbs/day is sufficient to increase the Draft EIR's emission estimates of 51.9 lbs/day for construction over the BAAQMD's 54 lbs/day significance threshold. As the above emission estimates for different percentages of passenger cars and trucks in Table 2 show, emissions increase in direction proportion to the number of trucks included in the construction worker commuter vehicle fleet mix. Clearly, construction worker vehicles have the potential to substantially contribute to daily emissions during Project construction. Thus, the Draft EIR fails to identify significant impacts on air quality due to NOx, and most likely other pollutant, emissions.

Third, the Draft EIR assumes a one-way trip distance of 12.4 miles for construction worker commuter vehicles. These numbers are based on URBEMIS default values for Solano County assuming urban home-work ("H-W") trip lengths for construction workers. These county-average default trip lengths most likely substantially underestimate actual trip lengths for Project construction, given that a large number of highly skilled construction workers would be required to operate the various specialized equipment such as the cranes, track low railer, track production tamper, or track regulator. It appears unlikely that a sufficiently skilled construction labor force would be available within an average 12.4-mile radius of the Project site. More likely, the construction work force does not live close by but instead may commute long distances to the Project site. Based on a report by the Electric Power Research Institute ("EPRI"), construction workers commute as much as 60 miles daily to construction sites from their homes rather than relocate.[28]

In sum, emissions from construction worker commuter vehicles are considerably higher than disclosed by the Draft EIR and the Draft EIR fails to identify significant impacts on air quality due to NOx, and possibly other pollutant, emissions.

2. *Off-site Vehicles*

Fourth, the Draft EIR assumes a one-way trip distance of 7.3 miles for material delivery trucks. These numbers are based on URBEMIS default values for Solano County assuming urban commercial-nonwork ("C-NW") trip lengths for delivery trucks. These county-average default trip lengths for *commercial* trips substantially underestimate actual trip lengths for delivery of materials required for Project construction, especially considering that large amounts of specialized materials are required – *e.g.*, rail terminal components, rail tracks, pumps, etc. – that may have to be trucked in over long distances, potentially directly from California ports.

[28] EPRI, Assessing and Managing Socioeconomic Impacts of Power Plants, August 1, 1984; http://www.arlis.org/docs/vol1/Susitna-temp/APA/23/APA2356.pdf. (Exhibit 10)

Fifth, the Draft EIR's calculations does not account for emissions associated with delivery of the numerous pieces construction equipment to the site, most of which will be delivered on heavy-duty flatbed diesel trucks.

3. Construction Equipment Emissions

The Draft EIR assumes state-wide fleet average emission factors obtained from the CARB's OFFROAD2007 model for estimating emissions from construction equipment[29] without requiring that the construction equipment used at the Project site would comply with these assumed emission factors. In fact, there is a good chance that it would not.

Studies of the average useful life of construction fleet equipment demonstrate that is very likely that some engines in the construction equipment fleet may be very old. Table 3 shows a summary of the useful life of construction equipment in years and their corresponding percentage emissions of the entire construction fleet as estimated by the Union of Concerned Scientists. [30]

Table 3: Useful life of construction equipment in years

	Percent of Total PM from Construction Equipment	Percent of Total NOx from Construction Equipment	Useful Life (in years)
Excavators	17%	18%	17
Tractors/Loaders/Backhoes	16%	12%	18
Crawler Tractors (Tracked Bulldozers)	13%	13%	29
Rubber-Tired Loaders	12%	12%	21
Skid-Steer Loaders	7%	4%	13
Off-Highway Trucks	5%	9%	17
Rough-Terrain Forklifts	5%	3%	16
Graders	5%	5%	23
Off-Highway Tractors	4%	5%	31
Rollers	3%	3%	20
Trenchers	3%	2%	28
Scrapers	3%	4%	26
Cranes	3%	4%	19
Rubber-Tired Dozers	2%	2%	32
Pavers	2%	1%	26
Bore/Drill Rigs	1%	1%	10
Other Construction Equipment	0.4%	1%	16
Paving Equipment	0.3%	0.2%	24
Surfacing Equipment	0.04%	0.1%	22

[29] Draft EIR, Appx. E.2, Footnote 1 to "Equipment and Vehicle Emission Factors."

[30] Union of Concerned Scientists, Digging up Trouble, The Health Risk of Construction Pollution in California, November 2006, p. 4; http://www.ucsusa.org/assets/documents/clean_vehicles/digging-up-trouble.pdf. (Exhibit 11)

As the above table shows, the useful life of construction equipment, which is defined as the age at which half of the equipment of a given model year has been retired, varies from 10 to 32 years. In other words, the other half of equipment of a given model year continues to be operated considerably longer than 10 to 32 years. Especially heavy-duty equipment can be very old. For example, the average useful life for crawler tractors is 29 years, for cranes 19 years, for scrapers 26 years, and for graders 23 years. Thus, there is a good chance that some of the equipment, especially the heavy-duty equipment used at the site may be very old and have very high emissions and is currently not covered by federal and state regulations because it is too old.

The programs and regulations developed by CARB and EPA to reduce emissions from construction equipment, targeted specifically to address carcinogenic diesel particulate matter emissions, are not yet implemented or fully implemented and many provisions do not apply to existing equipment. For example, CARB's restrictions on *adding* older vehicles to an existing fleet only just became effective in January 1, 2014.[31] This restriction does not affect *existing* vehicles in the fleet, whose emissions will be addressed under upcoming fleet-wide performance requirements which will begin on July 1, 2014 for large fleets, January 1, 2017 for medium fleets, and January 1, 2019, for small fleets and will reduce diesel particulate matter emissions from large fleets by 22.8 percent by 2023, medium fleets by 18 percent by 2023, and 10 percent from small fleets by 2028.[32]

Thus, some of the construction equipment on the Project site may be very old, in which case the Draft EIR substantially underestimated emissions from these sources. I recommend that the Draft EIR be revised to assume more conservative emission factors or that the City require a mitigation measure that requires that the construction fleet comply with the assumed emission factors. Calculators for this purpose are available from CARB for medium and large fleets.[33]

Because the Draft EIR does not provide a construction schedule, I was unable to run CalEEMod. However, based on information from Appendix E.2, specifically, the total equipment-hours and average pounds per project for each type of construction equipment I was able to calculate pounds per hour emitted for each type of construction equipment. Assuming two shifts per day during which each type of equipment is operate for five hours, or a total of 10 hours per day, results in the approximate daily emissions shown in Table 4.

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[31] CARB, In-Use Off-Road Diesel Vehicle Regulation Overview, Revised February 2014; http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf. (Exhibit 12)

[32] *Ibid*.

[33] CARB, In-Use Off-Road Diesel Vehicle Regulation; http://www.arb.ca.gov/msprog/ordiesel/documents/documents.htm. (Exhibit 13)

Table 4: Average daily emissions (in lbs/day) assuming 10 hours of operation per day

Offroad Equipment	ROG	NOx	PM10	PM2.5
120 Ton Crawler Crane	1.76	16.45	0.59	0.54
25 Ton Hydraulic Crane	0.69	5.20	0.30	0.27
50 Ton Hydraulic Crane	0.69	5.20	0.30	0.27
Air Compressor (185)	0.60	1.48	0.15	0.13
Blade - 140H/M with GPS	0.98	7.49	0.42	0.39
Bobcat - S770	0.35	1.53	0.11	0.10
Bulldozer (D-5)	0.87	5.15	0.45	0.42
Compactor – 32" Walk Behind	0.08	0.49	0.02	0.02
Concrete Pumper (trailer mt.)	0.69	2.15	0.18	0.17
Dozer - D5HXL W/RIPPERS	0.87	5.15	0.45	0.42
Dozer - D6N LGP	0.87	5.15	0.45	0.42
Excavator - 320CL	0.83	7.61	0.25	0.23
Excavator - 345BL/C	1.16	9.88	0.35	0.32
Forklift - Telehandler TL1255	0.38	2.83	0.16	0.15
Front End loader (644)	0.84	8.12	0.28	0.26
Light Plant - 4,000 Watt Diesel	0.67	2.32	0.18	0.17
Loader - 950G/H	0.84	8.12	0.28	0.26
Loader - 966G/H	0.84	8.12	0.28	0.26
Loader - Backhoe - 420D	0.46	3.06	0.26	0.24
Loader - John Deere 210 - 4/1 Bucket	0.65	4.03	0.35	0.32
Man Lift (40')	0.39	1.23	0.10	0.09
Off Road Truck - 730 CAT	1.45	11.96	0.42	0.39
Paver - CAT AP800	1.19	9.22	0.52	0.47
Paver - Lee boy Paver	0.93	5.60	0.49	0.45
Roller - (AC) 42"/47"	0.66	4.19	0.36	0.33
Roller - (Dirt) 84" SD	0.66	4.19	0.36	0.33
Scraper - 613C	2.13	18.94	0.74	0.68
Track - Low Railer	0.67	4.70	0.38	0.35
Track - Production Tamper	0.97	10.17	0.33	0.30
Track - Regulator	0.63	5.36	0.28	0.26
Track Hoes (225)	1.70	14.99	0.58	0.53
Welding Machine (300)	0.64	1.69	0.16	0.15
Wheel Compactor (small)	0.67	4.70	0.38	0.35

As Table 4 shows, several pieces of construction equipment have very high daily emissions. Operation of those pieces of equipment that can reasonably be expected to be on site simultaneously during the grading and cut-and-fill operations, including bulldozer, dozers, excavators, loaders, and off-road trucks (shaded grey in the table above) would result in daily NOx emissions of 68.2 lbs/day, far in excess of the BAAQMD's significance threshold of 54 lbs/day, without even considering any off-site sources such as construction worker commuter vehicles or delivery trucks.

4. Summary

The above discussion demonstrates that the Draft EIR substantially underestimates construction emissions and, consequently, fails to identify and mitigate significant impacts on air quality due to emissions of NOx, which is an ozone precursor, and likely other pollutants. The emission estimates must be corrected in a Revised Draft or Final EIR for the Project and adequate mitigation must be required for all identified significant impacts.

B. Feasible Mitigation Measures

Mitigation measures recommended by the BAAQMD for projects with significant construction emissions include these additional mitigation measures:

1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
2. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
3. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
5. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
6. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
7. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
8. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
9. Minimizing the idling time of diesel powered construction equipment to two minutes.
10. The project shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NOX reduction and 45 percent PM reduction compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products,

alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

11. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
12. Requiring that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NOx and PM.
13. Requiring all contractors use equipment that meets CARB's most recent certification standard for off-road heavy duty diesel engines.

The BAAQMD recently recommended the following additional mitigation measures to reduce NOx emissions during construction of the proposed WesPac Pittsburg Energy Infrastructure project:

- Prohibit diesel generators where access to the electrical grid is available.
- Require electrification of motors, pumps, and other power tools whenever feasible.
- Require the use of biodiesel or other alternative fuels in generators, construction equipment, and/or off-road vehicles.[34]

All of the above measures are feasible and must be required for the Rail Project to mitigate its significant impacts on air quality during construction due to NOx any other potentially significant emissions. I recommend that the City prepare a revised Draft EIR that a) relies upon a detailed construction schedule and b) follows the BAAQMD's recommended 6-step methodology for estimating construction emissions described in the agency's 2012 CEQA Guidelines[35] (including use of the district-recommended computer model CalEEMod to estimate emissions) and c) requires adequate mitigation.

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[34] Jean Roggenkamp, BAAQMD, Letter to Kristin Vahl Pollot, City of Pittsburg, Re: WesPac Pittsburg Energy Infrastructure Project Recirculated DEIR, September 13, 2013; http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA%20Letters/WesPac%20Pittsburg%20Energy%20Infrastructure%20Project%20DEIR.ashx. (Exhibit 14)

[35] BAAQMD CEQA Guidelines, *op. cit.*, pp. 8-1 and 8-2.

C. The Draft EIR's Conclusions Regarding Cumulative Impacts from Construction Emissions Are Incorrect

The Draft EIR provides cumulative impact analyses in Section 5.4.3.1. The Draft EIR dismisses the cumulative impacts of construction activities because "Project construction exhaust emissions would not exceed the BAAQMD regional mass emissions thresholds and Mitigation Measure 4.1-1 would be implemented to ensure that impacts associated with fugitive dust emissions would be reduced to a less-than-significant level." "Consequently," the Draft EIR concludes, "construction of the Project facilities would not be considered to make a cumulatively considerable contribution to regional air quality impacts. The cumulative impact would be reduced to a level that would be less than significant."[36] This conclusion is not supported because, as explained in Comment III above, the Draft EIR substantially underestimated construction emissions. Approximate daily emission estimates (*see* Table 3) show that the Project would result in exceedance of the BAAQMD's thresholds. Thus, the Draft EIR's cumulative impact analysis must be revised accordingly.

IV. The Draft EIR's Approach to Determine Significance of Operational Emissions Is Flawed, Its Conclusions Regarding Impacts on Air Quality Are Unsubstantiated, and It Fails to Require All Feasible Mitigation for Impacts It Finds Unavoidable

For operational emissions, the Draft EIR assesses impacts on air quality separately for each of the four air districts with jurisdiction over the three affected air basins, *i.e.*, the SFBAAB, the SVAB, and the MCAB:

- For the YSAQMD, SMAQMD, and PCAPCD, the Draft EIR quantifies indirect emissions from locomotives hauling crude oil within the jurisdictional boundaries of each of these air districts on a daily basis and compares them to the air districts' respective significance thresholds, finding significant unavoidable impacts on air quality due to NOx emissions for the YSAQMD and the SMAQMD.

- For the BAAQMD, in addition to the line haul locomotive emissions within the air district's jurisdictional boundary, the Draft EIR quantifies indirect emissions from switching locomotives at the refinery site; direct emissions of fugitive equipment leaks from the new unloading rack and associated piping at the site; and subtracts the indirect emissions from marine vessels which allegedly would be displaced by rail transport as the baseline to determine total net emissions on an annual basis. Because the total net emissions of

[36] Draft EIR, p. 5-5.

> criteria pollutant on an annual basis are all negative, the Draft EIR finds that the Project would result in a beneficial impact to air quality in the BAAQMD as compared to the baseline and, therefore, the potential impact for the Project to contribute to an existing or projected air quality violation in the SFBAAB under the BAAQMD's jurisdiction would be less than significant.[37]

The Draft EIR's approach and conclusions to assessing impacts on air quality and determining associated health risks are substantially flawed and fail to identify and/or mitigate significant impacts.

A. Reliance on Marine Vessel Displacement for Determining Net Project Emissions within BAAQMD's Jurisdictional Boundaries Is Neither Enforceable Nor Supported

The Refinery currently receives crude oil shipments via pipeline and marine vessels.[38] The Rail Project would add crude oil deliveries of up to 70,000 bbl/day by rail.[39] The Draft EIR states that "[b]ased on Valero's plans, the crude oil delivered by rail would displace up to 70,000 barrels per day of the crude oil that is presently delivered by marine vessels" but "would not displace crude oil delivered to the Refinery by pipeline."[40] Beyond this reference to Valero's "plans," the Draft EIR provides no enforceable commitments to guarantee that these plans and the assumed emission reductions from displaced marine vessels would, in fact, materialize. There are several indications that future operations of the Refinery will change substantially, invalidating the Draft EIR's assumption that marine vessel movements will indeed be displaced by the Rail Project.

1. Valero Improvement Project Substantially Increased the Refinery's Crude Processing Capacity

Between 2004 and 2010, Valero made significant modifications to the Refinery's process unit and other equipment, collectively known as the "Valero Improvement Project ("VIP"). The VIP substantially increased the crude processing capacity at the Refinery and enabled Valero to process lower grade (heavier and more sour) crude oils. The City certified the VIP EIR in 2003 and certified an addendum to the EIR in 2008. All elements of the VIP, except for the hydrogen plant, were operational as of 2011.[41]

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[37] Draft EIR, pp. 4.1-17 – 4.1-22.

[38] Draft EIR, p. 3-1.

[39] *Ibid*.

[40] *Ibid*.

[41] Draft EIR, pp. 3-12 and 5-6.

The first unit in which incoming crude oil is processed at the Refinery is the pipestill or crude unit (S-1007). In the atmospheric fractionation column of the crude unit, the crude oil is heated and distilled or separated into six output streams called fractions.[42] Pre-VIP, the BAAQMD's permit for the crude unit limited processing to a maximum crude oil feed rate of 135,000 barrels per day ("bbl/day"). The VIP increased the maximum annual average daily crude oil throughput at the crude unit to 165,000 bbl/day, a nominal capacity increase of 25 percent, with a maximum daily crude oil throughput of 180,000 bbl/day.[43] In addition, the Refinery installed two new external floating roof storage tanks for crude oil storage (S-1047 and S-1048)[44] with a combined capacity of 130,000 barrels.[45] These tanks share a combined permitted throughput of 62.6 million barrels per year[46] ("bbl/year") with tanks S-57 through S-62 at the contiguous Nustar Energy facility (BAAQMD Facility ID# B5574), which was spun off as an independent terminal, storage, and product transportation facility from the Valero Refinery in 2006[47] and is operated pursuant to a service agreement between NuStar Energy and Valero.[48]

2. Baseline Crude Oil Deliveries Demonstrate that Refinery Does Not Operate at Capacity

Over the 3-year period assumed as the baseline in the Draft EIR (2010–2012), the Refinery's operations as a percentage of its total refining capacity can be approximated as shown in Table 5 below. The table below assumes that 80 percent of the crude oil is currently delivered via the Refinery's marine terminal and 20 percent via pipeline.[49]

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[42] VIP Draft EIR, p. 3-12.

[43] BAAQMD, Major Facility Review Permit, Final, Rev. 5, Valero Refining Co., Facility #B2626, April 30, 2013, (hereafter "BAAQMD Title V Permit Facility #B2626, April 30, 2013"), p. 28; http://www.baaqmd.gov/~/media/Files/Engineering/Title%20V%20Permits/B2626/B2626-2013-4_MR-Final-Permit_02.ashx?la=en. (Exhibit 15)

[44] *Ibid*, p. 31.

[45] (27,300,000 gal/tank)(2 tanks)/(42 gal/bbl) = 130,000 bbl.

[46] BAAQMD Title V Permit Facility #B2626, April 30, 2013, p. 31.

[47] Wikipedia, Valero Energy Corporation, http://en.wikipedia.org/wiki/Valero_Energy_Corporation. (Exhibit 16)

[48] Draft EIR, Appx. A1 to Appx. A, p. 10.

[49] DEIR, Appx. K, p. K-10.

Table 5: Comparison of Refinery-wide baseline crude import, permitted throughput at Project storage tanks, and approximate capacity utilization at crude unit

	Baseline (2010-2012) total crude import		
A	3-year total crude import by marine vessel	93,361,985	bbl/3 years
B	Average annual crude import by marine vessel	31,120,662	bbl/year
C	Average daily crude import by marine vessel (80% of total import)	85,262	bbl/day
D	Average daily crude import by pipeline (20% of total import)	21,316	bbl/day
E	Average total daily crude import by marine vessel and pipeline	106,578	bbl/day
	Crude throughput permit limits for storage tanks S-57 through S-62 (Valero) and S-1047 and S-1048 (Nustar)		
F	Average annual combined throughput limit	62,600,000	bbl/year
G	Annual average daily combined throughput limit	171,500	bbl/day
	Crude throughput at crude unit S-1006		
H	Annual average daily throughput limit	165,000	bbl/day
I	Baseline (2010-2012) throughput at crude unit	65%	of capacity

A Draft EIR, Appx. E.2, p. 2.
B (Row A) / (3 years)
C (Row B) / (365 days/year)
D (Row C) / (0.8) × (0.2)
E (Row C) + (Row D)
F BAAQMD Title V Permit Facility #B2626, April 30, 2013, p. 31, and Condition #32, p. 529
G *Ibid*
H BAAQMD Title V Permit Facility #B2626, April 30, 2013, Condition #50
I (Row E) / (Row H)

As shown, the three-year average capacity use at the crude unit can be approximated at 65 percent. Thus, the Refinery has substantial remaining capacity for crude oil processing, about 35 percent. Thus, provided a reliable crude oil supply – in other words, adequate pipeline and marine terminal capacity to accommodate increased raw material deliveries – the Refinery will be able to substantially increase crude oil processing in the future. However, the ability of the current infrastructure to support such an increase in production capacity is questionable.

3. Marine Terminal Operations

To accommodate VIP capacity increases and production, the VIP EIR anticipated an additional 12 ships per year delivering crude and gas oil and an additional 12 ships per year for coke exports at its marine terminal for a total of 24 additional ships per year.[50] While this estimate of 24 additional ships per year at the time represented "Valero's best estimate of the VIP's increase in ship traffic," the 2008 Addendum to the VIP EIR discloses that "it remains possible, whether due to unforeseen effects of the VIP or to other unforeseen circumstances, that Valero may need to increase ship traffic

[50] VIP Draft EIR, pp. 3-52 and 4-24.

by up to approximately 36 more ships per year, in addition to the VIP increase of 24 ships, to obtain sufficient crude feedstocks."[51]

However, in addition to costs considerations for foreign and domestic crude imports, explained in the Fox Comments on the IS/MND and Draft EIR, there are several other constraints to increasing marine imports of crude oil to the Refinery to satisfy the VIP's increased demand, which indicate that the rail terminal is likely required in addition to, rather than to replace, vessel movements at its marine terminal.

First, the Addendum to the VIP EIR states:

> The "BAAQMD proposes to impose approval conditions that place new limits on VIP ship and barge emissions and require monitoring and reporting throughput at the Main Benicia Crude Dock and at the Valero Coke Dock. These new limits on ship and barge emissions are at the emission levels that would occur with the VIP ship movements described … above. *In the future, the new emission limits could constrain Valero's current ability to choose between shipping and pipeline transport*."[52,53]

Based on the crude oil receipts at the Refinery over the past years, summarized in Table 5 above, it appears that Valero's concerns may have been validated as the company has not been able to realize the additional crude oil imports via ships it anticipated in the VIP EIR.

Second, it is well known, that the Bay Area refineries' marine terminals are near capacity and that production of California crude oils, which are delivered via pipeline, has been declining.[54] The proposed WesPac Pittsburg Energy Infrastructure Project ("WesPac Project") was specifically conceived to improve the energy infrastructure of crude oil deliveries to Bay Area refineries:

> The project is needed to provide energy infrastructure for local refineries to receive crude oil from sources outside of California to make up for declining oil

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[51] VIP EIR Addendum, p. A-41.

[52] VIP EIR Addendum, p. A-41, *emphasis* added.

[53] BAAQMD Title V Permit Facility #B2626, April 30, 2013, contains combined emission limits for crude and gas oil receipts and petcoke exports for the Valero Refinery's cargo carrier and dock. An additional grandfathered throughput limit exists for gasoline exports from the Crude/Product Dock (S-129) of 9.39 million bbl/year over a consecutive 12-month period.

[54] WesPac Pittsburg Energy Infrastructure Project, October 2013; http://www.pittsburgterminalproject.com/WesPac%20Pittsburg%20Terminal%20Project%20for%20Pittsburg%20Citizen%20Advisory%20Committee%2010-21-2013%20rev%206.pdf) (Exhibit 17)

> production in California. *Bay Area marine oil terminals and storage facilities are near capacity and many times ships need to wait in the Bay for a place to berth,* adding to local air pollution and congestion in shipping lanes. This project will relieve some of that congestion, help reduce local air pollution and help stabilize the supply base of crude oil. Crude oil brought into the rail facility will reduce the amount of crude oil brought into the area by marine vessels and further reduce ship traffic.[55]

Along with rail connections, the WesPac Project would be tied into two existing pipelines connecting with four East San Francisco Bay refineries (Valero Benicia, Shell Martinez, Tesoro Avon, and Phillips 66 Rodeo)[56] and the WesPac Project Draft EIR specifically named the Valero Benicia Refinery as one of the four refineries that would potentially receive crude oil from the new facility.[57] Figure 1 below shows how the WesPac Project would tie into existing pipelines to the Bay Area refineries.

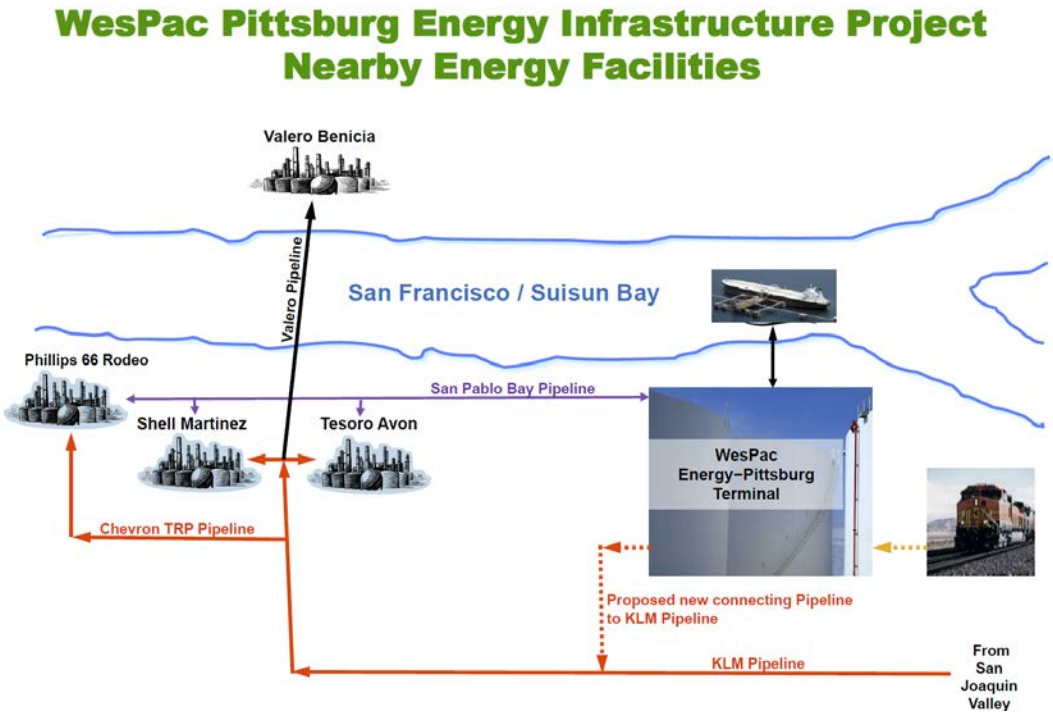

Figure 1: WesPac Project connections to East San Francisco Bay refineries
(from: WesPac Pittsburg Energy Infrastructure Project, October 2013; *see* Exhibit 17)

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[55] The Pittsburg Energy Infrastructure Project; http://www.pittsburgterminalproject.com/projectoverview.htm. (Exhibit 18)

[56] Richard Nemec, NGI's Shale Daily, California Continues to Gear Up for More Oil-by-Rail, June 30, 2014; http://www.naturalgasintel.com/articles/98872-california-continues-to-gear-up-for-more-oil-by-rail. (Exhibit 19)

[57] City of Pittsburg, WesPac Pittsburg Energy Infrastructure Project, Recirculated Draft EIR, p. 2.0-43; http://www.ci.pittsburg.ca.us/Modules/ShowDocument.aspx?documentid=5674. (Exhibit 20)

Figure 2 below summarizes currently proposed oil projects around the San Francisco Bay.

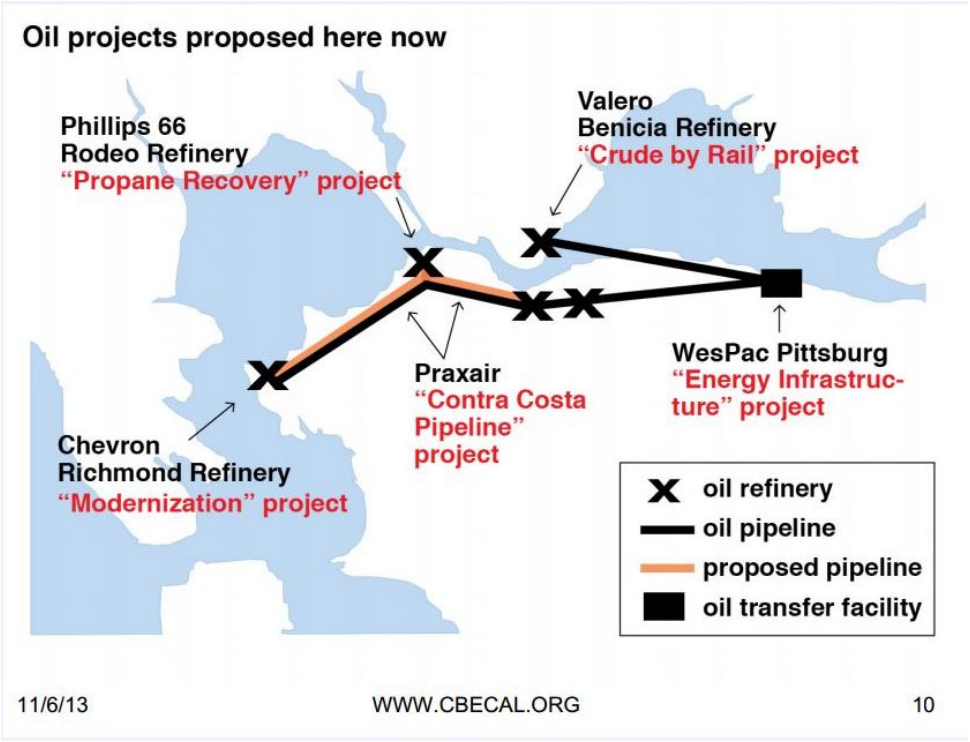

Figure 2: Oil projects currently proposed in the Bay Area
(from: http://safebenicia.org/wp-content/uploads/2014/07/Oil-Projects-Proposed.CBE-MAP.11.6.13.jpg. (Exhibit 21)

The WesPac Project, an oil transfer facility with combined 50,000 barrel/day rail and 192,000 barrel/day marine terminal capacity, would have relieved some the maxed out marine terminals at the Bay Area refineries, limiting crude oil deliveries. However, the WesPac Project has been substantially delayed as the City of Pittsburg determined that additional information will be required for a revision to the Recirculated Draft EIR[58] and is unclear whether the facility will be built, at least in the foreseeable future. This leaves Bay Area refineries to find alternative cost-advantaged crude oil delivery options, at least in the short-term.

Further, it appears that the Refinery's marine terminal is at capacity and cannot receive more crude oil without compromising the Refinery's capacity to export finished products (gasoline) from the terminal. Specifically, according to the Draft EIR, the

[58] City of Pittsburg, WesPac Pittsburg Energy Infrastructure Project; http://www.ci.pittsburg.ca.us/index.aspx?page=700. (Exhibit 22)

Refinery's marine terminal received 264 ships over the three-year period 2010 through 2012, or an annual average of 88 ships per year delivering about 85,000 bbl/day of crude oil on a three-year annual average[59], an average of about 353,600 barrels per ship.[60] Thus, at a typical discharge capacity of 22,707 bbl/hour[61], a ship spends on average about 16 hours to discharge its load.[62] In addition, the ship spends about 6 hours per trip hotelling at the terminal without discharging and half an hour for maneuvering, mooring, and unmooring.[63] Thus, the total time a ship delivering crude oil spends on average at the Refinery's marine terminal is about 22 hours or almost a full day.[64] Thus, the terminal is in service for receiving crude oil from marine vessels at about a quarter of the year.[65]

Given that Valero's marine terminal also receives crude oil by barge and functions as an export terminal for finished products, specifically for gasoline, it becomes clear that the terminal cannot accommodate much of an increase in crude oil imports and at the same time accommodate the company's stated plans to increase export of gasoline via marine vessels in step with other West Coast refineries.[66] (Valero, like Chevron, apparently cited lower-carbon fuel policies as drivers for increased product exports outside of U.S. borders.[67]) Refined-petroleum exports out of the West Coast, largely California and Alaska, have increased by 126 percent reaching 465,000 barrels per day in July 2013.[68] Thus, the Refinery's marine terminal may have to yield some of the import capacity to enable Valero's plans to increase exports of gasoline, which, while reducing marine vessel emissions from importing crude oil would not reduce total marine vessel movements or emissions.

Third, Valero's plan to for substantial marine exports of finished products (gasoline) may severely restrict its ability to receive crude oil deliveries via ship. To

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[59] (93,361,985 barrels/3 years)/(365 days/year) = 85,263 barrels per day.

[60] (93,361,985 barrels/3 years)/(264 ships/3 years) = 353,644 barrels/ship.

[61] Draft EIR, Appx. E.2, p. 3.

[62] (353,644/ship)/(22,707 bbl/hour) = 15.6 hours.

[63] Draft EIR, Appx. E.2, "Ocean Going Vessels Activity Data."

[64] (15.6 hours discharge) + (0.5 hours maneuvering/mooring/unmooring) + (6 hours hotelling without discharge) = 22.1 hours.

[65] (88 ships/year)(22.1 hours/ship) = 81 days; (81 days/365 days) = 0.22.

[66] Amy Harder, National Journal, Amid Oil Boom, Petroleum Exports Surge, October 17, 2013; http://www.nationaljournal.com/new-energy-paradigm/amid-oil-boom-petroleum-exports-surge-20131017.

[67] *Ibid*.

[68] *Ibid*.

facilitate these increased exports, specifically to non-domestic markets (South America), Valero submitted a bid to create a Foreign Trade Zone ("FTZ") at the Benicia marine terminal. A Valero spokesman explained the motive for establishing a Foreign Trade Zone:

> "It is something that would help the refinery be more competitive," Valero Energy Corp. spokesman Bill Day said. Day added that he is prohibited from releasing detailed information about the company's business plans. But he said the move could "assist with exporting of finished fuels" to other countries, where demand is rising.[69]

Valero's bid to establish a Foreign Trade Zone was approved by the San Francisco Port Commission in December 2010[70] and the company's subsequent bid to the U.S. Department of Commerce in January 2011[71] was approved in November 2011.[72]

Thus, in addition to gaining better access to cost-advantaged crude oils, as explained in detail in the Fox IS/MND and Draft EIR Comments, additional drivers behind Valero's plans to import crude oil via rail to take advantage of the Refinery's currently underutilized refining capacity are likely the above-described lack of adequate marine terminal capacity for imports and exports; the restriction on crude oil imports due to the BAAQMD permit limits for the marine terminal; the postponement of the WesPac Project; and Valero's plans to substantially increase its gasoline exports. Thus it is likely that the delivery of crude by rail would not displace or reduce marine vessel movements to and from the Refinery but instead the Rail Project would allow the Refinery to increase production and at the same time permit more exports from the marine terminal. Thus, the Draft EIR's assumption of a reduction in marine vessels as "displaced baseline" is not supported.

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[69] Tony Burchyns, Inside Bay Area News, Benicia's Valero Refinery Seeks Free Trade Status, December 22, 2010; http://www.insidebayarea.com/news/ci_16923738http:/www.insidebayarea.com/news/ci_16923738. (Exhibit 24)

[70] Tony Burchyns, Vallejo Times-Herald, S.F. Port Commission Approves Valero's Bid to Create a Trade Zone at its Benicia Refinery, December 24, 2010; http://www.timesheraldonline.com/news/ci_16935911. (Exhibit 25)

[71] U.S. Department of Commerce, Foreign-Trade Zones Board, Foreign Trade Zone 3-San Francisco, California; Application for Subzone; Valero Refining Company-California (Oil Refinery), Benicia, California, 76 FR 10329, February 24, 2011; http://www.gpo.gov/fdsys/pkg/FR-2011-02-24/pdf/2011-4208.pdf. (Exhibit 26)

[72] U.S. Department of Commerce, Foreign-Trade Zones Board, Order No. 1797, Grant of Authority for Subzone Status, Valero Refining Company – California (Oil Refinery), Benicia, California, 76 FR 72675, November 25, 2011; https://federalregister.gov/a/2011-30315. (Exhibit 27)

B. The Draft EIR's Exclusive Reliance on the BAAQMD's Annual Significance Threshold Is Inadequate and Fails to Identify Significant Air Quality Impacts

The BAAQMD established two sets of thresholds for assessing the significance of a project's operational emissions: on a daily basis (in lbs/day) and on an annual basis (in tons/year).[73] The step-by-step guidance provided by the BAAQMD's CEQA Guidelines clearly illustrate the agency's intent that both daily and annual thresholds be used to determine the significance of a project's operational emissions:

> **Step 2: Comparison of Unmitigated Emissions with Thresholds of Significance**
> Sum the estimated emissions for area, mobile, and stationary sources (if any) for each pollutant as explained above *and compare the total average daily and annual emissions of each criteria pollutant and their precursors with the thresholds of significance* determined by the lead agency…
>
> **Step 4: Comparison of Mitigated Emissions with Thresholds of Significance**
> *Compare the total average daily and annual amounts of mitigated criteria air pollutants and precursors with the project thresholds.*[74]

Yet, despite this explicit guidance, the Draft EIR provides emission estimates only on an annual basis, ignoring significant impacts the Project may have on a short-term basis. The short-term emissions here are the most critical to evaluate as the Project would significantly increase both NOx and ROG emissions, which are ozone precursors. The State and federal ozone ambient air quality standards for ozone are based on an 8-hour average. Thus, short-term emission increases are much more important than long-term, annual averages.

As discussed in Comment IV.A.3, the Valero marine terminal currently receives about 88 crude oil deliveries via marine vessel per year. Based on information provided by the Draft EIR, Appx. E.2, the total roundtrip time for marine vessels (from and to the Pilot Sea Buoy to the marine terminal, maneuvering/mooring/unmooring, hotelling without discharge, and hotelling with discharge at the marine terminal) can be calculated at about thirty hours.[75] Thus, crude oil ship movements from and out to the Pilot Sea Buoy occur on about 2,612 hours of the year or about 109 days of the year. Thus, there are 256 days of the year when no marine vessel deliveries of crude oil occur

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[73] BAAQMD, Proposed Air Quality CEQA Thresholds of Significance, May 3, 2010; http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Summary_Table_Proposed_BAAQMD_CEQA_Thresholds_May_3_2010.ashx?la=en. (Exhibit 28)

[74] BAAQMD 2012 CEQA Guidelines, p. 4-3, *emphasis* added.

[75] (Maneuvering/Mooring/Unmooring + hotelling without discharge + hotelling with discharge = 22.1 hours) + (Slow Cruise/Maneuvering: 0.56 hours) + (Slow Cruise 2: 2.60 hours) + (Slow Cruise 1: 4.42 hours) = 29.86 hours.

within the SFBAAB. On those days, marine vessel emissions would be zero. (While there may be overlap of vessels moving through the Bay, this would only further increase the number of days when no emissions occur.) On these days, increases in emissions from other operational sources, such as fugitives and tanks, would not be offset, resulting in significant impacts.

Table 6 below summarizes Project daily operational emissions for those days when no marine vessel emissions would occur within the San Francisco Bay Area Air Basin. Table 6 incorporates increases in fugitive ROG emissions from storage tanks and rail cars from the Fox Draft EIR Comments. All other emission estimates are based on the Draft EIR's annual emission estimates divided by 365 days and tons converted to pounds to arrive at daily emission estimates in pounds per day.

Table 6 below summarizes Project daily operational emissions for those days when no marine vessel emissions would occur within the SFBAAB. Table 6 incorporates increases in fugitive ROG emissions from storage tanks and rail cars from the Fox Draft EIR Comments. All other emission estimates are based on the Draft EIR's annual emission estimates divided by 365 days and tons converted to pounds to arrive at daily emission estimates in pounds per day.

Table 6: Significance of daily net operational emissions within the SFBAB on days without crude oil deliveries via marine vessels

Source	ROG (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Unloading rack and pipeline fugitive components	10.3	-	-	-
Tank fugitive emissions*	64.6	-	-	-
Locomotives	9.3	181.0	4.5	4.4
Marine vessels	0	0	0	0
Total net emissions	**84.2**	**181.0**	**4.5**	**4.4**
BAAQMD significance thresholds	54	54	82	82
Significant?	**YES**	**YES**	no	no

* From Fox Draft EIR Comments.

Table 6 demonstrates that total ROG and NOx emissions on days without marine crude oil deliveries would by far exceed the BAAQMD's daily significance thresholds and would substantially worsen the air quality in the BAAQMD and in other air basins affected by pollutant transport, as discussed in Comment IV.A.C. This is of particular concern during the ozone season as several affected areas within the three air basins are in nonattainment. The increase in ROG and NOx, ozone precursors, may result in or contribute to existing violations of federal and State ozone ambient air quality standards. This a new significant impact that the Draft EIR fails to identify.

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C. The Draft EIR's Impact Assessment Based on Air District Jurisdictional Boundaries Is Arbitrary and Fails to Adequately Address the Project's Impacts on Air Quality

The Draft EIR analyzed air quality impacts separately for the four air districts through whose jurisdiction locomotives are assumed to travel, shown in Figure 3 below (outlined in red). The affected counties within these air districts are Solano County whose western portion is under the jurisdiction of the BAAQMD with the eastern portion being under the YSAQMD's jurisdiction; Yolo County, under the jurisdiction of the YSAQMD; Sacramento County under the jurisdiction of the SMAQMD; and Placer County under the jurisdiction of the PCAPCD.

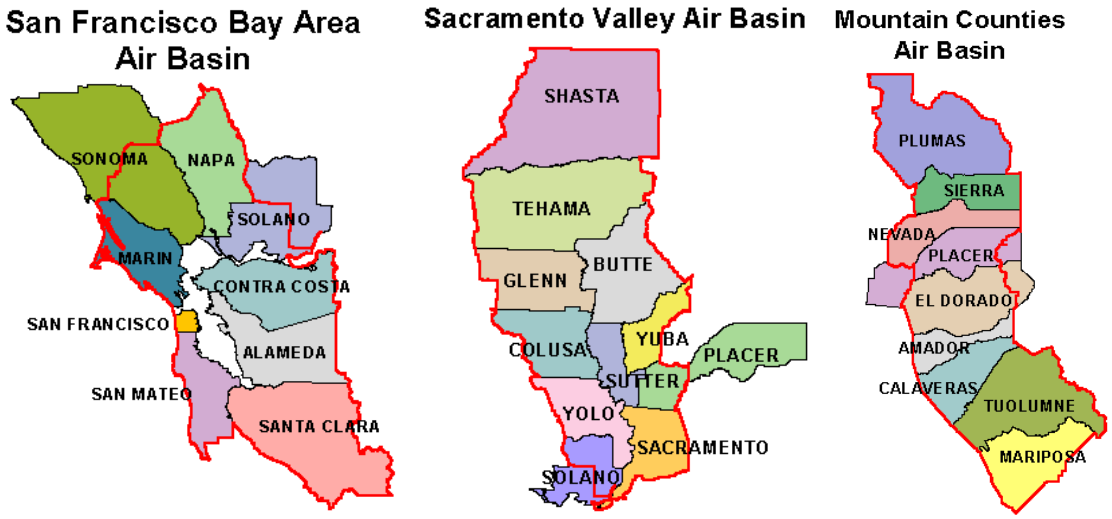

Figure 3: Air basins affected by the Project
(from: http://www.arb.ca.gov/ei/maps/basins/absfmap.htm (SFBAAB), http://www.arb.ca.gov/ei/maps/basins/absfmap.htm (SVAB), and http://www.arb.ca.gov/ei/maps/basins/abmcmap.htm (MCAB); maps not to scale)

However, it is well known that pollutants don't stay put where they are emitted due to winds and other atmospheric phenomena. Pollutants generated in one air basin do not necessarily stay in that basin but rather are transported under certain weather conditions from one air basin to another (referred to as "interbasin transport"). Thus,

pollutants generated in one basin can contribute to air pollution in adjacent basins.[76] Interbasin transport among the three adjacent air basins that would be impacted by the Project is known to impact ozone and particulate matter concentrations, as illustrated in Figure 4 below. [77]

Figure 4: Interbasin Transport of Pollutants
(from: CARB 2001 Ozone Transport Review, *op. cit.*)

The CARB and others have conducted numerous technical assessments of transport relationships between air basins in California.[78] These studies demonstrate that the Mountain Counties Air Basin violates ozone standards due to transport of pollutants from the Sacramento Valley Air Basin, the San Joaquin Valley Air Basin and the San Francisco Bay Area Air Basin. Air quality in the broader Sacramento Area is impacted by transport from the San Francisco Bay Area and, infrequently, from the San Joaquin Valley. On some days when the state standards for ozone are violated, the Sacramento area is impacted by transport of pollutants from the Bay Area. This occurs when there is a slight to moderate delta breeze in the morning which can carry commute hour emissions into the Sacramento area to mix with local emissions and react with the summer sun to produce ozone.

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[77] CARB, Ozone Transport: 2001 Review, April 2001 (hereafter "CARB 2001 Ozone Transport Review"); http://www.arb.ca.gov/aqd/transport/summary/transportsummary.doc. (Exhibit 29)

[78] *See*, for example, CARB 2001 Ozone Transport Review, *op. cit.*; and BAAQMD, Characterization of Inter-Basin PM and Ozone Transport for the Bay Area, March 2010; http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Research%20and%20Modeling/PM%20and%20ozone%20transport%20cluster%20analysis%20report.ashx. (Exhibit 30)

Because the three air basins through which Project trains would pass are interconnected by weather patterns, resulting in interbasin pollutant transport, the impact of the Project also should be evaluated cumulatively, for the entire impacted area, rather than piecemealed in the fashion analyzed in the Draft EIR. Further, CEQA is statewide statute, not a basin-by-basin statute, requiring that regional impacts be evaluated.

Thus, I aggregated daily emissions from the entire impacted area. The results of my analysis are summarized in Table 7 below for days when no marine vessels call at the Valero marine terminal. The table also incorporates fugitive emissions of ROG from storage tanks as calculated in the Fox Draft EIR Comments. For daily significance thresholds, I selected the most stringent for each pollutant from among the thresholds established by the four affected air districts. However, this selection would not affect the results, which remain highly significant, regardless of which set of thresholds is selected.

Table 7: Total daily emissions in all three affected air basins on days without crude oil deliveries via marine vessels

Source	**ROG** (lbs/day)	**NOx** (lbs/day)	**PM10** (lbs/day)	**PM2.5** (lbs/day)
Unloading rack/fugitives	10.3	-	-	-
Tank emissions*	64.6	-	-	-
Locomotives				
BAAQMD	9.3	181.0	4.6	4.4
YSAQMD	8.1	170.7	4.6	4.4
SMAQMD	3.9	82.7	2.2	2.1
PCAPCD	3.4	57.9	1.3	1.3
Total Locomotives	**24.7**	**492.3**	**12.7**	**12.2**
Total Operational Emissions	**99.6**	**492.3**	**12.7**	**12.2**
Displaced Marine Emissions	0	0	0	0
Net Emissions	**99.6**	**492.3**	**12.7**	**12.2**
Significance Threshold	54	54	82	82
Significant?	**YES**	**YES**	no	no

* Fox Draft EIR Comments

Table 7 shows that both ROG and NOx emissions are highly significant for the entire affected area, covering the three impacted air basins and the four air districts that serve them on days when no marine vessels call. The daily ROG emissions exceed the significance threshold of 54 lbs/day by a factor of almost two[79] and the daily NOx emissions exceed the significance threshold of 54 lbs/day by a factor of almost nine.[80]

[79] ROG: (99.6 lbs/day)/(54 lbs/day) = 1.81.

[80] NOx: (482.3 lbs/day)/(54 lbs/day) = 8.91.

D. The Draft EIR Fails to Require Mitigation to Reduce Significant Operational Impacts on Air Quality

The Draft EIR itself concluded that the increase in NOx emissions from locomotives passing through the YSAQMD (annual) and the SMAQMD (daily) were significant.[81] However, the Draft EIR declines to mitigate these significant impacts, arguing that the City has no jurisdiction to impose emission controls on locomotives. Instead, the Draft EIR concludes, these impacts are "significant and unavoidable."[82]

Setting aside the legal issue of jurisdiction, the City has at least three non-jurisdictional options to mitigate the significant ROG and NOx emissions. First, it can deny the Project. Second, it can require that Valero install ROG and NOx controls at its Benicia Refinery. Third, it can require Valero to enter into Voluntary Emission Reduction Agreements ("VERAs") with air districts in adjacent air basins affected by ozone transport.

1. The Unmitigated Project Should Be Denied

Most of the affected area currently violates California's 8-hour ozone ambient air quality standard as shown in Figure 5 (nonattainment areas are crosshatched).

Figure 5: 2013 area designations for State ambient air quality standards for ozone
(from: http://www.arb.ca.gov/desig/adm/2013/state_o3.pdf (Exhibit 31)

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[81] Draft EIR, Table 4.1-6.

[82] Draft EIR, p. 4.1-20.

Most of the population in the affected air basins currently live in areas that also violate the federal 8-hour ozone ambient air quality standard. Figure 6.

Figure 6: 2013 area designations for federal 8-hour ambient air quality standard for ozone
(from: http://www.arb.ca.gov/desig/adm/2013/fed_o3.pdf (Exhibit 32)

Both ROG and NOx are converted into ozone in the atmosphere. Thus, the increase in Project emissions from locomotives and Refinery sources (tanks, fugitive, leaking rail cars) will increase ozone concentrations, aggravating existing exceedances of ozone standards, set to protect public health. The short-term increase in emissions are very large, close to twice the daily ROG significance threshold and almost nine times higher than the daily NOx significance threshold. These short-term increases are highly significant as the State and Federal ozone standards are based on 8-hour averages, set to protect public health. Exceedances translate directly into adverse health impacts in the affected population. Further, these unmitigated increases will interfere with the affected air basins' ability to comply with State Implementation Plans, designed to bring the basins into compliance with standards.

These are serious impacts with serious consequences that should result in denial of the Project if these impacts are not mitigated.

2. ROG and NOx Emission Increases Can Be Mitigated By Reducing Emissions from the Valero Refinery

The control of NOx (and ROG) at the Valero Refinery would mitigate significant impacts from locomotives in adjacent air districts as it is well known that ozone precursors generated in one air basin form ozone in other adjacent basins. (*See* Figure 4.)

NOx Emissions

The Valero Refinery is a major source of NOx emissions. Emission inventory data provided by the BAAQMD indicates that it emitted 10,297 lbs/day of NOx in 2011, 5,642 lbs/day of NOx in 2012, and 6,504 lbs/day of NOx in 2013. Most of these emissions arise from burning refinery fuel gas in various heaters and boilers.[83] The increase in NOx emissions from locomotives could be reduced to less than daily and annual NOx significance thresholds by installing updated low or ultra-low NOx burners and/or selective catalytic reduction ("SCR") on one or more combustion sources.

SCR has been widely used to control NOx emissions from refinery heaters and boilers and is frequently required in federal Consent Decrees settling New Source Review issues. The combination of low-NOx burner technology and SCR has been demonstrated to achieve very low emissions of NOx in refinery applications. In the South Coast Air Quality Management District ("SCAQMD"), a large refinery heater, operational since 1995, is equipped with low-NOx burners and an SCR[84] Source tests have verified NOx emissions of 7 parts per million ("ppm") or less.[85] Large and small process heaters have also been demonstrated in the SCAQMD to achieve NOx emissions in the 5 to 9 ppm range using low-NOx burners and SCR.[86,87] Installation of

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[83] Source: BAAQMD Emissions Inventory Data, downloaded from EmitLook, transmitted from BAAQMD to NRDC via Public Records Request on August 28, 2014 for years 2011 through 2013 and to the International Council on Clean Transportation on September 30th, 2011 for the year 2010. (Exhibit 33)

[84] SCAQMD, AQMD BACT Determinations, Equipment Category Heater - Refinery, Application No. 326118, TOSCO Refining Company; http://www.aqmd.gov/docs/default-source/bact/laer-bact-determinations/aqmd-laer-bact/heater-refinery-an-326118-tosco.doc?sfvrsn=2. (Exhibit 34)

[85] *Ibid*.

[86] CARB, Best Available Control Technology Determination Data Submitted to the California Air Pollution Control Officers Association BACT Clearinghouse, CENCO Refining Company, A/C # 352869, 50 MMBtu/hr Tulsa Heaters Inc. Process Heater, John Zink Low-NOx Burners with SCR, January 2001; http://www.arb.ca.gov/bact/bact2to3.htm. (Exhibit 35)

[87] SCAQMD, AQMD BACT Determinations, Equipment Category Heater - Refinery, Application No., 337979, Air Products and Chemicals, Inc., 764 MMBtu/hr Kinetics Technology International Process Heater, John Zink Low-NOx burners and SCR, June 1999; http://www.aqmd.gov/docs/default-

SCR plus low NOx burners plus flue gas recirculation ("FGR") or installation of ultra-low-NOx burners plus FGR has been determined to be a typical technology for control for NOx emissions from refinery boilers by the BAAQMD.[88]

ROG Emissions

A substantial portion (42 percent[89]) of the increase in ROG emissions from the Project is due to sources at the Refinery itself and its adjacent tank farm, owned by Nustar – fugitive equipment leaks from the new loading rack and fugitive emissions from storage tanks. These emissions can be mitigated at the source. Fugitive emissions can be reduced by installing of state-of-the-art leakless or low-leak fugitive components such as valves, pumps, connectors, etc. throughout the Refinery. Storage tank fugitive emissions can be mitigated by installing geodesic domes on the currently uncovered external floating roof tanks that would store the imported crude oil. The increase in ROG emissions due to the Project can be mitigated by installing geodesic domes on additional, non-Project storage tanks, such as floating roof tanks used to store gasoline.

ROG and NOx Emissions

In addition, Refinery emissions of ROG and NOx can be reduced by dock electrification of the marine terminal, as recently recommended by the BAAQMD in its comments on the Recirculated Draft EIR for proposed WesPac Pittsburg Energy Infrastructure Project:

> Staff supports the inclusion of Mitigation Measure AQ-3 which requires NOx and ROG emissions from operational activities to be fully offset. However, staff recommends that the City require the project proponent to seek emission reductions on-site prior to purchasing emission reduction credits. This could include dock electrification of the marine terminal to further reduce emissions from ships running auxiliary engines for power generation. This would also service to reduce PM2.5 concentrations and TAC [toxic air contaminant] exposure to nearby sensitive receptors.[90]

This mitigation measure is equally feasible for the Project.

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source/bact/laer-bact-determinations/aqmd-laer-bact/heater-refinery-an-337979-air-products.doc?sfvrsn=2. (Exhibit 36)

[88] BAAQMD, Best Available Control Technology (BACT) Guideline, August 4, 2010; http://www.baaqmd.gov/~/media/Files/Engineering/BACT%20TBACT%20Workshop/Combustion/94-3-1.ashx. (Exhibit 37)

[89] (10.3 lbs/day+64.6 lbs/day)/(178.5lbs/day) = 0.42.

[90] Letter Roggencamp to Pollot, *op. cit*. Exhibit 14.

3. ROG and NOx Emissions Can Be Reduced by Requiring Valero to Enter into Voluntary Emission Reduction Agreements with the Air Districts

The City can require Valero to enter into a so-called Voluntary Emission Reduction Agreement ("VERA") with the affected air districts. This offsite measure has been required, for example, for the Hydrogen Energy California Project, a proposed power generation and fertilizer production facility in the San Joaquin Valley which has entered into a VERA with the San Joaquin Valley Air Pollution Control District ("SJVAPCD") for about $1.2 million to mitigate 16.7 tons/year of NOx emissions.[91] The funding provided under the VERA was required by the SJVAPCD to satisfy CEQA mitigation requirements and will support the air district's Emission Reduction Incentive Program which, for example, provides assistance to replace older agricultural equipment. A similar requirement could be developed with assistance from the air districts to address emission reductions from mobile and/or stationary pollution sources in the affected air basins.

V. The Draft EIR's Health Risk Assessments Are Unsupported and Substantially Flawed

The Draft EIR presents health risk assessment results for maximum cancer, acute and chronic non-cancer risks, and PM2.5 concentrations for Project impacts in Table 4.1-9 for the SFVAAB and Table 4.1-10 for the SVAB and for cumulative impacts in Table 5-2 for near the Refinery and Table 5-3 for the maximum exposed individual receptor ("MEIR") in Fairfield. The Draft finds that all results are below the applicable project-level and cumulative significance thresholds and, therefore, are less than significant.[92]

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[91] SJVAPCD, Hydrogen Energy California Power Plant Project, Mitigation Agreement 20130092 and Voluntary Emission Reduction Agreement 20130026; available at http://www.energy.ca.gov/sitingcases/hydrogen_energy/documents/others/2013-04-26_SJVUAPCD_Mitigation_Agreement_TN-70496.pdf. (Exhibit 38)

[92] Draft EIR, p. 4.1-25.

A. Most Health Risk Assessment Results Are Not Supported by Modeling Files

The Natural Resources Defense Council ("NRDC") requested all modeling files supporting the results of the health risk assessments presented in the Draft EIR. The compact disc received by the NRDC contained:

- Meteorological files and wind roses for the Suisun Sewage Treatment Plant, adjacent to Fairfield; the Sacramento Executive Airport; and the BAAQMD meteorological data from the "Valero Admin" meteorological site;

- Input and output files for PM2.5 concentrations, cancer risk and acute and chronic health risk for Dixon, Placer, Sacramento and PM2.5 concentrations for the Refinery.

Missing are all files supporting the cancer risk and acute and chronic health risk for the Refinery presented in the Draft EIR, Table 4.19, for the maximum exposed worker ("MEIW") and maximum sensitive receptor ("MSR"). These locations are affected by both diesel particulate matter emissions from locomotives as well as toxic air contaminant ("TAC") emissions from fugitive equipment leaks. The NRDC requested these missing files on September 10, 2014; on Monday, September 15, 2013 the City indicated that it did not have a copy of these files and that according to the Applicant these files were submitted on a compact disc to the BAAQMD.[93] Thus, the Draft EIR's findings for these receptors are unsupported.

B. The Draft EIR's Dispersion Modeling Is Flawed

The following comments were prepared with assistance from experienced air dispersion modelers Lindsey Sears[94], Camille Sears[95], and Dan Hernandez.[96]

1. Use of Superseded Dispersion Model (ISCST3 vs. AERMOD)

The Draft EIR's health risk assessments rely on modeling atmospheric concentrations of pollutants with a dispersion model developed by the USEPA, the

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[93] Email exchanges between Diane Bailey, NRDC, and Amy Million, City of Benicia, Re: HRA Supporting Files, September 10, 2014 through September 15, 2014. (Exhibit 39)

[94] Phone conversation with Lindsey Sears, September 10, 2014.

[95] Phone conversation with Camille Sears, September 10, 2014.

[96] Phone conversation with Dan Hernandez, MPH, September 10, 2014.

Industrial Source Complex Short Term Version 3 ("ISCST3")[97]. This model has been superseded by a new model, the American Meteorological Society/USEPA Regulatory Model with Plume Rise Model Enhancements ("AERMOD), which was formally proposed as replacement for ISCST3 in 2000 and was adopted by USEPA as the preferred model in November 2005.[98] AERMOD allows for more sophisticated and detailed dispersion modeling than ISCST3, including the choice of surface characteristics (ISCST3: two options, *i.e.*, urban or rural; AERMOD: selection of a variety of conditions); meteorological data (ISCST3: six discrete stability classes only; AERMOD: profiles for wind, temperature and vertical and horizontal turbulence); and many other input parameters. Overall, there is more confidence in the accuracy of AERMOD results.[99] The BAAQMD has prepared guidance for using AERMOD.[100] AERMOD is also the recommended model of use in CARB's *Health Risk Assessment Guidance for Rail Yard and Intermodal Facilities.*[101] The Draft EIR provides no justification for using the outdated ISCST3 model.

2. Use of Outdated Meteorological Data

The USEPA recommends using the most recent five years of meteorological data for conducting air dispersion modeling[102]; for the Project, this five-year time period is 2009 through 2013. The Draft EIR's relies on the following three sets of meteorological data for the three of the four locations for which it conducted dispersion modeling:

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[97] Draft EIR, p. 4.1-25.

[98] EPA, 40 CFR Part 51 Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule, 70 FR 216, November 9, 2005 (hereafter "EPA Appx. W"); http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf. (Exhibit 40)

[99] Khanh T. Tran, Applied Modeling Inc., Comparative Use of ISCST3, ISC-PRIME and AERMOD in Air Toxics Risk Assessment; http://www.vnbaolut.com/ami/acecomp.pdf. (Exhibit 41)

[100] *See*, for example, Kenneth J. Craig, Garnet B. Erdakos, Stephen B. Reid, Sonoma Technology, Inc., Technical Memorandum, to Saffet Tanrikulu, BAAQMD, Re: Documentation of AERMET Processing Procedures (Contract # 2012-095), STI-912032-5565-TM, December 21, 2012; ftp://ftp.baaqmd.gov/incoming/pub/sti/912032_AERMETProcessing_Dec2012.pdf. (Exhibit 42)

[101] CARB, ARB Health Risk Assessment Guidance for Rail Yard and Intermodal Facilities, September 2006, p. 5; http://www.arb.ca.gov/railyard/hra/1107hra_guideline.pdf. (Exhibit 43)

[102] EPA Appx. W, *op. cit.*

- For Benicia, five years of "BAAQMD meteorological data from the "Valero Admin" meteorological site"[103] with 300 meter mixing heights for years 2000 through 2003 and 2005; the year 2004 is missing.[104] (File "VAA_ALLYR.ASC")
- For Fairfield, a five-year meteorological dataset from the Suisun Sewage Treatment Plant, adjacent to Fairfield[105], with 300 meters mixing heights for 2001 through 2005.[106] (File "SUS013RA-1_5.ASC")
- For Sacramento, a five-year meteorological data from the Sacramento Executive Airport[107] with 300 meters mixing heights for 1985 through 1989. (File "SAC85_89.ASC")

Thus, none of these three meteorological data sets comply with the USEPA's explicit guidance to use the most recent five years of available data for dispersion modeling. Datasets for 2009 through 2013 are readily available from the respective air district and should have been used in conjunction with AERMOD dispersion modeling.[108]

3. Use of Incorrect Dispersion Coefficient for Fairfield Health Risk Assessment

The Draft EIR's ISCST3 modeling files for assessing health risks from locomotive diesel particulate matter emissions for residents in the City of Fairfield specify the dispersion coefficient as "rural." According to USEPA modeling guidance, if more than 50 percent of an area within a three-kilometer radius of the emission source is classified as rural, then rural dispersion coefficients are to be used in the dispersion modeling analysis. Conversely, if more than 50 percent of the area is urban, urban dispersion coefficients are to be used for modeling.[109] The area within a three-kilometer radius of the rail tracks in Fairfield shows more than 60 percent impervious surfaces and should therefore be classified as "urban."[110]

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[103] Draft EIR, p. 4.1-24; Appx. D to Appx. E.4, p. 3; and Appx. E.6, p. 2.

[104] Personal communication with Camille Sears, September 10, 2014.

[105] Draft EIR, p. 4.1-25; Appx. E.6, p. 3.

[106] Personal communication with Camille Sears, September 10, 2014.

[107] Draft EIR, p. 4.1-26, Appx. E.6, p. 3.

[108] Personal communication with Camille Sears, September 10, 2014.

[109] EPA Appendix W, *op. cit*., Section 7.2.3.

[110] Phone conversation with Lindsey Sears, September 10, 2014.

C. Health Risks Due to Fugitive Component TAC Emissions at the Refinery Are Underestimated

This comment summarizes information discussed in more detail in the Fox IS/MND and Draft EIR Comments to provide a clear picture of the various shortcomings of the Draft EIR's health risk assessments in one place.

According to Dr. Fox as well as the Goodman IS/MND Comments, the Project will likely receive, store and process cost-advantaged heavy sour Canadian tar sands (as Dilbits) and light sweet crudes likely originating from the Bakken oil fields. The Draft EIR failed include any emissions from the change in physical and chemical properties of the crudes that would be stored in the Project's six storage tanks. Dr. Fox estimated increase in tank breathing losses emissions to be at least64.6 lbs/day and 11.79 tons/year of ROG. Dr. Fox also identified several other sources of emissions from these tanks that she did not quantify. Because these fugitive emissions also contain TACs, TAC emissions for the Draft EIR's health risk assessment were underestimated as the Draft EIR only included TAC emissions from fugitive components, valves, pumps, flanges, which are a tiny fraction of the total potential ROG emissions.

Further, the Fox Draft EIR Comments criticized the Draft EIR's failure to adequately quantify TAC emissions for fugitive emissions from these crude oils by relying on a "default speciation profile" for crude oil from the EPA's TANKS 4.09d program. The Fox Draft EIR comments provide a comparison of the weight percentage of five TACs in the default crude oil relied upon by the Draft EIR and the maximum weight percentage for these TACs from a number of Material Safety Data Sheets ("MSDS") recently submitted in the context of other applications to import cost-advantaged North American crudes. The values in Table 8 are excerpted from the Fox Draft EIR Comments.

Table 8: Weight percentages of TAC components in crude oil relied upon by Draft EIR compared to reported maxima in MSDSs for Bakken crude oils

	Weight Percent		
	A	**B**	
TAC	Default Crude Draft EIR	Maximum from MSDS	Difference (B/A)
Benzene	0.6	7	11.7
Ethyl Benzene	0.4	7	17.5
Hexane	0.4	11	27.5
Toluene	1.0	7	7.0
Xylenes	1.4	7	5.0

A Draft EIR, Appx. E.4, Table 3-5; B Fox Draft EIR Comments

As shown, the Draft EIR's emission estimates for TACs based on the default crude oil underestimate emissions by factors ranging from 5 to almost 28. Thus, the Draft EIR's TAC emissions are substantially underestimated.

D. Health Risk Assessments Do Not Account for Fugitive TACs from Rail Cars

In summer, it can be over a hundred degrees Fahrenheit in the Central Valley. This leads to fugitive losses from the rail cars through pressure relief valves while in transit or parked at the Roseville Railyard or the Valero Refinery proposed Railyard. The Draft EIR makes no mention of fugitive emissions from railcars. Fugitive TAC emissions from railcars should be estimated and included the health risk assessments for the Project (as well as in the operational emission estimates for ROGs).

E. Rail Emission Impacts beyond the Roseville Yard to the East

The Draft EIR provides a health risk assessment for locomotive diesel particulate matter emissions for receptors near Union Pacific's J.R. Davis Yard in Roseville ("Roseville Yard") in western Placer County but dismisses analyzing potential impacts beyond the Roseville Yard as "indirect and difficult to predict given the speculative nature of the exact rail routes that would be used to transport the crude oil" to the Roseville Yard.[111]

There are only so many likely routes from the Canadian tar sands fields and the Bakken oil fields connecting to the Roseville Yard. These include two routes over the Sierra Nevada: the Modoc Line route over Donner Pass in eastern Placer County past the City of Truckee to Reno and via the Feather River Corridor via Winnemucca to Reno. The route to Canada would likely go along the I-5 corridor.

[111] Draft EIR, p. 4.1-12.

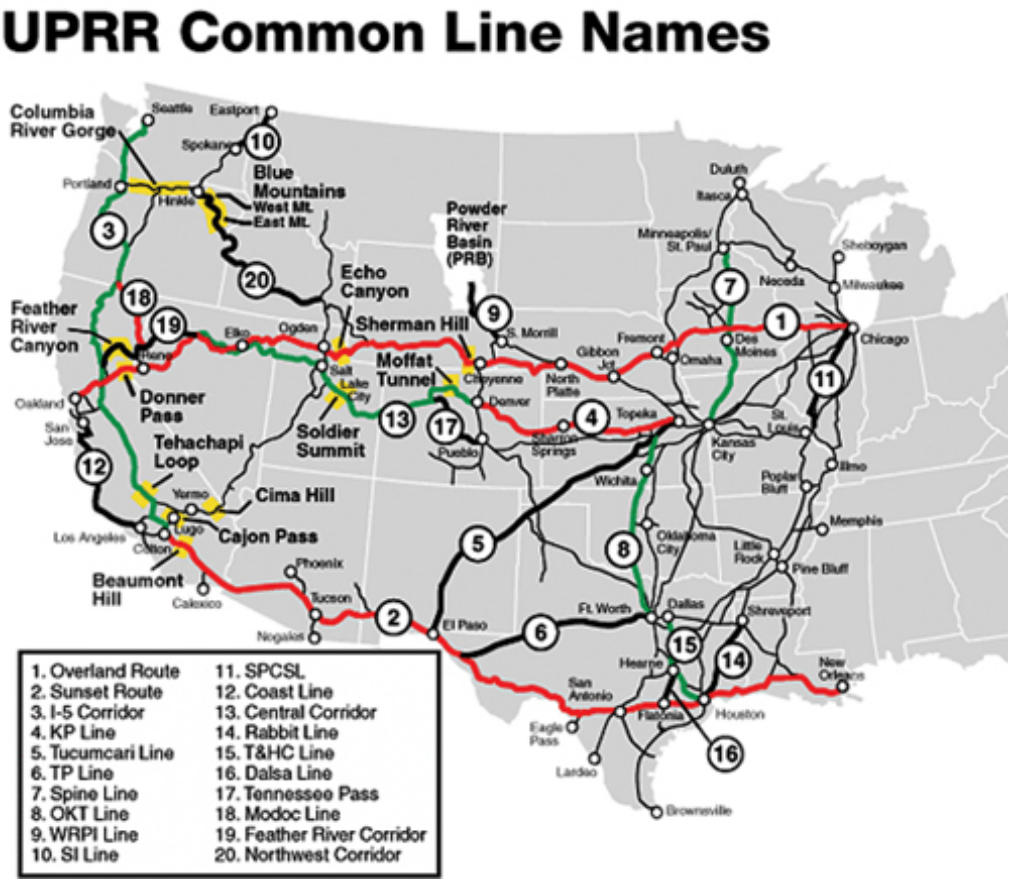

Figure 6: Union Pacific Rail Road Lines
(from: Bay Crossings, June 5, 2014; http://www.baycrossings.com/Archives/2004/05_June/Map.jpg)

The communities along routes through the Sierra Nevada are subject to the highest emissions of carcinogenic diesel particulate matter emissions due to the locomotives operating at maximum load while navigating the switch-backs up and down the steep slopes of the Sierra Nevada. The Draft EIR should be revised to include a health risk assessment for communities along any of these potential routes. When preparing such a risk assessment, care must be taken to use emission factors appropriate to mountainous areas rather than the generic nationwide annual average factors used by the Draft EIR for estimating health risks elsewhere.

F. The Draft EIR Fails to Provide a Health Risk Assessment for Toxic Air Contaminant Emissions during Construction

The BAAQMD recommends that lead agencies assess the incremental toxic air contaminant ("TAC") exposure risk to all sensitive receptors to determine the maximum exposure for the Project. The Draft EIR's analysis of TAC emissions from construction consists of the following paragraph:

> Construction of the Project would generate diesel particulate matter (DPM), which is considered to be a TAC, from the use of diesel off-road equipment. For short-term construction emissions, the BAAQMD recommends that construction health risks be evaluated if there are sensitive receptors located within 1,000 feet of the construction site. All project-related construction sources would be temporary (i.e., 25 weeks) and would be over 2,000 feet from the nearest sensitive land uses, which are residences off Lansing Circle. Therefore, Project construction would not result in a significant health risk.

The Draft EIR appears to misinterpret the zone of influence, which is specified as a 1000-foot radius from the fence line of a source or receptor, in the BAAQMD's summary table of CEQA thresholds of significance[112] as guidance that no modeling must be performed should there be no receptors within 1000 feet of the source. This interpretation is incorrect. This zone of influence, or project radius, is described by the BAAQMD as follows:

> For assessing community risks and hazards, the District recommends that a region around the proposed project be defined by a project radius for assessing potential impacts on new receptors and cumulative impacts of new sources. More specifically, a 1,000 foot radius is generally recommended around the project property boundary to identify existing sources that may individually or cumulatively impact new receptors and to identify existing sources that may contribute to the cumulative impact of new sources.[113]

Thus, the 1000 foot radius is intended only for identifying existing sources within and around a project property boundary, not as a zone within which health risk assessments must be performed, as interpreted by the Draft EIR. Instead, for determining the health risks of new sources, the BAAQMD recommends the following thresholds for individual project impacts:

> Compliance with qualified community risk reduction plan
> OR
> To the *nearest receptor (resident) regardless of distance*:
> Increased Cancer Risk >10 in a million
> Increased Chronic and Acute Hazard Index >1.0
> Ambient PM2.5 concentration increase >0.3 µg/m^3 [114]

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[112] BAAQMD, Proposed Air Quality CEQA Thresholds of Significance, May 3, 2010. (Exhibit 28).

[113] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 2.0, May 2011, p. 12; http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx. (Exhibit 44)

[114] *Ibid*, p. 6, *emphasis* added.

The BAAQMD clarifies the applicability of these thresholds as follows:

> For assessing the project alone impacts of a new source or new sources, no project radius is recommended. In this case, the location of maximum risk, hazard, and PM2.5 concentration affecting a receptor should be identified.[115]

> The thresholds for local risks and hazards from TAC and PM2.5 are intended to apply to all sources of emissions, including both permitted stationary sources and on- and off-road mobile sources, *such as sources related to construction*, busy roadways, or freight movements.[116]

Thus, unless compliance with a qualified community risk reduction plan can be demonstrated, modeling of construction TAC emissions must be performed in order to determine health risks for *the nearest receptor regardless of distance*. As discussed before, clouds of soot from construction equipment can travel for long distances affect heavily populated areas. The risks to these receptors must be determined in a health risk assessment.

As discussed in Comment III.A.3, lagging emission standards have kept very old equipment with very high emissions in operation. Construction equipment has been identified as one of the largest sources of toxic diesel particulate matter (soot) pollution in California.[117] Clouds of soot emitted with the exhaust from construction equipment can travel downwind for miles, then drift into heavily populated areas.

An analysis by the Union of Concerned Scientists found that air pollution from construction equipment is already taking a staggering toll on the health and economic well-being of Californians. In the San Francisco Bay Area Air Basin, 2005 estimates for health and economic damage from construction equipment emissions include 154 premature deaths, 117 hospitalizations for respiratory and cardio-vascular disease, more than 3400 incidences of asthma attacks, acute bronchitis, and other lower respiratory symptoms, almost 26,000 days of lost work, more than 333,000 school absences, and more than one and a half million restricted activity days. This loss of life and productivity cost Bay Area residents more than 1.2 million dollars.[118] These estimates are conservative because they do not include emissions from a large number of smaller construction projects (residential and commercial and projects smaller than

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[115] *Ibid*, p. 13.

[116] *Ibid*, *emphasis* added.

[117] Union of Concerned Scientists, *op. cit*.

[118] Union of Concerned Scientists, *op. cit.,* p. 14.

one acre in size and because multi-story buildings were treated as one-story buildings). Further, John Hakel, Vice President of the Associated General Contractors, an organization representing construction equipment fleet owners and general contractors, indicated that the analysis appeared to underestimate the sheer volume of construction equipment in use.[119]

The area around Benicia has been identified as one of the areas with very high risks from construction equipment, as shown in Figure 7 below.

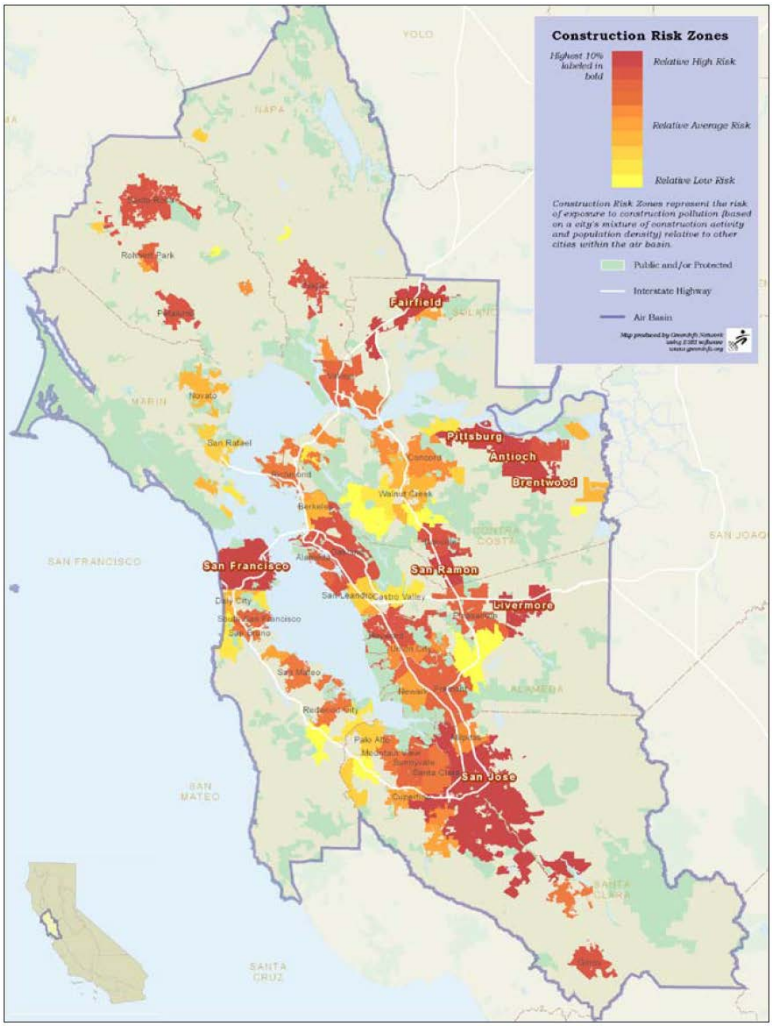

Figure 7: Construction pollution risk in the San Francisco Bay Area Air Basin
(from: Union of Concerned Scientists, *op. cit.*, p. 15)

[119] Los Angeles Times, Dire Health Effects of Pollution Reported, Diesel Soot from Construction Equipment Is Blamed for Illnesses and Premature Deaths, December 6, 2006; http://articles.latimes.com/2006/dec/06/local/me-dig6. (Exhibit 45)

While the Union of Concerned Scientists study is now eight years old, the programs and regulations developed to reduce diesel particulate matter emissions from construction equipment by CARB and EPA are not yet implemented or fully implemented, as discussed in Comment III.A.3. Thus, while statewide diesel particulate matter emissions have certainly been reduced since the Union of Concerned Scientists study was published by introducing newer vehicles into the fleet and some of the above cited numbers would now be lower if they were reanalyzed for current conditions, the magnitude of the problem remains and no CEQA analysis is complete without adequately analyzing health risks associated with diesel particulate matter emissions from the construction fleet and other diesel-powered combustion sources during construction.

G. The Draft EIR's Cumulative Health Risk Assessments Are Flawed

The Draft EIR provides cumulative health risk assessments for toxic air contaminant emissions in Section 5.4.3.1.

Cumulative Health Risk Assessment for Construction Emissions

The Draft EIR does not specifically address cumulative health risks due to diesel particulate matter emissions from construction activities. Instead, the Draft EIR summarily dismisses the cumulative impacts of construction activities because "Project construction exhaust emissions would not exceed the BAAQMD regional mass emissions thresholds." "Consequently," the Draft EIR concludes, "construction of the Project facilities would not be considered to make a cumulatively considerable contribution to regional air quality impacts. The cumulative impact would be reduced to a level that would be less than significant."[120]

First, as explained in Comment III above, construction emissions are substantially underestimated and, if revised, may exceed the BAAQMD's significance thresholds.

Second, even if diesel particulate matter emissions do not exceed the BAAQMD's quantitative mass significance threshold for PM2.5 for exhaust emissions, health risks may still be significant. The BAAQMD's emission thresholds for PM2.5 were developed to bring the region into attainment with the ambient air quality standards, not to address health risks from diesel exhaust. The BAAQMD has developed separate thresholds for risks and hazards that apply to both construction and operation:

[120] Draft EIR, p. 5-5.

Compliance with qualified community risk reduction plan

OR

Common sources within 1,000 foot radius of the individual project modeled to the maximum likely exposed individual (resident) based on the individual source analysis:

Cancer Risk >100 in a million
Chronic Hazard Index >10.0
PM2.5 concentration >0.8 µg/m^3 [121]

Third, health risks due to construction emissions may be cumulatively considerable even if they are not significant on an individual project basis.

Cumulative Health Risk Assessment for Operational Emissions near Refinery

The Draft EIR finds that the cumulative health risk and cumulative concentrations of PM2.5 near the Refinery would be below the BAAQMD's respective cumulative significance thresholds and the Project would therefore not be cumulatively considerable.[122] The Draft EIR's analysis is flawed and its conclusions are not supported.

First, the Draft EIR's cumulative health risk assessment fails to address chronic health hazards.

Second, the Draft EIR includes the following cumulative projects in the cumulative health risk assessment: the Rail Project; Interstate I-680 (misidentified in the Draft EIR as I-160[123]), which crosses the Benicia-Martinez Bridge; the Union Pacific Rail Road ("UPRR"); and the incremental health risks associated with the VIP. These are not the only projects that must be included:

- Draft EIR's analysis fails to include one of the cumulative projects it identifies in Table 5-1: diesel particulate matter emissions associated with the ongoing dredging at Valero's crude dock.

- The Draft EIR's analysis also fails to include emissions from the Valero Cogeneration Project, which went online in 2002.[124] Incremental cancer risks

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[121] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, *op cit.,* p. 6.

[122] Draft EIR, p. 5-13.

[123] Draft EIR, p. 5-13.

[124] California Energy Commission, Valero Cogeneration Power Plant Project; http://www.energy.ca.gov/sitingcases/valero/. (Exhibit 46)

from this project were estimated at 0.978 in a million, not adjusted for Age Sensitivity Factor.[125]

Third, the Draft EIR does not follow the BAAQMD's guidance on how to conduct a cumulative health risk assessment:

> For assessing community risks and hazards, the District recommends that a region around the proposed project be defined by a project radius for assessing potential impacts on new receptors and cumulative impacts of new sources. More specifically, *a 1,000 foot radius is generally recommended around the project property boundary* to identify existing sources that may individually or cumulatively impact new receptors and *to identify existing sources that may contribute to the cumulative impact of new sources*.[126]

Within a 1,000-foot radius, there are a number of sources the Draft EIR fails to include in its cumulative impact analysis:

- The most important source of TAC emissions are existing Refinery operations, where only those attributable to the incremental emissions associated with the implementation of the VIP were included in the cumulative health risk assessment. This omission fails to disclose cumulatively significant impacts.

- The Valero Asphalt plant immediately adjacent to the Valero Refinery. While owned by Valero, the facility operates under a separate Title V permit from the BAAQMD. The Valero asphalt plant, a small-scale petroleum refinery, primarily produces asphalt from crude oil. The by-products (naphtha, kerosene, and gas oil) are transferred to the adjacent Valero Refinery or sold to other companies for the production of other petroleum products.[127]

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[125] California Energy Commission, Commission Decision, Valero Cogeneration Project, Application for Certification (01-AFC-05), Benicia, California, October 2001, P800-01-026, p. 107; http://www.energy.ca.gov/sitingcases/valero/documents/2001-11-07_COMMISN_DECISION.PDF. (Exhibit 47)

[126] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, *op cit.*

[127] BAAQMD, Valero Benicia Asphalt Plant Facility #A0901, Facility Address: 3001 Park Road, Benicia, CA 94510, April 30, 2013; http://www.baaqmd.gov/~/media/Files/Engineering/Title%20V%20Permits/A0901/A0901-2013-4_MR-Final-Permit_02.ashx?la=en. (Exhibit 48)

- The Nustar tank farm, formerly owned by Valero and operated under a common agreement between both firms, immediately adjacent to the Refinery.

TAC emissions from these sources must be included in the cumulative health risk assessment based on BAAQMD guidance.

VI. The Draft EIR's Odor Analysis Is Inadequate

The Draft EIR's odor analysis consists of the following terse paragraph:

> Project construction and operations would include diesel exhaust sources, such as off-road construction equipment and generators and train locomotives that could result in the creation of objectionable odors. However, these emissions would be temporary and/or intermittent in nature and the closest sensitive receptors to the Project site are residences that would be at distances of over 2,000 feet, thus odor impacts associated with diesel combustion during Project construction activities and operations would be less than significant. This impact would be less than significant.[128]

This "analysis" is entirely inadequate and the Draft EIR's conclusion regarding the significance of odor impacts is entirely unsupported.

First, while the Draft EIR dismissal of the potential odor impacts of diesel exhaust emissions from the locomotives due to the "intermittent nature" is not acceptable. The odor of diesel exhaust is considered by most people to be objectionable and EPA found that, at high intensities, diesel exhaust may produce sufficient physiological and psychological effects to warrant concern for public health.[129] Two trains with two locomotives each would deliver crude oil to the Refinery and then travel back empty to the Roseville switchyard. En route, these four locomotives per day would pass directly through numerous densely populated residential neighborhoods, in many areas traveling at low speed, within 50 feet of residences in Fairfield[130], which could cause major odor nuisances for receptors located within these neighborhoods. Further, clouds of soot from the diesel-powered locomotives when idling at the Project site, can travel downwind for miles and drift into heavily populated areas.[131]

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[128] Draft EIR, p. 4.1-26.

[129] EPA, Health Assessment Document for Diesel Engine Exhaust, EPA/600/8-90/057F, May 2002; http://www.epa.gov/ttn/atw/dieselfinal.pdf. (Exhibit 49)

[130] Draft EIR, p. 4.1-24.

[131] Union of Concerned Scientists, *op. cit*. (Exhibit 11)

Second, diesel exhaust is not the only source of odiferous emissions associated with the Project. Other sources include fugitive emissions of odiferous hydrocarbons and hydrogen sulfide ("H_2S") from equipment leaks[132] (H_2S emissions from this source alone are estimated at 37.55 lbs/year) and evaporating from the crude oil rail cars in transit to the Refinery, as discussed in detail in the Fox Draft EIR Comments. The Draft EIR for the Phillips 66 Santa Maria Rail Terminal in San Louis Obispo County provided a quantitative odor analysis estimating that fugitive crude oil vapor emissions from equipment leaks could produce H_2S levels at the property line of up to 1.7 parts per billion ("ppb") and less than 1 ppb at residences. Based on an H_2S odor limit of 2 ppb with a significant impact being assigned to levels that could exceed the 50 percent odor threshold at 1 ppb, the Santa Maria Rail Terminal Draft EIR found that fugitive emissions could cause odor impacts offsite and odor emissions would be potentially significant.[133]

Crude oils also contain various amounts of other odiferous sulfur compounds, including mercaptans, which are known for their very strong and unpleasant odors. As discussed in the Fox Draft EIR Comments, mercaptans may be present at very high concentrations in the crude oils that would be delivered to the Project. Information available for Canadian crudes indicates that diluents can contain more than 100 ppm of volatile mercaptans.[134] The odor threshold for most mercaptans is considerably less than 0.5 ppb; some mercaptans can be detected at concentrations as low as 0.029 ppb.[135] In fact, mercaptans are added to natural gas in pipelines in very tiny amounts to facilitate detecting leaks.

The change of crude oils may also result in higher emissions of odiferous compounds from existing refinery operations, which have in the past included an odor release from a tank used for wastewater and "slop oil" which sent two Union Pacific workers to the hospital for a day in 2009[136] and a widespread "rotten egg" smell emanating from the refinery and being detected in Vallejo, Benicia, Crockett and Marin

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[132] Draft EIR, p. 4.1-24.

[133] Draft EIR for Santa Maria Rail Terminal Phillips 66, *op. cit.*, p. 4.3-51; http://www.slocounty.ca.gov/Assets/PL/Santa+Maria+Refinery+Rail+Project/Draft+EIR-Phillips+66+Rail+Spur+Extension+Project+(November+2013)/Full+EIR+-+Large+File/p66.pdf. (Exhibit 50)

[134] crudemonitor.ca, 2014; http://www.crudemonitor.ca/home.php.

[135] Syneco Systems, Inc., Odor Perception, 2009; http://www.synecosystems.com/wp/PDF/151.pdf. (Exhibit 51)

[136] Tony Burchyns, Vallejo Times-Herald, Valero Agrees to Pay $130,500 for Air Violations at Benicia Refinery, November 17, 2011; http://www.timesheraldonline.com/ci_19354929. (Exhibit 52)

County in 2009;[137] and a release of hydrocarbons and H_2S from the coker unit during which four refinery employees were injured in 2010;[138] an H_2S release from the hydrocracker unit also in 2010.[139]

I recommend that the City provide a revised and recirculated Draft EIR that includes modeling of all odorous compounds including diesel exhaust, hydrocarbons, and sulfurous compounds, including mercaptans, to adequately assess potential odor impacts associated with the Rail Project. The revised Draft EIR should evaluate potential odor impacts for the full range of crude oils that could be delivered to the Refinery including heavy Canadian sour crude oil, DilBits, and Bakken crude oil and, if found significant, require adequate mitigation including, for example, the use of leakless components (*e.g.*, welded connectors, bellows valves, double mechanical seals with high pressure fluids on pumps, enclosed distance pieces on compressors with venting to a control device, etc.). Further, the revised Draft EIR should investigate how to best reduce fugitive emissions from rail cars, whether it is tank design and/or requiring Valero to only accept stabilized crude oils, which have a lower potential for fugitive emissions and, at the same time, would reduce risk of explosion after a potential derailment.

VII. Failure to Address Risks Associated with Earthquakes and Potential Vandalism or Terrorism Attacks

The Draft EIR's risk analysis, provided in Section 4.7, entirely ignores the risks associated with earthquakes or potential vandalism or terrorist attacks. Valero, on the other hand, is well aware of these threats to its refineries and associated facilities.[140]

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[137]Tony Burchyns, Vallejo Times-Herald, Report on Air Ties Refinery to Ozone Woes, May 8, 2009; http://www.timesheraldonline.com/ci_12325742. (Exhibit 53)

[138] BAAQMD, Incident Report Valero Refinery (Site #B2626), 3400 E 2nd Street, Benicia, California, June 17, 2010; http://www.baaqmd.gov/~/media/Files/Compliance%20and%20Enforcement/Incident%20Reports/i061710_valero_refinery_coker.ashx?la=en. (Exhibit 54)

[139] Tony Burchyns, Vallejo Times-Herald, Pinhole leak reported at Valero hydrocracker in Benicia; http://www.insidebayarea.com/ci_15913030. (Exhibit 55)

[140] Morningstar® Document Research℠, FORM 10-Q, Valero Energy Partners LP – VLP, filed: August 11, 2014 (period: June 30, 2014), Quarterly Report with a Continuing View of a Company's Financial Position, pp. 16-17; http://app.quotemedia.com/data/downloadFiling?webmasterId=101533&ref=9745826&type=PDF&symbol=VLP&companyName=Valero+Energy+Partners+LP+Com+Unit+Repstg+Ltd+Partner+Ints&formType=10-Q&dateFiled=2014-08-11. (Exhibit 56)

The potential for terrorist attacks on trains in transit transporting crude oil through long stretches of sensitive habitat, along much of California's water supply and through densely populated areas must be taken into account as a substantial risk factor. Freight trains are an easy target, as they are operated by a very small crew and are frequently left unattended. For example, the recent tragic crude oil rail accident in Lake Mégantic in Canada, which resulted in 47 fatalities in a town of 6,000, occurred while the train operator left the train unattended.[141] Given the worldwide awareness raised by the recent slate of catastrophic train derailments and accidents, it may be only a matter of time for trains in transit carrying crude oil to become the target for a terrorist attack or vandalism with disastrous consequences.

Earthquakes also could have disastrous consequences. Benicia is located between two known earthquake faults, the West Napa Fault, which rattled the Bay Area in August of this year[142], and the Concord/Green Valley Fault, which is one of the six major slip-strike faults in the Bay Area[143], and is characterized as a "very high risk area" for earthquakes, the most severe designation. The U.S. Geological database shows that there is a 98.5 percent chance of a major earthquake within 50 km of Benicia within the next 50 years..[144] Given two daily deliveries of crude oil and the increasing probability of a major earthquake in the greater Bay Area (a greater than 63% percent for one or more magnitude 6.7 or greater earthquakes from 2007 to 2036[145], *see* Figure 8 below), the likelihood of an earthquake derailing a train is probable, yet, the Draft EIR makes no mention of this risk.

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[141] *See*, for example, Wikipedia, Lac-Mégantic Derailment; http://en.wikipedia.org/wiki/Lac-M%C3%A9gantic_derailment. (Exhibit 57)

[142] Wikipedia, West Napa Fault; http://en.wikipedia.org/wiki/West_Napa_Fault. (Exhibit 58)

[143] Wikipedia, San Francisco Bay Area, http://en.wikipedia.org/wiki/San_Francisco_Bay_Area#Earthquake_faults. (Exhibit 59)

[144] Homefacts, Benicia, CA Earthquake Report; http://www.homefacts.com/earthquakes/California/Solano-County/Benicia.html. (Exhibit 60)

[145] U.S. Geological Service, 2008 Bay Area Earthquake Probabilities; http://earthquake.usgs.gov/regional/nca/ucerf/. (Exhibit 61)

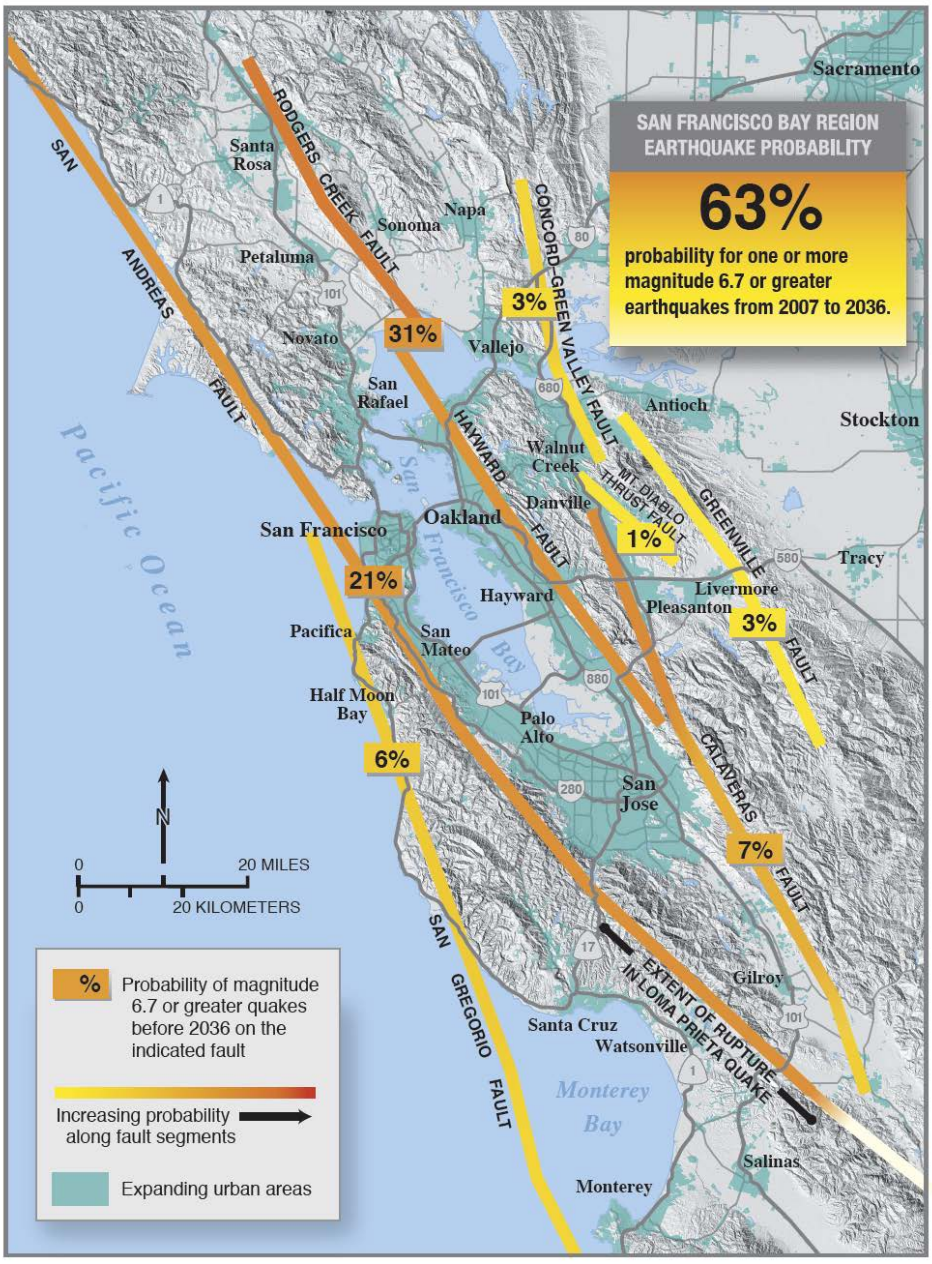

Figure 8: San Francisco Bay Region Earthquake Probability
(from: U.S. Geological Service, 2008 Bay Area Earthquake Probabilities; *see* Exhibit 61)

The following photographs provide a graphic illustration of what can happen to trains and rail tracks during earthquakes.

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Figure 9: Collapsed train overpass in Fukushima Prefecture, Japan, due to earthquake on March 11, 2011
(from: National Geographic, Japan Tsunami: 20 Unforgettable Pictures, March 15, 2011; http://news.nationalgeographic.com/news/2011/03/pictures/110315-nuclear-reactor-japan-tsunami-earthquake-world-photos-meltdown/#/japan-earthquake-tsunami-nuclear-unforgettable-pictures-railroad_33286_600x450.jpg.)

Figure 10: A rail line buckled by shifting ground during an earthquake in Christchurch, New Zealand, on September 5, 2010
(from: TNT Magazine, New Zealand earthquake: Christchurch pictures, October 12, 2011; http://www.tntmagazine.com/news/new-zealand-news/new-zealand-earthquake-christchurch-pictures.)

Figure 11: Derailed Joetsu Shinkansen train after earthquake in Niigata Prefecture, Japan, on October 23, 2004
(from: Nipponia, Special Feature, Earthquake Warning — Stop that Bullet Train!, No. 33, June 15, 2005; http://web-japan.org/nipponia/nipponia33/images/feature/17_1.jpg)

To address the hazards associated with train derailments due to earthquake, Japan, an earthquake-prone region like California, has developed a sophisticated system to stop trains before the ground shakes using seismographs to pick up small seismic waves called P-waves, which reach the earth's surface before the main shock coming from the epicenter. The system immediately estimates the quake's intensity and risk areas. These two factors are used to determine risk levels where trains are running. If the risk is higher than a certain level, a signal is sent to transformers to stop the trains. The time lapse between P-wave detection and signal transmission is only two seconds.

No such system exists for freight trains in California, where trains carrying hazardous materials such as crude oils utilize the same tracks as passenger trains. To minimize risks from transporting crude oils and the potential for an accidental release of highly explosive crude oils in communities and through wetlands, Valero could be required to financially contribute to developing a system for stopping trains like the one implemented in Japan. Such an early warning system has been developed by the University of California at Berkeley Seismological Laboratory for the Bay Area Rapid Transit ("BART") system.[146]

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[146] BART, BART Teams with UC Berkeley to Adopt Earthquake Early Warning System, September 27, 2012; http://www.bart.gov/news/articles/2012/news20120927. (Exhibit 62)

VIII. Recommendation

Based on the above discussion, I find that the Draft EIR for Valero's Rail Project is substantially deficient as an informational document for purposes of compliance with CEQA and recommend that the City prepare and recirculate a revised Draft EIR that addresses the issues outlined above.

Please feel free to call me at (415) 492-2131 or e-mail at petra@ppless.com if you have any questions.

Best regards,

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Dr. Pless is a court-recognized expert with over 20 years of experience in environmental consulting conducting and managing interdisciplinary environmental research projects and preparing and reviewing environmental permits and other documents for U.S. and European stakeholder groups. Her broad-based experience includes air quality and air pollution control; water quality, water supply, and water pollution control; biological resources; public health and safety; noise studies; California Environmental Quality Act ("CEQA"), Clean Air Act ("CAA"), and National Environmental Policy Act ("NEPA") review; industrial ecology and risk assessment; and use of a wide range of environmental software.

EDUCATION

Doctorate in Environmental Science and Engineering (D.Env.), University of California Los Angeles, 2001

Master of Science (equivalent) in Biology (focus on Limnology), Technical University of Munich, Germany, 1991

PROFESSIONAL HISTORY

Pless Environmental, Inc., Principal, 2008–present

Environmental Consultant, Sole Proprietor, 2006–2008

Leson & Associates (previously Leson Environmental Consulting), Kensington, CA, Environmental Scientist/Project Manager, 1997–2005

University of California Los Angeles, Graduate Research Assistant/Teaching Assistant, 1994–1996

ECON Research and Development, Environmental Scientist, Ingelheim, Germany, 1992–1993

Biocontrol, Environmental Projects Manager, Ingelheim, Germany, 1991–1992

REPRESENTATIVE EXPERIENCE

Air Quality and Pollution Control

Projects include CEQA/NEPA review; CAA attainment and non-attainment new source review; prevention of significant deterioration ("PSD") and Title V permitting; control technology analyses (BACT, LAER, RACT, BARCT, BART, MACT); technology evaluations and cost-effectiveness analyses; criteria and toxic pollutant and greenhouse gas emission inventories; emission offsets; ambient and source monitoring; analysis of emissions estimates and ambient air pollutant concentration modeling. Some typical projects include:

- Provided expert support for intervention in California Energy Commission ("CEC") proceedings for numerous power plants including natural gas-fired, integrated gasification combined-cycle, geothermal (flash and binary) solar (thermal and photovoltaic) facilities with respect to air quality including emission reduction credits, hazards and hazardous materials, public health, noise, and biological resources.
- Critically reviewed and prepared technical comments on the air quality, biology, noise, water quality, and public health and safety sections of CEQA/NEPA documents for numerous commercial, residential, and industrial projects (*e.g.*, power plants, airports, residential developments, retail developments, university expansions, hospitals, refineries, slaughterhouses, asphalt plants, food processing facilities, slaughterhouses, feedlots, printing facilities, mines, quarries, landfills, and recycling facilities) and provided litigation support in a number of cases filed under CEQA.
- Critically reviewed and prepared technical comments on the air quality and public health sections of the Los Angeles Airport Master Plan (Draft, Supplement, and Final Environmental Impact Statement/Environmental Impact Report) for the City of El Segundo. Provided technical comments on the Draft and Final General Conformity Determination for the preferred alternative submitted to the Federal Aviation Administration.
- Prepared comments on proposed PSD and Title V permit best available control technology ("BACT") analysis for greenhouse gas emissions from a proposed direct reduced iron facility in Louisiana.
- Prepared technical comments on U.S. Environmental Protection Agency ("EPA")'s *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills* prepared for EPA's proposed coal combustion waste landfill rule.
- Prepared technical comments on the potential air quality impacts of the California Air Resources Board's *Proposed Actions to Further Reduce Particulate Matter at High Priority California Railyards*.
- For several California refineries, evaluated compliance of fired sources with Bay Area Air Quality Management District Rule 9-10. This required evaluation and review of hundreds of source tests to determine if refinery-wide emission caps and compliance monitoring provisions were being met.
- Critically reviewed and prepared technical comments on draft Title V permits for several refineries and other industrial facilities in California.
- Evaluated the public health impacts of locating big-box retail developments in densely populated areas in California and Hawaii. Monitored and evaluated impacts of diesel exhaust emissions and noise on surrounding residential communities.
- In conjunction with the permitting of several residential and commercial developments, conducted studies to determine baseline concentrations of diesel exhaust particulate matter using an aethalometer.
- For an Indiana steel mill, evaluated technology to control NOx and CO emissions from fired sources, including electric arc furnaces and reheat furnaces, to establish BACT. This required a comprehensive review of U.S. and European operating experience. The lowest emission levels were being achieved by steel mills using selective catalytic reduction ("SCR") and selective non-catalytic reduction ("SNCR") in Sweden and The Netherlands.

- For a California petroleum coke calciner, evaluated technology to control NOx, CO, VOCs, and PM10 emissions from the kiln and pyroscrubbers to establish BACT and LAER. This required a review of state and federal clearinghouses, working with regulatory agencies and pollution control vendors, and obtaining and reviewing permits and emissions data from other similar facilities. The best-controlled facilities were located in the South Coast Air Quality Management District.
- For a Kentucky coal-fired power plant, identified the lowest NOx levels that had been permitted and demonstrated in practice to establish BACT. Reviewed operating experience of European, Japanese, and U.S. facilities and evaluated continuous emission monitoring data. The lowest NOx levels had been permitted and achieved in Denmark and in the U.S. in Texas and New York.
- In support of efforts to lower the CO BACT level for power plant emissions, evaluated the contribution of CO emissions to tropospheric ozone formation and co-authored report on same.
- Critically reviewed and prepared technical comments on applications for certification ("AFCs") for numerous natural-gas fired, solar, biomass, and geothermal power plants in California permitted by the California Energy Commission. The comments addressed construction and operational emissions inventories and dispersion modeling, BACT determinations for combustion turbine generators, fluidized bed combustors, diesel emergency generators, etc.
- Critically reviewed and prepared technical comments on draft PSD permits for several natural gas-fired power plants in California, Indiana, and Oregon. The comments addressed emission inventories, greenhouse gas emissions, BACT, case-by-case MACT, compliance monitoring, cost-effectiveness analyses, and enforceability of permit limits.
- For a California refinery, evaluated technology to control NOx and CO emissions from CO Boilers to establish RACT/BARCT to comply with BAAQMD Rule 9-10. This required a review of BACT/RACT/LAER clearinghouses, working with regulatory agencies across the U.S., and reviewing federal and state regulations and State Implementation Plans ("SIPs"). The lowest levels were required in a South Coast Air Quality Management District rule and in the Texas SIP.
- In support of several federal lawsuits filed under the federal Clean Air Act, prepared cost-effectiveness analyses for SCR and oxidation catalysts for simple cycle gas turbines and evaluated opacity data.
- Provided litigation support for a CEQA lawsuit addressing the adequacy of pollution control equipment at a biomass cogeneration plant.
- Prepared comments and provided litigation support on several proposed regulations including the Mojave Desert Air Quality Management District Rule 1406 (fugitive dust emission reduction credits for road paving); South Coast Air Quality Management District Rule 1316, San Joaquin Valley Air Pollution Control District Rule 2201, Antelope Valley Air Quality Management District Regulation XIII, and Mojave Desert Air Quality Management District Regulation XIII (implementation of December 2002 amendments to the federal Clean Air Act).
- Critically reviewed draft permits for several ethanol plants in California, Indiana, Ohio, and Illinois and prepared technical comments.

- Reviewed state-wide average emissions, state-of-the-art control devices, and emissions standards for construction equipment and developed recommendations for mitigation measures for numerous large construction projects.
- Researched sustainable building concepts and alternative energy and determined their feasibility for residential and commercial developments, *e.g.*, regional shopping malls and hospitals.
- Provided comprehensive environmental and regulatory services for an industrial laundry chain. Facilitated permit process with the South Coast Air Quality Management District. Developed test protocol for VOC emissions, conducted field tests, and used mass balance methods to estimate emissions. Reduced disposal costs for solvent-containing waste streams by identifying alternative disposal options. Performed health risk screening for air toxics emissions. Provided permitting support. Renegotiated sewer surcharges with wastewater treatment plant. Identified new customers for shop-towel recycling services.
- Designed computer model to predict performance of biological air pollution control (biofilters) as part of a collaborative technology assessment project, co-funded by several major chemical manufacturers.
- Experience using a wide range of environmental software, including air dispersion models, air emission modeling software, database programs, and geographic information systems.

Water Quality and Pollution Control

Experience in water quality and pollution control, including surface water and ground water quality and supply studies, evaluating water and wastewater treatment technologies, and identifying, evaluating and implementing pollution controls. Some typical projects include:

- Evaluated impacts of on-shore oil drilling activities on large-scale coastal erosion in Nigeria.
- For a 500-MW combined-cycle power plant, prepared a study to evaluate the impact of proposed groundwater pumping on local water quality and supply, including a nearby stream, springs, and a spring-fed waterfall. The study was docketed with the California Energy Commission.
- For a 500-MW combined-cycle power plant, identified and evaluated methods to reduce water use and water quality impacts. These included the use of zero-liquid-discharge systems and alternative cooling technologies, including dry and parallel wet-dry cooling. Prepared cost analyses and evaluated impact of options on water resources. This work led to a settlement in which parallel wet dry cooling and a crystallizer were selected, replacing 100 percent groundwater pumping and wastewater disposal to evaporation ponds.
- For a homeowner's association, reviewed a California Coastal Commission staff report on the replacement of 12,000 linear feet of wooden bulkhead with PVC sheet pile armor. Researched and evaluated impact of proposed project on lagoon water quality, including sediment resuspension, potential leaching of additives and sealants, and long-term stability. Summarized results in technical report.

Applied Ecology, Industrial Ecology and Risk Assessment

Experience in applied ecology, industrial ecology and risk assessment, including human and ecological risk assessments, life cycle assessment, evaluation and licensing of new chemicals, and fate and transport studies of contaminants. Experienced in botanical, phytoplankton, and intertidal species identification and water chemistry analyses. Some typical projects include:

- Conducted technical, ecological, and economic assessments of product lines from agricultural fiber crops for European equipment manufacturer; co-authored proprietary client reports.
- Developed life cycle assessment methodology for industrial products, including agricultural fiber crops and mineral fibers; analyzed technical feasibility and markets for thermal insulation materials from natural plant fibers and conducted comparative life cycle assessments.
- For the California Coastal Conservancy, San Francisco Estuary Institute, Invasive Spartina Project, evaluated the potential use of a new aquatic pesticide for eradication of non-native, invasive cordgrass (*Spartina spp.*) species in the San Francisco Estuary with respect to water quality, biological resources, and human health and safety. Assisted staff in preparing an amendment to the Final EIR.
- Evaluated likelihood that organochlorine pesticide concentrations detected at a U.S. naval air station are residuals from past applications of these pesticides consistent with manufacturers' recommendations. Retained as expert witness in federal court case.
- Prepared human health risk assessments of air pollutant emissions from several industrial and commercial establishments, including power plants, refineries, and commercial laundries.
- Managed and conducted laboratory studies to license pesticides. This work included the evaluation of the adequacy and identification of deficiencies in existing physical/chemical and health effects data sets, initiating and supervising studies to fill data gaps, conducting environmental fate and transport studies, and QA/QC compliance at subcontractor laboratories. Prepared licensing applications and coordinated the registration process with German environmental protection agencies. This work led to regulatory approval of several pesticide applications in less than six months.
- Designed and implemented database on physical/chemical properties, environmental fate, and health impacts of pesticides for a major multi-national pesticide manufacturer.
- Designed and managed experimental toxicological study on potential interference of delta-9-tetrahydrocannabinol in food products with U.S. employee drug testing; co-authored peer-reviewed publication.
- Critically reviewed and prepared technical comments on applications for certification for several natural-gas fired, solar, and geothermal power plants and transmission lines in California permitted by the California Energy Commission. The comments addressed avian collisions and electrocution, construction and operational noise impacts on wildlife, risks from brine ponds, and impacts on endangered species.
- For a 180-MW geothermal power plant, evaluated the impacts of plant construction and operation on the fragile desert ecosystem in the Salton Sea area. This work included baseline noise monitoring and assessing the impact of noise, brine handling and disposal, and air emissions on local biota, public health, and welfare.

- Designed research protocols for a coastal ecological inventory in Southern California; developed sampling methodologies, coordinated field sampling, determined species abundance and distribution in intertidal zone, and conducted statistical data analyses.
- Designed and conducted limnological study on effects of physical/chemical parameters on phytoplankton succession; performed water chemistry analyses and identified phytoplankton species; co-authored two journal articles on results.

PRO BONO ACTIVITIES

Founding member of "SecondAid," a non-profit organization providing tsunami relief for the recovery of small family businesses in Sri Lanka. (www.secondaid.org.)

PUBLICATIONS & RECOMMENDATIONS

Available upon request.