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September 14, 2018

SENT VIA EMAIL (hhines@m-group.us)

Heather Hines, Planning Manager
Planning Division, City of Petaluma
11 English Street
Petaluma, California 94952

RE: September 17, 2018 Regular Meeting of the City Council and Petaluma Community Development Successor Agency Agenda Item 6.B. (Safeway Fuel Center)

Dear Ms. Hines:

On behalf of our clients, JoAnn McEachin and No Gas Here, we submit these comments in support of the appeal filed by Ms. McEachin concerning the Planning Commission's approval of the proposed Safeway Fuel Station Project ("Project"). This letter explains why the Project's land use entitlement should be denied, and also addresses several fatal flaws in the Project's Initial Study/Mitigated Negative Declaration ("IS/MND").

As discussed more fully below, the City has full authority to deny the requested land use entitlement for the Project. Indeed, the location of the proposed use and its resulting health risks to Petaluma residents, workers, and children compel that result. Even if the City Council finds that it is inclined to grant the entitlement, however, the Project's potential adverse environmental impacts have not been adequately considered, evaluated, or mitigated in the IS/MND. Simply put, because substantial evidence supports a "fair argument" that the proposed Project may have significant adverse environmental impacts, the City cannot make the required findings to certify the IS/MND under the California Environmental Quality Act ("CEQA"). To comply with CEQA and the CEQA Guidelines, the City must prepare an environmental impact report ("EIR") to analyze the Project's potential direct, indirect and cumulative adverse environmental impacts.

This letter was prepared with input from three experts in the areas of air modeling, environmental engineering and traffic engineering: Phyllis Fox, PhD, PE, Ray Kapahi, BSC, M. Eng., and Larry Wymer, T.E. Documentation from Mr. Wymer is attached as

Exhibit A. The documentation from Dr. Fox and Mr. Kapahi is presently being finalized and will be submitted on Monday, September 17, 2018.

In order to comply with the requirements of CEQA, the City cannot certify the IS/MND, and must instead prepare an EIR prior to approving the Project. In the alternative, the City Council may choose at any time not to approve the Project and an EIR will not be necessary.

I. THE CITY HAS BROAD AUTHORITY TO DENY THE PROJECT, AND SHOULD EXERCISE THAT AUTHORITY HERE TO AVOID POTENTIAL HUMAN HEALTH IMPACTS

A. The Proper Nature of the City's Discretionary Review

The Project requires a site plan and architectural review ("SPAR") pursuant to Chapter 24 of the City's Implementing Zoning Ordinance ("IZO"). The Applicant's legal counsel, Rutan & Tucker LLP, submitted a memo to the City claiming that the City's discretion over the Project was extremely limited, stating in relevant part:

> [T]he City has limited discretion over the Project. The scope of discretion relates to aesthetic and design issues. To the extent the City attempts to employ this limited discretion to preclude a use that it or some of its residents to do not want, it would be acting in contravention of the law.

(Rutan & Tucker memo to City dated June 6, 2018, p. 3.)

Nothing could be further from the truth. The SPAR is a discretionary entitlement by the City that expressly includes the authority to "approve the project as applied for, approve the project with modifications, or disapprove the project." (IZO, § 24.010, subd. (G).) The City's decision to deny the Project would be afforded great deference by a reviewing court. (Code Civ. Proc., § 1094.5(b).) The agency's decision will be overturned only if no reasonable person would have reached the same conclusions. (*Harris v. City of Costa Mesa* (1994) 25 Cal.App.4th 963, 969 (*Harris*); *Breakzone Billiards* (2000) 81 Cal.App.4th 1205, 1244.) A reviewing court presumes a city's decision is correct, and will resolve all reasonable doubts in favor of the administrative findings and decision; the party challenging the decision bears the burden to demonstrate otherwise. (Evid. Code, § 664; see *Breneric Associates v. City of Del Mar* (1998) 69 Cal.App.4th 166, 175.)

Further, the law is well settled that only ***one reason*** is required to deny a discretionary entitlement like the requested SPAR. (*Desmond v. County of Contra Costa* (1993) 21 Cal.App.4th 330, 336-337.) *Desmond* explains with clarity:

> Because we are reviewing a *denial* of a requested land use permit, it is not necessary to determine that *each* finding by the Board was supported by substantial evidence. As long as the Board made a finding that any one of the necessary elements enumerated in the ordinances was lacking, and this finding was itself supported by substantial evidence, the Board's denial of appellant's application must be upheld.

(*Id*. at 336-337 [italic in original]; see also *Saad v. City of Berkeley* (1994) 24 Cal.App.4th 1206, 1213 [inadequacy of a single finding does not undermine denial of permit when other adequate findings were made].)

Finally, agencies are afforded considerable latitude with regard to the precision and formality of their findings denying a project. (*Young v. City of Coronado* (2017) 10 Cal.App.5th 408, 421.) Findings under Code of Civil Procedures section 1094.5 need not be "extensive or detailed." (*Environmental Protection Information Center v. California Dept. of Forestry & Fire Protection* (2008) 44 Cal.4th 459, 516.) Findings may incorporate matters by reference, or omissions may be filled by relevant references available in the record. (*Craik v. County of Santa Cruz* (2000) 81 Cal.App.4th 880, 884.) An agency may memorialize its findings in writing after the quasi-adjudicatory decision itself. (See *Levi Family Partnership, L.P. v. City of Los Angeles* (2015) 241 Cal.App.4th 123 [upholding planning commission findings supporting the decision to deny a permit application given first orally at a public hearing and then memorializing the decision in writing nearly one year later].)

The applicant also misleads the City regarding the scope of permissible considerations. Contrary to the Rutan & Tucker's suggestion, the City's authority to deny the SPAR may be based on broad considerations:

> 1. It is the intent of this Section that any controls be exercised to achieve a satisfactory quality of design in the individual building and its site, appropriateness of the building to its intended use, and the ***harmony of the development with its surroundings***. Satisfactory design quality and harmony will involve ***among other things***:
> a. The appropriate use of quality materials and harmony and proportion of the overall design.

> b. The architectural style which should be appropriate for the project in question, and compatible with the overall character of the neighborhood.
> c. ***The siting of the structure on the property, as compared to the siting of other structures in the immediate neighborhood***.
> d. The size, location, design, color, number, lighting, and materials of all signs and outdoor advertising structures.
> e. The bulk, height, and color of the proposed structure as compared to the bulk, height, and color of other structures in the immediate neighborhood.

(IZO, § 24.010, subd. (G)(1) (emphasis added).)

Thus, the IZO authorizes the City to consider whether a proposed project is in harmony with its surroundings as well as its siting as compared to other structures in the immediate neighborhood. (*Ibid*.) These considerations are in addition to unspecified "other" considerations that are described in the IZO's general "Applicability" provision:

> Minimum requirements. The provisions of this Zoning Ordinance shall be minimum requirements for the promotion of the public health, safety, and general welfare. When this Zoning Ordinance provides for discretion on the part of a City official or body, that discretion may be exercised to impose more stringent requirements than set forth in this Zoning Ordinance, as may be determined by the review authority to be necessary to promote appropriate land use and development, environmental resource protection, and the other purposes of this Zoning Ordinance.

(IZO, § 1.040.)

Approving or denying the SPAR is unquestionably a discretionary action, and so the City is empowered to "impose more stringent requirements" than found in the express language of Chapter 24 to the extent necessary to promote the general health and welfare, including the health of City residents, workers, and children.[1] Thus, the IZO grants the City authority to deny the requested SPAR based on broad considerations such as

[1] The applicant's legal counsel cited *Friends of Davis v. City of Davis* (2000) 83 Cal.App.4th 1004, 1014) to support its argument for a more constrained scope of review. (Memo dated June 6, 2018.) *Friends of Davis* is irrelevant here because that case addressed the narrow issue that "design review ordinance does not encompass tenant approval." We are not quibbling with the specific tenant or operator, but rather challenging the underlying land use itself.

whether the siting of a proposed use is not in harmony with the immediate neighborhood due to toxic air emissions.

The City's General Plan is in accord. Any discretionary action by the City, including the requested SPAR, must be consistent with the City's General Plan. "The propriety of virtually any local decision affecting land use and development depends upon consistency with the application general plan and its elements." (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 570.) "A project is inconsistent if it conflicts with a general plan policy that is fundamental, mandatory, and clear." (*Endangered Habitats League, Inc. v. County of Orange* (2005) 131 Cal.App.4th 777, 782.) The City's General Plan includes a specific policy concerning toxic air contaminants, and compels denial of the requested SPAR. General Plan policy 4-P-17 provides:

> To avoid potential health effects and citizen complaints that may be caused by sources of odors, dust from agricultural uses, or toxic air contaminants the following measures may be considered:
>
> • Locate new stationary sources of air pollutants, such as industrial facilities, at sufficient distances away from residential areas and facilities that serve sensitive receptors to avoid significant impacts caused by odors, dust, and toxic air contaminants.

The intent of General Plan policy 4-P-17 is clear: do not approve new sources of toxic air contaminants where they could pose "potential health effects" to citizens.

Finally, and while not likely necessary here in light of the obvious public health impact, the City is permitted to deny the SPAR based solely on neighborhood opposition. "It is appropriate and even necessary for the [agency] to consider the interest of neighboring property owners in reaching a decision whether to grant or deny a land use entitlement, and the ***opinions of neighbors may constitute substantial evidence on this issue***." (*Harris*, *supra*, 25 Cal.App.3d at 973, emphasis added; *Dore v. County of Ventura* (1994) 23 Cal.App.4th 320, 328-329.) IZO section 24.010 requires the City to consider whether the Project is in harmony with its surroundings, and so the opinions of the neighbors who reside in those surroundings are relevant under case law.

In short, the City is vested with discretion to deny the requested SPAR based on broad considerations of human health and harmony with the surroundings. Further, only one reason is necessary to deny the Project, which would be upheld by a reviewing court

unless no reasonable person could reach the same conclusion. This applicant's misleading legal analysis to the contrary is inexcusable.

B. The City Should Exercise Its Broad Discretion to Deny the Project in Order to Protect Human Health and Ensure Harmony in the Area.

Having clarified the nature of the City's discretion over the SPAR, relevant evidence overwhelmingly demonstrates that the Project should be denied. The California Air Resources Board ("CARB"), the state agency charged with addressing air contaminant modeling and associated health risk, provides ***land use guidance*** to local agencies in order to address human health risks from various land uses in its Air Quality and Land Use Handbook ("CARB Handbook"). (See attached Exhibit B, CARB Handbook, p. ES-1.) The CARB Handbook directly addresses the issue of an appropriate location for gas stations, providing in relevant part: "Avoid siting new sensitive land uses within 300 feet of a large gasoline dispensing facility (defined as a facility with a throughput of 3.6 million gallons per year or greater)." (Exhibit B, pp. 4, 32.) The Project's proposed throughput of 8.5 million gallons would be more than twice the minimum throughput triggering the recommended 300-foot distance, and yet the gas station would be merely 60 feet from the nearest sensitive receptor—the 4Cs Petaluma Child Development Center.[2]

In other words, the Project's proposed location flagrantly violates specific land use guidance from the state agency with the greatest expertise on toxic air emissions. The City is well within its discretion to deny the Project based ***solely*** on CARB's land use guidance, since doing so is consistent with both General Plan Policy 4-P-17 as well as ensuring "harmony of the development with its surroundings" under Section 24.010, subdivision (G)(1).

Here, the Project's inappropriate proximity to residential dwellings, a daycare center and elementary school—as articulated by CARB—constitutes, by itself, substantial evidence supporting denial of the SPAR. As will be explained more fully below, CARB's land use guidance is reinforced by a site-specific expert air quality and health risk assessment unequivocally concluding ***the actual human health risk at these sensitive receptors is significant under established standards***. We urge the City to deny

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[2] Both the IS/MND and its HRA fail to properly identify all relevant sensitive receptors. The closest receptor is the 4Cs Petaluma Child Development Center at 401 S. McDowell Boulevard. The North Bay Children's Center is a second daycare center located at 405 S. McDowell Boulevard. Incredibly, the IS/MND and HRA fail to identify both sensitive receptors.

the SPAR, and submit proposed findings that would easily survive judicial review. (See attached Exhibit C, proposed findings denying the Project.)

II. CEQA REQUIRES AN EIR WHENEVER A "FAIR ARGUMENT" CAN BE MADE THAT A SIGNIFICANT IMPACT WILL OCCUR BECAUSE OF A PROJECT

If there is "substantial evidence supporting a fair argument the project may have significant adverse effects, the agency must (assuming the project is not exempt from CEQA) prepare an EIR." (*Save the Plastic Bag Coalition v. City of Manhattan Beach* (2011) 52 Cal.4th 155, 171-172; CEQA Guidelines, § 15064, subd. (f)(1).) If, on the other hand, "[t]here is no substantial evidence, in light of the whole record . . . that the project may have a significant effect on the environment," the agency may adopt a negative declaration. (Pub. Resources Code, § 21080, subd. (c)(1); see also § 21082.2, subd. (a); CEQA Guidelines, § 15064, subd. (f)(3); *Communities for a Better Environment v. South Coast Air Quality Management Dist*. (2010) 48 Cal.4th 310, 319.)

The "fair argument" test requires the preparation of an EIR whenever "there is substantial evidence that any aspect of the project, *either individually or cumulatively*, may cause a significant effect on the environment, *regardless of whether the overall effect of the project is adverse or beneficial* . . . ." (CEQA Guidelines, § 15063, subd. (b)(1), emphasis added.) Furthermore, as the California Supreme Court explained long ago, a project need not have an "important or momentous effect of semi-permanent duration" to require an EIR. (*No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 75, 87 ("*No Oil*").) Rather, an agency must prepare an EIR "whenever it perceives some substantial evidence that [a] project may have a significant effect environmentally." (*Id.* at p. 85.) An EIR is required even if substantial evidence in the record supports a conclusion that significant impacts will not occur, if a "fair argument" supports the opposite conclusion. (*Id.* at p. 75.)

Where experts have presented conflicting evidence on the extent of the environmental effects of a project, like here, the lead agency must consider the effects to be significant and prepare an EIR. (*Pocket Protectors v. City of Sacramento* (2004) 124 Cal.App.4th 903, 935; *Sierra Club v. County of Sonoma* (1992) 6 Cal.App.4th 1307, 1317-18; CEQA Guidelines, § 15064, subd. (g).) "It is the function of an EIR, not a negative declaration, to resolve conflicting claims, based on substantial evidence, as to the environmental effects of a project." (*Pocket Protectors*, *supra*, 25 Cal.App.4th at p. 935.) In the context of reviewing a negative declaration, "neither the lead agency nor a court may 'weigh' conflicting substantial evidence to determine whether an EIR must be prepared in the first instance." (*Ibid.*) Where such substantial evidence is presented,

"evidence to the contrary is not sufficient to support a decision to dispense with preparation of an EIR and adopt a negative declaration, because it could be 'fairly argued' that the project might have a significant environmental impact." (*Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 310.)

As discussed in section III, *infra*, expert testimony and additional substantial evidence in the record establish much more than the required "fair argument" that the proposed Project will have adverse environmental impacts, necessitating an EIR.[3]

III. SUBSTANTIAL EVIDENCE SUPPORTS A "FAIR ARGUMENT" THAT THE PROJECT MAY HAVE SIGNIFICANT ADVERSE IMPACTS ON THE ENVIRONMENT

The discussion contained in this letter demonstrates that the IS/MND fails to comply with CEQA. For each of the reasons discussed below, CEQA requires the City to prepare an EIR before the City considers approving the Project. CEQA, however, does not require that an EIR be prepared for a project that is rejected or disapproved by a public agency. (CEQA Guidelines, § 15061, subd. (b)(4).) Therefore, the City Council may, without violating CEQA, exercise its discretion to deny the Project.

A. The Project Will Result in Significant Human Health Impacts from the Emission of Toxic Air Contaminants.

As set forth above, CARB has issued longstanding land use guidance to cities and counties to locate gasoline stations with a throughput of 3.6 million gallons more than 300 feet away from sensitive receptors such as homes, daycare centers and schools. The applicant asks the City to flout that expert guidance by approving a gas station with a throughput of 8.5 million gallons a mere 60 feet from the nearest sensitive receptor.

The applicant prepared a health risk assessment ("HRA") suggesting that this guidance is somehow incorrect because the health risks to these sensitive receptors are in fact less than significant under the accepted standard of 10 increased cancer risks. We retained preeminent experts to review the applicant's HRA in order to determine whether it employed proper methodologies and accurately characterized the Project's risk to

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[3] In addition to misleading the City regarding the nature of its discretionary review of the requested SPAR, the applicant also relies on *San Diego Navy Broadway Complex Coalition v. City of San Diego* (2010) 185 Cal.App.4th 924 to argue that the scope of CEQA review should be similarly limited. (Memo dated June 6, 2018.) This argument also has no merit, as City staff correctly found.

human health. These experts include Phyllis Fox, PhD, PE and Ray Kapahi, BSC, M. Eng. Dr. Fox's work, in particular, has figured prominently in seminal CEQA cases such as *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners* (2001) 91 Cal.App.4th 1344 and *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 90.

Dr. Fox and Mr. Kapahi agreed to peer review the applicant's HRA, but were unable to do so comprehensively because the applicant and its consultant refused to provide their underlying modeling data inputs and assumptions.[4] While unable to obtain the applicant's underlying data, Dr. Fox and Mr. Kapahi were nevertheless able to determine from the available information that the applicant's HRA was not based on current methodologies for air modeling and health risk assessment, among other errors that will be documented in their forthcoming report ("Fox Report"). In addition to documenting the various methodological flaws in the applicant's report, the Fox Report will include stand-alone health risk analysis utilizing current methodologies. Due to delay resulting from the applicant's refusal to provide its data, Dr. Fox and Mr. Kapahi have not been able to finalize their report as of the submission of this letter and instead will be submitted on Monday, September 17, 2018. While the Fox Report has not been finalized, some of its conclusions and resulting implications may be summarized as follows:

1. The applicant's HRA fails as an informational document because it relies on outdated methodologies, namely the ISC air dispersion model, that is itself outdated (in favor of AERMOD) and also prevents use of the required HARP2 tool to model to human health risks, which was not used by the applicant's HRA;

2. The Project will unquestionably result in significant (i.e. more than 10 increased cancer risks) human health risk to nearby residents (up to 69 increased cancer risk) and workers at the 4Cs Petaluma Child Development Center (12.5 increased cancer risks).

3. Substantial evidence of a fair argument exists for significant health risk to students and teachers at McDowell Elementary School (8.2 increased cancer risks). When accounting for prevailing winds in Petaluma that are primarily from the west-northwest and therefore directly upwind from these receptors, the risk to these receptors is likely above the threshold of 10 increased cancer risks.

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[4] City staff confirmed on September 10, 2018, that the applicant never provided the City with this information.

4. The Fox Report's conclusions are consistent with guidance and studies prepared by other agencies including CARB, CAPCOA and SCAQMD. The applicant's HRA is inconsistent with these authorities.

In sum, there is no question that an EIR will need to be prepared before the City can approve the Project. But because the health risk impact to residents along McDowell Boulevard is so high (nearly 700 percent of the significance threshold), the City would likely be able certify that EIR, and approve the Project, only upon making the policy determination that the claimed benefits of the Project (i.e. increased Safeway revenue and resulting tax dollars) are more important than, and therefore "override," the harm from exposing residents to an increased risk of cancer. (CEQA Guidelines, § 15093 (statement of overriding considerations).)

B. The Project Will Result in Significant Impacts to Greenhouse Gas Emissions and Global Climate Change.

Substantial evidence supports a fair argument that the Project will result in significant greenhouse gas ("GHG") emissions. The IS/MND acknowledges the issue, and then sets forth a significance standard of 1,100 metric tons of CO2e per year. (IS/MND, pp. 33-34.) The MND then states that the Project's total CO2e emissions is 947 metric tons per year, which the MND claims is less than significant. (IS/MND, p. 34.) This analysis is flawed for at least two reasons.

First, the IS/MND relied on CalEEMod calculations to determine the Project's CO2e emissions. (IS/MND, p. 33.) Yet, as will be discussed more fully in the HRA report, our experts found that the IS/MND's CalEEMod fleet mix assumptions and, by extension, the output numbers, are flawed because they are skewed towards smaller vehicles. Adjusting the CalEEMod fleet mix will likely increase the output and, in turn, increase the Project's CO2e emissions that are already very close to the stated significance threshold.

The second and more significant flaw is the IS/MND's failure to account for emissions from the fuel sold by the Project. The IS/MND states that the Project would sell 8.5 million gallons of fuel annually, which translates to 75,540 metric tons of CO2 emitted annually. (See attached Exhibit D, EPA CO2 Calculator.) This is 68 times the stated significance threshold of 1,100 metric tons per year. The IS/MND completely ignores this Project impact. Indeed, even if it can be characterized as an "indirect" impact of the Project, CEQA mandates analysis of indirect impacts. (CEQA Guidelines, § 15126.2, subd. (a) ("Direct and indirect significant effects of the project on the environmental shall be clearly identified and described"); § 15064.2, subd. (d)(2); see

Kings County v. City of Hanford (1990) 221 Cal.App.3d 692, 716-17; *Citizens to Pres. the Ojai v. County of Ventura* (1985) 176 Cal.App.3d 421, 430.)

The Project will result in CO2e emissions that are well above the threshold of significance. An EIR will need to be prepared that will properly disclose this potentially significant impact, and propose mitigation measures to the extent feasible. Numerous measures are available to mitigate the Project's significant GHG. It can install photovoltaic generation at it store parking lot as Petaluma's schools have done, and on its store roof as many Petaluma businesses have done. It may utilize readily available carbon-free power at its store. It may convert its distribution fleet to electric, as contemplated by the BAAQMD's Clean Air Plan, and it can fund and facilitate transit. It can work with schools like McDowell Elementary to inform the public about reducing GHG and toxics emissions from gasoline.

C. The IS/MND's Analysis of Traffic Is Fatally Defective and Therefore Fails as an Informational Document.

The IS/MND acknowledges that the Project will result in thousands of vehicle trips per day, but ultimately determines that the impact is less than significant on all issues except internal queuing. (IS/MND, pp. 51-58.) The IS/MND's analysis is based on separate traffic studies that purport to describe the Project's trip distribution on City roadways and associated impacts. Larry Wymer, T.E. peer reviewed the IS/MND's traffic studies and issued a report identifying several defects. Mr. Wymer's report is attached as Exhibit A. A few of the identified flaws include:

1. In several instances the traffic study is internally inconsistent and therefore fails to adequately describe the project. Moreover, correcting for these inconsistencies may result in significantly different Project trip distribution and associated traffic impacts.

2. The traffic study assumes an admitted unrealistic trip distribution through the Project driveways. As a result, the traffic study acknowledges that it does not reflect actual travel patterns. The traffic study claims that this was done to provide a "conservative" analysis, yet it is inconsistent with generally accepted methodologies for traffic analysis. Further, this strategy violates CEQA by concealing project impacts.

3. The traffic study acknowledges that it has some impact on CalTrans facilities, namely highway 101 ramps and Washington Street. The traffic study failed to identify Caltrans' threshold of significance for these facilities, and therefore failed

to identify a potentially significant impact to those facilities. (See Exhibit E, Sonoma County Guidelines, p. 12.)

4. The traffic study failed to identify any methodology for its selection of roadway segments and intersection included for analysis. Exacerbating this legal error is evidence in the record suggesting that additional intersections should have been studied. As such, Project impacts have not been adequately disclosed.

Additionally, the traffic analysis suffers from at least two additional legal errors. First, the traffic study states, "The Petaluma General Plan 2025 has adopted a standard of Level of Service ("LOS") D as the minimum acceptable operations for City streets, and signalized intersections that operate at an LOS E under existing conditions would result in a significant traffic impact if the addition of a new project would cause LOS E to deteriorate to LOS F. The Project's 2014 TIS applied these LOS thresholds to all study intersections, as appropriate." (Traffic Impact Study Update, p. 4.) This violates CEQA. (*Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th 1099 [agency improperly applied thresholds of significance narrowly to avoid finding significant impacts from stream flow reductions], *Friends of Oroville v. City of Oroville* (2013) 219 Cal.App.4th 832, 842 [agency misapplied threshold of significance for measuring project's greenhouse gas emissions].)

In fact, the court in *East Sacramento Partnerships for a Livable City v. City of Sacramento* (2016) 5 Cal.App.5th 281, 301-03, struck down a city's reliance on a traffic LOS significance threshold from its General Plan. As in *East Sacramento*, the IS/MND fails to explain and support application of its General Plan threshold. Here, the IS/MND fails to explain how LOS E can be acceptable simply because the project does not deteriorate to LOS F. In these instances, it is common practice to identify the significance threshold in terms of incremental additional delay. For example, Sonoma County Guidelines provide, "If the intersection currently operates or is projected to operate below the County standard, the project's impact is considered significant and cumulatively considerable if it causes the average delay to increase by five seconds or more." (See attached Exhibit E, p. 11.) The IS/MND's uncritical reliance on the City's General Plan in the face of unacceptable conditions significantly exacerbated by the Project is a failure to proceed in a manner required by law.

The IS/MND's traffic study suffers from the additional legal flaw that it relies on speculative future roadway improvements that have not been adequately funded. More specifically, the IS/MND assumes improved LOS under cumulative conditions by assuming development of the Rainier Cross-Town Connector. (MND p. 54.) This violates CEQA. (*Neighbors for Smart Rail v. Exposition Metro Line Construction*

Authority (2013) 57 Cal.4th 439, 453.) For example, the Sonoma County Traffic Impact Guidelines provide, "Planned roadway improvements shall only be assumed completed for use in the TIS if the improvement project is fully funded and programmed for construction." (Exhibit E, p. 9.) None of the exceptions under *Neighbors for Smart Rail* apply here, particularly since the Rainier Cross-Town Connector continues to have uncertain funding. (See attached Exhibit F, Petaluma360.com article.) The IS/MND's contrary approach is legal error and fails to adequately disclose Project impacts.

D. The IS/MND Failed to Adequately Disclose and Mitigate for Potentially Significant Hazardous Materials Impacts.

The IS/MND acknowledges that the Project is located within1/4 mile of a school, which triggers the need to consider whether the Project would emit or handle hazardous or acutely hazardous materials. (IS/MND, p. 35) While acknowledging the issue, the IS/MND fails to adequately disclose and mitigate the potentially significant impact.

On this issue the IS/MND conclusively asserts, "As previously discussed, adherence to existing federal, state and local regulations will ensure that all potentially hazardous materials onsite are properly labeled, transported and stored. Established policies and programs set forth by the EPA, DTSC, CAL/OSHA and other regulatory agencies provide that the presence of potential hazardous materials occurs in the safest possible manner." (IS/MND, p. 38.) This analysis fails to specifically identify what hazardous materials are being addressed, much less the specific "federal, state and local regulations" that will be applied to mitigate the impacts or the actions pursuant to these "regulations" that will actually mitigate the impact. While in some instances compliance with regulatory requirements may constitute adequate mitigation, the lead agency must actually commit in the CEQA document to such compliance through imposition of mitigation measures and not, as here, simply discuss purportedly applicable "regulations." (*Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 234 Cal.App.4th 214, 243) Moreover, the agency must satisfy its duty of informed decision-making engaging in a site-specific analysis of the potential impacts and the effect of regulatory compliance. (*Californians for Alternatives to Toxics v. Department of Food & Agric*. (2005) 136 Cal.App.4th 1.) The IS/MND includes no such discussion here.[5]

[5] These same defects apply equally to the IS/MND's analysis of Impacts 3.8(a – b) at pages 36 through 38.

The IS/MND also fails to include a meaningful cumulative analysis of this important issue. (IS/MND, p. 64). CEQA requires analysis of "[t]he cumulative impact from several projects" which "can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, §§ 15355, 15130.) "Proper cumulative impact analysis is vital 'because the full environmental impact of a proposed project cannot be gauged in a vacuum. One of the most important environmental lessons that has been learned is that environmental damage often occurs incrementally from a variety of small sources." (*Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1214.)

While the IS/MND purports to address cumulative impacts, the discussion does not even attempt to identify other projects that involve the handling or transport of hazardous materials in the relevant geographic area. (See CEQA Guidelines, § 15130.) Nor does the IS/MND attempt to identify the number of other delivery trucks transporting hazardous materials along South McDowell Boulevard, a City designated truck haul route.

In summary, the IS/MND is fatally flawed as an informational document. Moreover, substantial evidence in the record supports a fair argument that the Project will have significant impacts requiring preparation of an EIR before the Project can be approved.

IV. CONCLUSION

We urge the Council to weigh seriously the concerns voiced herein. The General Plan requires the City to consider whether it should "avoid potential health impacts" to residents by denying new emissions sources like the Project. Similarly the City's IZO section 1.040 grants the Council broad discretion to deny the Project based on the general welfare. The Project will unquestionably increase cancer to the City's residents, workers and even children. The Council should rely on land use guidance from those with more expertise in this field and deny the Project in order to protect its citizens from unnecessary health risks.

Even if the Council is not inclined to deny the underlying Project entitlements, the facts and law are clear that the Project cannot be approved until an EIR is prepared that adequately analyzes and discloses the Project's environmental impacts.

Thank you for your consideration of the above matters.

Very truly yours,

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By: 
Patrick M. Soluri

PS/mre

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Attachments:

Exhibit A, Wymer Report
Exhibit B, Excerpts from the CARB Handbook
Exhibit C, Proposed findings denying the Project
Exhibit D, US EPA CO2 Calculator for 8,500,000 gallons of gasoline
Exhibit E, Excerpts from the Sonoma County Traffic Study Guidelines
Exhibit F, May 24, 2018 Petaluma360.com article, “After Petaluma highway funding, focus shifts to Rainier.”

EXHIBIT A

Larry Wymer
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September 14, 2018

Patrick Soluri,

RE: Petaluma Safeway Fuel Center Traffic Study Review

This letter summarizes the professional opinions of Larry Wymer, licensed California Traffic Engineer (#1955) for:

Project: Petaluma Safeway Fuel Center
Address: 335 S. McDowell Blvd, Washington Square, Petaluma, CA
Location: Northwest corner of McDowell Blvd. & Maria Dr. (Southeast corner of Washington Square Shopping Center)
Size: 0.75 acres (32,450 ft^2)
Use: 16 fuel pump gas station
3,180 sf mini-mart
Access: 1-way inbound only driveway from E-W shopping center driving corridor between Washington St. and Maria Dr.
1-way exit only – right turn only at SE corner of project onto SB Maria Dr. towards McDowell Blvd. intersection.
1-way exit only – at SW corner of project onto internal driving aisles within shopping center connecting to all external roadways including McDowell Blvd., Washington St., and Maria Dr.
Docs: (1) **Traffic Study for Safeway Fuel Center at Washington Square** – TJKM Transportation Consultants (8/13/2014)
(2) **Petaluma Safeway Fuel Center Traffic Impact Study Update –** CHS Consulting Group (3/16/2018)
(3) **CEQA Environmental Checklist & Initial Study IS/MND** – City of Petaluma (3/29/2018)

Following my review of these documents, I noted errors and/or omissions which should be revisited to correct the traffic study and IS/MND. My review and opinions are included below.

Trip Generation / Trip Distribution / Trip Assignment

The peak hour project trip generation is reported as 210 AM pk hr trips, 276 PM pk hr trips, and 336 Saturday pk hr trips (between 11 am and 1 pm), split evenly (50%/50%) between inbound and outbound trips. Trip generation calculations were conservative and greater than those established from ITE Trip Generation rates.

Trip distribution gateway volumes are listed within the 2014 Traffic Study's "Project Trip Distribution and Assignment" section (pg 14) and depicted graphically within the 2014 Traffic Study's Figure 4 (pg 16).

Trip Distribution COMMENTS
The following errors/conflicts were noted when reviewing and comparing the trip distribution list on pg 14 with trip distribution numbers depicted on Figure 4:

1) *US-101 Trip Distribution* - The list on pg 14 contains the following two errors (Capitalization of NORTH and SOUTH added for emphasis):
   - "5% will travel to/from the NORTH via US 101 SOUTHbound ramps"
     (Figure 4 shows 5% will travel to/from the SOUTH via the Southbound US-101 on-ramp & Northbound US-101 off-ramp)
   - "15% will travel to/from the SOUTH via US 101 NORTHbound ramps"
     (Figure 4 shows 15% will travel to/from the NORTH via the two Northbound US-101 on-ramps & Southbound US-101 off-ramp)

If project trip distribution is 5% to/from the north/15% to/from the south as listed on pg 14 of the Traffic Study, the traffic analysis will need to be revised

2) *Lakeville St. vs. Kenilworth Dr. Trip Distribution* - The list on pg 14 cites the following trip assignment:
   - "10 percent will travel to/from the west via Washington Street"
   - "3 percent will travel to/from the west via Lakeville Street neighborhood"

   Figure 4 contradicts this trip distribution somewhat by assigning the 3% to Kenilworth Dr. (which is located less than ¼ mile west of US-101), and not Lakeville Street (which is located ¾ mile west of US-101). It is noted that the alternative trip distribution would not alter the traffic analysis since the variation is west of the westernmost study intersection.

3) *Sonoma Mountain Pkwy vs. Maria Dr. Trip Distribution* - The list on pg 14 cites the following trip assignment: "15 percent "to/from the north via Sonoma Mountain Parkway" - which would result in the following trip assignments:
   - Outbound – 40% of project traffic – EB Washington St. between Maria Dr. & Sonoma Mountain Pkwy.
   - Outbound – 15% of project traffic – EB left from EB Washington St. to NB Sonoma Mountain Pkwy.
   - Inbound – 40% of project traffic – WB Washington St. between Sonoma Mountain Pkwy & Maria Dr.
   - Inbound – 15% of project traffic – SB left from SB Sonoma Mountain Pkwy. to WB Washington St

   Figure 4 contradicts this trip distribution by assigning the 15% to/from Maria Dr. north of Washington St., NOT Sonoma Mountain Pkwy. If it is assumed <u>NO</u> traffic is assigned "to/from the north via Sonoma Mountain Parkway", but instead assigned "to/from the north via Maria Dr. as shown in Figure 4, this would result in the following trip assignments:
   - Outbound – 15% of project traffic – NB Maria Dr. north of Washington St.
   - Outbound – 25% of project traffic – EB Washington St. between Maria Dr. & Sonoma Mountain Pkwy. (with NO traffic continuing to Sonoma Mountain Pkwy.)
   - Inbound – 15% of project traffic – SB Maria Dr. north of Washington St
   - Inbound – 25% of project traffic – WB Washington St. between Sonoma Mountain Pkwy. & Maria Dr.

   If 15% of project trips are distributed to Sonoma Mountain Pkwy. (north of Washington St.) as listed on pg 14 of the 2014 Traffic Study instead of to Maria Drive (north of Washington St), the traffic analysis will need to be revised to correct the trip assignment(s) along Maria Dr. north of Washington Pkwy., and Sonoma Mountain Pkwy north of Washington Pkwy.

<u>Trip Assignment Assumptions from 2014 Traffic Study & Initial Study IS/MND</u>

It is noted that the Initial Study IS/MND ("Existing Plus Project Condition" section - pg 53) describes project driveway access and trip assignment assumptions as follows:

> *"In order to maintain a conservative analysis all project traffic is assumed to enter and exit the project site via the two-way Maria Drive site driveway located closest to the fuel center. This assumption represents an anticipated worst-case scenario level of service since there are several other access driveways by which to enter the Shopping Center."*

Aspects of this methodology are repeated, and expanded upon within the following two sections of the 2014 Traffic Study:

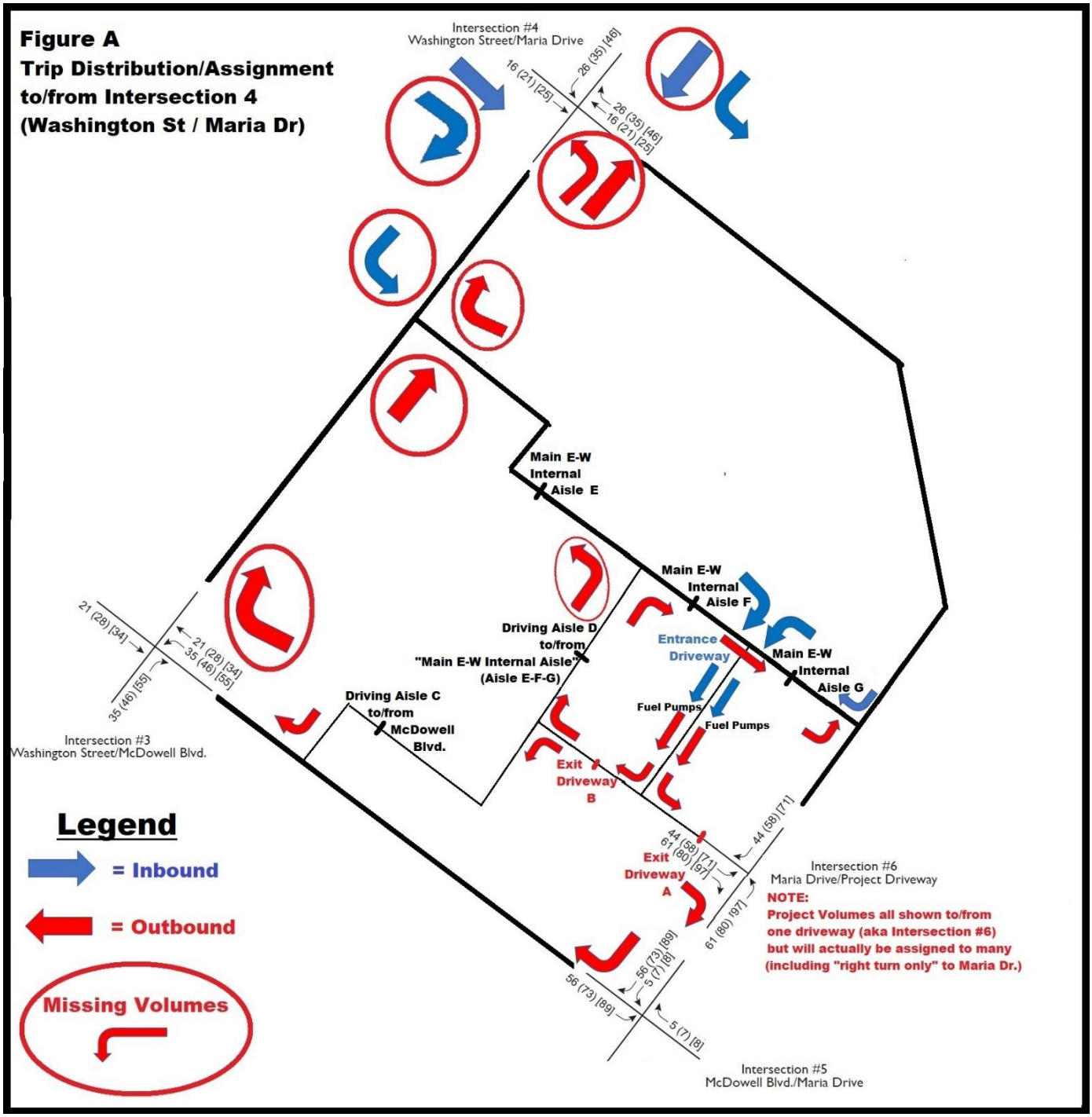
(Level of Service Analysis - pg 14-15):

> *"For the purpose of maintaining a conservative traffic analysis, all project traffic is assumed to enter and exit the project site via the two-way Maria Drive site driveway located closest to the fuel center to estimate worst-case level of service. This assumption is considered conservative (worst-case) since in reality trips would distribute to multiple existing driveways at the shopping center. TJKM expects that approximately 40 percent of the project peak hour trips (55 inbound*

and 55 outbound trips) would access via Maria Drive, 30 percent (42 inbound and 42 outbound trips) would access via McDowell Boulevard and 30 percent (42 inbound and 42 outbound trips) would access via Washington Street."

(Project Access and Circulation - Project Access - pg 18):

Access to the project site is via any of the two project driveways located along Maria Drive, two driveways along McDowell Boulevard and the farthest driveway access via Washington Street. To access the fuel center area, most patrons are expected to enter from either Maria Drive or McDowell Boulevard."



Trip Assignment Schematic (Figure A) COMMENTS

It is noted within the excerpts above that trip assignments were simplified, however a review of these assignments shodws omissions and/or error.

A review of the location of project driveways and corresponding ingress/egress turn restrictions, trip distribution, and trip assignment reveals that some project traffic is not assigned to study roadways, and study intersection turning movements, which would in fact contain added project traffic volumes. **Figure A** provides a schematic showing project driveway locations, inbound and outbound movements along study roadways, and intersection turning movements. The figure contains the following information:

- Snippets of added peak hour 'project only' intersection turning volumes at study intersections #3, #4, #5, and #6 (from Figure 4 of the 2014 Traffic Study)
- A schematic showing: (a) the main study roadways surrounding the Washington Square Shopping Center; (b) shopping center driving aisles which connect the study roadways to the Safeway Fuel Center project site, and (c) the 3 driveways (1 entrance driveway and 2 exit driveways) that provide direct access to the Safeway Fuel Center project site.
- Colored directional arrows showing where inbound (blue) and outbound (red) project volumes could be expected to travel to/from the project site.
- Red circles showing which movements did not have project traffic assigned, which should have had some project traffic assigned.

Trip Assignment COMMENT

A review of Figure A shows that the 2014 Traffic Study did not assign any project traffic volumes to the following roadway segments and intersection turning movements where some project traffic should have been assigned:

- Washington St. between McDowell Blvd. and Maria Dr. (between Intersection #3 & #4)
- NB right turn from McDowell Rd. to EB Washington St. (Intersection #3)
- EB left turn from Washington St. to SB Maria Dr. (Intersection #4)
- SB right turn from Maria Dr. to WB Washington St. (Intersection #4)
- EB Washington St. thru at Maria Dr. (Intersection #4)
- WB Washington St. thru at Maria Dr. (Intersection #4)

To provide a more realistic analysis of Washington St. intersections at McDowell Blvd. and Maria Dr., trip assignments should be revised to add vehicles to critical movements at these intersections which the current analysis does not provide, but which would almost certainly result in some worsened levels of service than those presented within the 2 previous traffic studies.

At the very least, a couple of sensitivity analyses should be conducted to establish and further analyze potential significant impacts by assigning:

(1) Some (or all) project trips through the Washington St./McDowell Blvd. intersection, including inbound and outbound left turns;
(2) All project trips through the Washington St./Maria Dr. intersection., including inbound/outbound left turns, and inbound and outbound through movements along Washington St. which load onto Washington Street either to/from McDowell Blvd. &/or to/from the Washington Square Shopping Center mid-block driveway.

Study Intersections

The 2014 Traffic Study establishes the study intersections for the project within the "Intersection Analysis Methodology - Study Intersections" section (pg 7):

> *"The traffic impact study focused on six study intersections that the proposed project may potentially impact based on consultation with City engineering staff."*

It is noted above that either 25% or 40% of project traffic continues to/from the east along Washington St. between Maria Dr. and Sonoma Mountain Pkwy., which would result in the following peak hour project volumes along this section of roadway, with all (or most) continuing through the Washington St./ Sonoma Mountain Pkwy.

- AM peak hour = 84 trips
- PM peak hour = 111 trips
- Sat peak hour = 135 trips

These peak hour project volumes comprise the following percentage ranges of total existing peak hour volumes along Washington St. between Maria Dr. and Sonoma Mountain Pkwy., depending on what percentage of project volumes are assigned along Washington St. east of Maria Dr.:

- 1.4%-1.8% (with 25% of project volumes east or Maria Dr.)
- 3.5%-4.5% (with 40% of project volumes east or Maria Dr.)

Study Intersections COMMENT

Depending on a couple of outstanding questions, there is a valid argument that the intersection of Washington St./Sonoma Mountain Pkwy. should have been included as a study intersection:

1. If 15% of total project trip distribution was incorrectly assigned to Maria Dr. (north of Washington St.) when it should have been assigned to Sonoma Mountain Pkwy. (north of Washington St.), a total of 40% of project traffic would have been distributed through this signalized intersection, with 10% or 15% distributed along each of the 3 inbound and 3 outbound turning movements within the intersection, (15% to/from north along Sonoma Mountain Pkwy., 15% to/from east along Washington St., and 10% to/from south along Ely Blvd.) The addition of project volumes along critical left turn and thru movements would potentially worsen levels of service to unacceptable conditions, warranting an analysis. Based on my personal experience as a traffic engineer, standard practice is to include study intersections that experience project trips of this magnitude.

2. If 15% of total project trip distribution was correctly assigned to Maria Dr. (north of Washington St.) and the list of trip distribution assignments on pg 14 of the 2014 Traffic Study was a typo, the fact would remain that 25% of project traffic would still been channeled through the Washington Blvd./ Sonoma Mountain Pkwy. intersection, with distributions to all legs of the intersection. Based on my personal experience as a traffic engineer, standard practice might require study intersections experience project trips of this magnitude.

Level of Service Threshold Criteria & General Plan Policies

The 2014 Traffic Study establishes the 'Level of Service Threshold Criteria' as follows (pg 7):

> *"All study intersections fall within City of Petaluma jurisdiction. The Petaluma General Plan 2025 has adopted a standard of LOS D as the minimum acceptable operations for City streets. Therefore, this LOS D threshold was applied to all study intersections, including the US 101 / Washington Street ramp intersections. Additional General Plan policies with respect to mobility are described below."*

The 2014 Traffic Study establishes the 'General Plan Policies' as follows (pg 7):

> *"The City of Petaluma General Plan Policies for mobility are specified as follows: 5-P-10: Maintain an intersection level of service (LOS) standard for motor vehicle circulation that ensures efficient traffic flow and supports multi-modal mobility goals. LOS should be maintained at level D or better for motor vehicles due to traffic from any development project."*

The updated 2018 Traffic Study establishes the following (pg 4):

> *"The Project's study intersections fall within City of Petaluma jurisdiction, with the exception of the US 101 Northbound and Southbound ramp intersections, which are under Caltrans jurisdiction. The Petaluma General Plan 2025 has adopted a standard of LOS D as the minimum*

acceptable operations for City streets, and signalized intersections that operate an LOS E under existing conditions would result in a significant traffic impact if the addition of a new project would cause LOS E to deteriorate to LOS F. The Project's 2014 TIS applied these LOS thresholds to all study intersections, as appropriate."

Level of Service Threshold Criteria & General Plan Policies COMMENT

As noted above, the 2014 Traffic Study assumed that (1) "All study intersections fall within City of Petaluma jurisdiction", (2) "LOS D [is] the minimum acceptable operations for City streets"; (3) "LOS D threshold was applied to all study intersections, including the US 101/Washington Street ramp intersections." Whereas the 2014 Traffic Study incorrectly stated that "all study intersections fall within City of Petaluma jurisdiction", the updated 2018 Traffic Study correctly acknowledges that "the US 101 Northbound and Southbound ramp intersections … are under Caltrans jurisdiction."

Both traffic studies fail to establish and use Caltrans level of service criteria for the two US-101 ramp intersections under their jurisdiction.

Caltrans level of service criteria will be established within (1) Caltrans' "Guide for the Preparation of Traffic Impact Studies" (December 2002); with additional clarification within (2) the "Transportation Concept Reports" (TCR) for the specific Caltrans facility (i.e. US-101 within Sonoma County).

Page 1 of Caltrans' "Guide for the Preparation of Traffic Impact Studies" states the following:

> "WHEN A TRAFFIC IMPACT STUDY IS NEEDED - The level of service (LOS) for operating State highway facilities is based upon measures of effectiveness (MOEs). These MOEs (see Appendix "C-2") describe the measures best suited for analyzing State highway facilities (i.e., freeway segments, signalized intersections, on- or off-ramps, etc.). Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" (see Appendix "C-3") on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing MOE should be maintained."

Per Caltrans' TIS guidelines, the LOS standard for the US-101 ramp intersections are "to maintain a target LOS at the transition between LOS "C" and LOS "D". The traffic study should be to establish Caltrans' LOS threshold for the US-101 ramp intersections at Washington St., and analyzed accordingly if different than the LOS "D" threshold assumed.

Washington St./McDowell Blvd. LOS Analysis

Both the original 2014 and updated 2018 Traffic Studies established LOS E for the study intersection of Washington St./McDowell Blvd. for the following 2 scenarios:

- Existing plus Approved (Background) Conditions - Unacceptable LOS E during PM peak hour
- Background plus Project Conditions - Unacceptable LOS E during PM peak hour

Under Background plus Project Conditions, the 2014 Traffic Study concluded that LOS "E" was not significant with the following comment (pgs 26 & 32):

> *"Under Background plus Project Conditions, the LOS E condition at the Washington Street / McDowell Boulevard intersection is expected to remain, while the remaining study intersections are expected to remain operating acceptably. However, the Washington Street / McDowell Boulevard intersection is expected to have only four seconds increase in average delay, which in consultation with City staff was determined not to be significant, consistent with TJKM*

experience in multiple Bay Area jurisdictions. Therefore, the LOS E condition is not considered to be an adverse project-related impact."

The revised operations analysis within the updated 2018 Traffic Study noted even higher increases in average delays at this intersection would increase to 11 seconds (pgs 9-11):

"Under the updated [PM peak hour] Background (Existing plus Approved) Conditions scenario … The LOS E condition at the intersection of McDowell Boulevard and Washington Street would remain, with an approximately 10 second increase in average delay. … These increases in intersection delay are attributable to the travel lane reconfigurations since 2014 at Project intersections (see Section 2) and the added vehicle trips from approved projects in the City of Petaluma. Compared to the Project's 2014 TIS analysis, the Project's updated LOS analysis results show no new unacceptable conditions under the Background (Existing plus Approved) Conditions scenario."

"Under the updated [PM peak hour] Background Plus Project Conditions scenario … The LOS E condition at the intersection of McDowell Boulevard and Washington Street would remain, with an eight second increase in average delay compared to 2014 results. … These increases in intersection delay are attributable to the travel lane reconfigurations (see Section 2) and the added vehicle trips from approved projects in the City of Petaluma. Compared to the Project's 2014 TIS analysis, the Project's updated LOS analysis results show no new unacceptable conditions under the Background plus Project Conditions scenario."

Washington St./McDowell Blvd. COMMENT

Both the 2014 and 2018 traffic studies show this intersection operating at LOS E for both no project and plus project conditions for near term conditions. The 2014 Traffic Study shows that during the PM peak hour this intersection will experience a 4 second increase in average delay (64.2-60.2=4.0 sec) between "Existing plus Approved (Background) Conditions" and "Background (Existing plus Approved) plus Project Conditions". However, the updated 2018 Traffic Study shows that this increase is narrowed to 1.5 seconds (72.2-70.7 sec) between "Background (Existing plus Approved) Conditions" and "Background Plus Project Conditions". The updated 2018 Traffic Study also notes that these increases from the 2014 and 2018 reports result in the following comparative delays/increases (scenario names per updated 2018 Traffic Study):

PM Peak Hour Scenario	Delay (Sec) & LOS		
	2014	2018	Change (2014-2018)
Background (Existing plus Approved) Conditions	60.2 (LOS E)	70.7 (LOS E)	10.5
Background Plus Project Conditions	64.2 (LOS E)	72.2 (LOS E)	8.0
Change With Addition of Project Traffic	4.0	1.5	

As was established above, this intersection should be reanalyzed with more realistic trip assignment to/from the project site with more trips to/from the Washington St./Maria Dr. intersection routed through the Washington St./McDowell Blvd. intersection instead of directly to/from Maria Dr. driveways These additional trips, which will include critical left turn movement from Washington St. to McDowell Blvd., will likely increase levels of service delays more, and provide for a more realistic analysis.

Cumulative Transportation Improvements

Rainer Avenue Crosstown Connector / Rainier Avenue Interchange Project

The 2014 Traffic Study (pg 28) establishes the following assumptions regarding the proposed project to (1) extend Rainer Avenue westward 0.65 miles from McDowell Blvd. to Petaluma Blvd, passing beneath US-101 via an underpass; (2) build a new US-101 freeway interchange with the Rainer Avenue Crosstown Connector.

"As per the approved City of Petaluma General Plan, the Rainier Avenue Interchange Project would be in place by 2025. It would provide an additional east-west cross-town connection between western and eastern Petaluma and an additional, mid-city connection to the US 101 freeway. The project is expected to shift local traffic patterns within the study area while alleviating traffic congestion along the East Washington Street and Old Redwood Highway corridors and at their respective US 101 interchanges."

SUMMARY OF OPINIONS/RECOMMENDATIONS

1) **Trip Distribution** – Correct following errors:
   a. trip distribution assignments to US-101 (NOTE: If project trip distribution is 5% to/from the north/15% to/from the south as listed on pg 14 of the Traffic Study, the traffic analysis will need to be revised).
   b. trip distribution assignments along Lakeville St. vs. Kenilworth Dr.
   c. trip distribution assignments along Maria Dr. (north of Washington St.) vs. Sonoma Mountain Pkwy. (north of Washington St.). (NOTE: If 15% of project trips are distributed to Sonoma Mountain Pkwy. (north of Washington St.) as listed on pg 14 of the 2014 Traffic Study instead of to Maria Drive (north of Washington St), the traffic analysis will need to be revised)

2) **Trip Assignment** – To provide a more realistic analysis of Washington St. intersections at McDowell Blvd. and Maria Dr., revise trip assignment to add vehicles to critical movements at these intersections which the current analysis does not provide, but which would almost certainly result in some worsened levels of service than those presented within the 2 previous traffic studies. These revised project trip assignments would add project volumes along internal roadways, project driveway, and study roadways as noted within Figure A, resulting in added project volumes along the following roadway segments and intersections turning movements (some of which are critical movements):
   - Washington St. between McDowell Blvd. and Maria Dr. (between Intersection #3 & #4)
   - NB right turn from McDowell Rd. to EB Washington St. (Intersection #3)
   - EB left turn from Washington St. to NB Maria Dr. (Intersection #4)
   - SB right turn from Maria Dr. to WB Washington St. (Intersection #4)
   - EB Washington St. thru at Maria Dr. (Intersection #4)
   - WB Washington St. thru at Maria Dr. (Intersection #4)

   At the very least, a sensitivity analyses should be conducted to establish and further analyze potential significant impacts by assigning all trips via two additional trip assignment scenarios:
   (1) some (or all) project trips through the Washington St./McDowell Blvd. intersection, including inbound and outbound left turns; and
   (2) all project trips through the Washington St./Maria Dr. intersection., including inbound/outbound left turns, and inbound and outbound through movements along Washington St. which load onto Washington Street either to/from McDowell Blvd. &/or the Washington Square Shopping Center mid-block driveway.

3) **Study Intersections –** Add Washington Blvd/Sonoma Mountain Pkwy. to list of study intersections if 40% of project traffic continues east along Washington St. past Maria Dr. toward the intersection of Washington St. /Sonoma Mountain Pkwy., with 15% continuing to/from Sonoma Mountain Pkwy. north of Washington St. Consider adding intersection if only 25% of project traffic continues east along Washington St. past Maria Dr. toward the intersection of Washington St./Sonoma Mountain Pkwy.

4) **LOS E at Washington St./McDowell Blvd. –** As noted above, to provide a more realistic analysis of the Washington St./McDowell Blvd. intersection, trip assignments should be revised to add vehicles to critical movements at this intersection which the current analysis does not provide, but which would exist in reality and almost certainly result in worsened LOS E at this intersection, impacts which should be quantified to see if the impacts are significant.

5) **Caltrans US-101 Ramp Intersections at Washington St. – LOS Criteria** –The traffic study should be revised to establish Caltrans' LOS threshold for the US-101 ramp intersections at Washington St., and analyzed accordingly if different than the LOS "D" threshold assumed.

CONCLUSION

Please feel free to give me a call if you have any questions.

Sincerely,

Larry Wymer, CA T.E. 1955

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Larry Wymer & Associates Traffic Engineering provides traffic/transportation engineering and transportation planning consulting services for development projects, public agencies, and others requiring solutions to their transportation challenges.

Owner Larry Wymer is a licensed traffic engineer with three decades of diverse experience covering a full range of traffic and transportation issues including completion of hundreds of letter reports, and over 100 full scale traffic impact study reports for developments ranging from small single-use developments to large multi-use developments having regional impact. His experience includes working with private clients, as well as public sector clients throughout California (including Caltrans, numerous Cities and Counties throughout California, and California tribal governments), as well as Nevada, Oregon, Washington, Florida, and other areas around the country. This experience with both the private and public sectors, and the establishment of successful, positive, working relationships with both private entities and public agency officials, helps to assure that fair and equitable traffic mitigation measures will be identified and/or negotiated when project induced traffic impacts are identified within our client's traffic impact studies. Mr. Wymer is known for his skillful report writing and strict attention to detail which assures that all traffic studies conform to NEPA/CEQA, State (i.e. Caltrans), and local agency standards, and include well researched, thorough, and detailed analysis which meet the expectation of reviewing agencies.

In addition to his involvement in typical transportation engineering projects, Mr. Wymer is an experienced expert witness in traffic engineering. His expertise includes three years of distinctive experience working with attorneys and expert witnesses to analyze impacts, design conceptual mitigated alternative site designs, and formulate opinions for use in depositions and expert witness testimony for over 100 properties undergoing eminent domain proceedings; as well as investigating, analyzing, reconstructing, and formulating opinions for over 100 accidents.

SERVICES PROVIDED

- Traffic/Transportation Engineering Consulting
- Transportation Planning Consulting
- Traffic Impact Studies
- Circulation Elements
- Traffic Operations and Flow Analysis
- Project Access & Internal Circulation Analysis
- Traffic Signal Warrant Analysis
- Expert Witness
- Traffic Data Collection
- Speed Studies

LARRY C. WYMER
Curriculum Vitae

PROFESSIONAL REGISTRATION

- California T.E. (Traffic Engineer) #TR-1955, February 1998
- Florida P.E. (Professional Engineer) #47692, February 1994
- Professional Traffic Operations Engineer (P.T.O.E.) #2187, June 2007-2010

PROFESSIONAL ORGANIZATIONS

- Institute of Transportation Engineers – Northern California Section
  - President (2007-08)
  - Section Administrator (2008-2012)
  - Board Member (2004-2012) through positions as Treasurer (2004-05), Secretary (2005-06), Vice President (2006-07), President (2007-08), Past President (2008-09), Section Administrator (2008-2012)
  - Various Chairs: Career/Student Guidance Chairperson (1997-2000), Technical Chairperson (1999-2000), Membership Chairperson (2004-2012), Archivist (2007-08).
- Institute of Transportation Engineers – Western District (aka District 6 / Western United States)
  - Candidate for ITE International Director representing Western District (2009-12 term)
  - Candidate for ITE Western District Secretary-Treasurer (2008-09 term)
  - Northern California Representative for Student Endowment Fund Grass Roots Committee (2007-2012)
  - Vice Chair for Student Initiatives (2008-2010)

COMMUNITY ORGANIZATIONS

- Admiral Neighborhood Association (Admiral neighborhood in West Seattle district of Seattle, WA)
  - President (Jan 2016-present)
- West Seattle Transportation Coalition (West Seattle district of Seattle, WA)
  - Board Member / Program Manager / Treasurer (July 2015-present)
- Southwest District Council (Seattle, WA)
  - Councilmember (Jan 2018-present)

EDUCATION / HONORS

- University of Texas at Arlington. B.S. in Civil Engineering, 1989
  - President - American Society of Civil Engineers Student Chapter
  - Distinguished Senior Award - Civil Engineering Department
  - Chi Epsilon National Civil Engineering Honor Society
  - Omicron Delta Kappa National Leadership Honor Society
- Recipient of ITE District 6 (Western US District) Presidential Proclamation (2008)

PROFESSIONAL EXPERIENCE

Owner, *Larry Wymer & Associates Traffic Engineering*, Lincoln, CA & Seattle, WA	Jan 2009 – Present
Manager, Traffic Engineering, *Gene E. Thorne and Associates*, Cameron Park, CA	Oct 2006 – April 2009
Senior Transportation Engineer, *Omni Means*, Roseville, CA	Feb 2004 – Sept 2006
Senior Transportation Engineer, *Analytical Environmental Services*, Sacramento, CA	July 2002 – Feb 2004
Manager, Traffic Engineering, *David Evans & Associates*, Roseville, CA	Aug 1999 – July\ 2002
Senior Transportation Engineer, *CCS Planning & Engineering*, Sacramento, CA	May 1996 – Aug 1999
Transportation Engineer, *Zook, Moore & Associate*, West Palm Beach, FL	Dec 1992 – Nov 1995
Transportation Analyst, *Kimley-Horn & Associates*, Orange, CA	Jan 1992 – Dec 1992
Associate Transportation Engineer, *DKS Associates,* Oakland & Santa Ana, CA	Jun 1989 – Nov 1991

College Internships

Transportation Technician, *Texas Transportation Institute*, Arlington, TX	Aug 1988 – May 1989
Environmental Technician, *Environmental Protection Agency,* Dallas, TX	Summer 1987

RELEVANT SKILLS / REPRESENTATIVE PROJECTS

REPORT PREPARATION SKILLS

- Have established a reputation for preparing exceptional traffic studies. An environmental agency client who obtains countless traffic impact studies for his EIR's calls mine 'the best traffic studies I have ever seen'; and a consultant who reviews all of the incoming traffic studies for a Northern California county has stated to me numerous times that those he receives from me are the best of all those he receives and reviews, and are so thorough with few to no errors that they require little to no review.

PROJECT MANAGEMENT / PUBLIC REPRESENTATION

- Have served as project manager on hundreds of diverse types of transportation planning/traffic engineering projects. Project management has included marketing to find and develop clients, identify their needs, and develop proposals to solve those needs; develop, monitor, and troubleshoot project budgets and scheduling; identify and assign project staff and resources; establish, attend, and/or oversee meetings with clients, stakeholders, public agency personnel, and the public; quality control of deliverables; perform and/or oversee engineering analysis and technical work (including report text, tables, figures, designs, report appendix, and overall appearance); oversee revisions and responses to comments; and present and support findings in meetings.
- Have served as the on-call traffic engineer supporting the traffic engineering staff for the City of Sacramento (1996-99), San Joaquin County (1999-2002), and Amador County (2006-08).
- Have organized, overseen, and served on numerous Project Development Teams, Technical Advisory Committees, etc.
- Have presented and supported report findings in scores of City council hearings, County supervisor meetings, and other public forums.
- Have served as a notable public representative of my profession through my work and leadership with the Institute of Transportation Engineers. This includes running and campaigning for International office representing the Western ITE District, running and campaigning for ITE Western District Secretary-Treasurer, and serving in two volunteer positions for the ITE Western District. I was also actively involved with the ITE Northern California Section for over 12 years serving in a total of ten different positions. I served on the ITE Northern California Board of Direction from 2004-2013, which included a term as President (2007-08), and a 4-year term as Section Administrator. I was also awarded an ITE Western District Presidential Proclamation in 2009.

TRANSPORTATION PLANNING

- Project manager/engineer on over 100 traffic impact studies ranging from small single-use developments requiring simple hand trip assignments and operations analysis to large regionally impacting multi-use developments requiring detailed computer analysis. (*NOTE: See attached list of traffic impact studies)*
- Project manager/engineer studying the feasibility of potential bypass alternatives for SR-49 traffic between I-80 and North Auburn, as well as traffic continuing to/from Nevada County. Analyzed existing travel patterns through use of video surveys and an associated DMV license plate check, oversaw the development and calibration of a MINUTP traffic model to simulate these patterns, tested ten alternative routes and various improvement strategies to alleviate congestion along the S.R. 49 corridor, and compared and contrasted the relative benefits and impacts associated with each of these alternatives, particularly in terms of how it eases congestion and improves operation of SR-49. Was an integral part of the SR-49 Bypass Study Technical Advisory Committee (TAC).
- Project manager/engineer of transportation/circulation studies for various design options associated with development of the Shingle Springs Rancheria in El Dorado County, a 160 acre site located adjacent to US-50 belonging to the Shingle Springs Band of the Miwok Indians. The latest proposed project includes a 238,500 sq. ft. casino and 250 room hotel with access via a new US-50 interchange. The various studies conformed to both CEQA/NEPA criteria and included: (1) Shingle Springs Hotel-Casino Environmental Assessment (EA), (2) Shingle Springs Medical Clinic-Residential EA, (3) Shingle Springs Interchange Project Study Report (PSR), and (4) Shingle Springs Interchange Project EIR/EA. Worked with El Dorado County traffic engineering personnel to establish analysis methodologies consistent with the El Dorado County General Plan, including helping the County to establish a matrix which outlines specific significant impact thresholds and criteria. The analysis investigated impacts to roadways and highways throughout all of El Dorado County through use of the El Dorado County MINUTP traffic model. The analysis also involved extensive research regarding recreational activity options within El Dorado County which resulted in an

establishment of the likely distribution of recreation oriented trips to and from the hotel component of the project. Also an active member of the Project Development Team (PDT).

- Project engineer for Project Study Reports (PSR) for I-80/Elkhorn-Greenback interchange in Sacramento and SR-99/Hammer Lane and SR-99/Wilson Way interchanges in Stockton. Assisted with development of traffic forecasts, performed traffic operation analyses for various alternatives and helped establish final recommended geometrics.
- Project manager/engineer assisting the developer of the Pheasant Run development in the City of Dixon by providing justification to the City of Dixon to change the parcel's zoning from light industrial to residential. Prepared a traffic study using the City's MINUTP model. Presented findings to the city council showing the lessened impacts which would accompany the proposed change in zoning. The city council subsequently approved the project.
- Project engineer performing numerous screenline analyses of fatal impacts associated with the development of Indian gaming casinos at various locations to help casino developers and tribes with the selection or elimination of potential casino locations in and around the San Francisco Bay metropolitan area.
- Project engineer in responsible charge of preparing the first circulation element for the newly incorporated City of Diamond Bar, California. The project included development of a corresponding forecast transportation demand model using EMME/2. Also organized and oversaw a license plate survey which quantified the through traffic along all of the city's arterials. Also prepared circulation element updates for the cities of South Pasadena and Chino Hills.
- Project engineer performing analysis of added trips within various San Diego County sub-regions which would be generated by new housing and commercial development associated with growth induced by development of the Jamul Indian gaming casino. Trips were established based on the number of jobs which would be established and the number of new homes which would be built to accommodate newly created jobs, with consideration for commutes occurring between and within each sub-region.
- Project engineer involved in the development and post-processing of the Riverside-San Bernardino Regional Transportation Model (RIVSAN) for the Riverside County Transportation Commission (RCTC) using TRANPLAN.
- Assistant project manager/project engineer for initial stages of preparation of the S. San Diego County Impact Fee Study.

TRAFFIC ENGINEERING

- Extensive experience analyzing intersection and roadway operations using a variety of methodologies, software applications, and traffic impact study guidelines. Operations analysis includes detailed methodologies requiring use of TRAFFIX and HCM software; more simple critical movement analysis methodologies (i.e. Circular 212, CMA); and straight volume-to-capacity analysis. Experience includes detailed research and surveys for purposes of collecting and establishing existing, proposed and future year field conditions including traffic volumes, geometrics, and signal timings; supplemented as necessary by experienced engineering judgment to establish reasonable assumptions when data is not available.
- Owned and operated business performing traffic data collection services, including peak hour intersection turning movement counts. Organized and supervised data collection crews, summarized traffic data for clients.
- Project manager/engineer for Ridge Road speed study to analyze 85th percentile speeds and safety consideration for establishment of a speed zone in the vicinity of the Jackson Rancheria, including testimony to Amador County Board of Commissioners.
- Served as traffic engineering expert on civil engineering site development plans for two civil engineering firms (David Evans and Associates, Gene E. Thorne and Associates) to establish proper selection and placement of traffic control devices, and assure conformity of other traffic engineering elements.
- Project manager/engineer for traffic control analysis of Lincoln Boulevard/Wyandotte Avenue intersection in the City of Oroville. Analyzed the feasibility of various traffic control measures to improve traffic operations at the intersection including signalization, all-way stop, and a round-about, along with opinions of costs for each alternative.
- Project manager/engineer for traffic operations and capacity analysis of design alternatives for a new roundabout intersection providing access to the new Grand Canyon Transit Center.
- Project engineer and assistant project manager for inventorying of City of Lodi's traffic control devices (signals, signing, and striping) and development of a database for use in monitoring and scheduling maintenance.
- Project engineer in responsible charge of overseeing data collection and analysis of traffic related data for the Contra Costa Transportation Authority's (CCTA) Traffic Service Objective (TSO) Monitoring Study. The study was the first detailed study performed to gauge the degree to which the County's traffic goals were met as compared to specific TSO's developed eight years earlier by CCTA, the five sub-County districts, Contra Costa County, Caltrans, BART and other local transit agencies, and the 20 incorporated cities within the County. Traffic Engineering analysis included level of service analysis for 120 intersection and numerous roadways, travel time studies and vehicle occupancy studies along freeways and dozens of major arterials, transit

ridership, park and ride lot utilization, reduction of accidents, and reduction of through truck traffic.

- Project engineer assisting in the redesign of Tropicana Avenue in Las Vegas, Nevada to an 8-lane facility by analyzing intersection design alternatives, and providing support in the preparation of final intersection, signal, and roadway designs.
- Principal project engineer for a corridor traffic improvement study for Spring Mountain Road in Las Vegas, Nevada.
- Experience and classroom training in use of TSIS/CORSIM (including TRAF-NETSIM, FRESIM), with ability to construct simulation models using ITRAF or write input code from scratch, and calibrate model with actual field conditions; applications include use in analyzing vehicle progression, signal coordination, and alternatives testing.
- Developed an expertise with the history of the development of civil and traffic engineering standards. This expertise was developed while employed with Zook, Moore and Associates whereby I researched, obtained and studied copies of old AASHTO, MUTCD, ITE, etc. manuals from their inception.
- Have collected and analyzed accident records for hundreds of locations to establish high accident locations, develop safety improvements, and perform cost-benefit analysis to help prioritize safety improvements.
- Project traffic engineer overseeing collection of forensic evidence, status of traffic control devices, etc. at accident locations as soon as possible after incident at the request of public agencies, insurance companies, etc.
- Project engineer assisting public agencies with dozens of tort cases involving traffic control devices. Performed detailed research to establish governing professional and legal standards at time of installation, and analyzed traffic control devices to establish conformity to those governing standards.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

- Project engineer involved in the traffic engineering element of the Long Beach-Los Angeles Metro Blue Line Light Rail Transit Project. Field manager overseeing the bench and field testing and installation of modified local and central traffic signal control and surveillance software for all 27 traffic signals within the City of Los Angeles. Worked hand-in-hand with City of Los Angeles traffic engineering personnel to integrate system into City's ATSAC (Automated Traffic Surveillance and Control) system at the City's ATSAC Operations Center. Continued to provide system fine tuning, modifications, and on-call troubleshooting during actual operation of the system. Modified design specifications and prepared final as-built functional specifications and users manuals for the software. Also assisted in the development of the automated traffic signal testing programs created specifically for the project.

CALTRANS INITIAL STUDIES

- Project manager/engineer on seven Initial Studies analyzing impacts associated with roadway and intersection improvements along SR-16 associated with the expansion of the Cache Creek Casino in Yolo County. The first of seven Initial Studies analyzed impacts associated with revised project access to the casino including a new signalized entrance, two new additional access driveways, and the widening and realigning of SR-16 adjacent to the casino. The other six Initial Studies analyzed impacts associated with improvements at six off-site intersections along SR-16 to accommodate increased traffic volumes associated with the expansion. Also active member of Project Development Team (PDT), and participated in public meeting in the affected community accepting comments on the first of the seven Initial Studies.

BICYCLE ROUTE STUDIES

- Completed the Safety and Transportation Analysis section of the City of Sacramento Bikeway Master Plan Update EIR which addressed safety and traffic related impacts which would be associated with adoption of the proposed plan amendments studied. Issues which were addressed included cyclist safety including shared use of roadways, potential conflicts with traffic, adequacy of roadways to accommodate proposed bikeways, and impacts associated with barriers such as freeways, freeway interchanges, rivers, railroad crossings, and major intersections. The analysis also addressed the consistency of the Bikeway Master Plan Amendment with local and regional transportation plans and programs.

CONSTRUCTION TRAFFIC HANDLING

- Project engineer responsible for evaluating traffic impacts and preparing preliminary traffic handling strategies for SRCSD pipeline construction projects along major arterials in Sacramento County including the 8 mile long Folsom 2 Interceptor and the 34 mile long Northwest Interceptor.
- Project engineer responsible for performing field inspections and assisting in the preparation of PS&E for traffic handling, construction area signing, and pavement delineation along the project corridor for the US-50 Storm Damage Repair Project in Caltrans District 3.

SPECIAL EVENT TRAFFIC MANAGEMENT

- Project engineer responsible for aspects of traffic and parking for the first annual Wings over Stockton Air Show with an attendance of over 100,000 people. Responsibilities included designing and overseeing creation and placement of signing

designating routes into and through the City of Stockton to off-site shuttle lots and on-site parking; design of on-site parking including public parking, handicap, and various special pass lots; overseeing actual parking and traffic during the show including coordinating the activities of approximately 250 volunteers and troubleshooting.

EMINENT DOMAIN / SITE DEVELOPMENT & ANALYSIS

- Project engineer involved with analyzing the impacts to over 100 properties undergoing eminent domain proceedings for use in expert witness testimony. Analysis of impacts and design of mitigating cures requires investigation and analysis of numerous issues encompassing many disciplines of civil engineering in addition to traffic engineering, transportation planning, and roadway design. Civil and traffic engineering issues which are typically addressed include site access and circulation, parking, building setbacks and landscape buffers, site drainage, adjacent roadway design, conceptual site redesigns, and preparation of construction cost estimates. Transportation planning issues include concurrency reviews and conceptual traffic impact analysis for both vacant sites and fully developed sites with alternative land use concepts. Work with attorneys as well as marketing experts, appraisers, contractors, and engineers acting as expert witnesses to help formulate final opinions and courtroom defense tactics.

ACCIDENT STUDIES & ACCIDENT RECONSTRUCTION

- Project engineer involved with the investigation and reconstruction of over 100 accidents for use in expert witness testimony. Analyze accident dynamics through hand calculations, graphical analysis, and the utilization of accident reconstruction computer programs such as EDVAP. Investigate potential deficiencies in roadway designs and traffic control. Research accident histories and conduct cost-benefit analysis for potential improvements at high accident risk locations. Work with attorneys and engineer acting as expert witness to help formulate final opinions and courtroom defense tactics.

EXPERT WITNESS

- Served as expert witness providing analysis, establishment of expert opinions, deposition testimony, and ultimately expert witness testimony at trial for an accident case between a vehicle and bicycle within the vicinity of a roadway construction project. Opinions considered the circumstances of the accident; applicable vehicle codes; and applicable federal, state, county, and city standards for traffic control and construction zones.

OFFICE/BUSINESS MANAGEMENT

- Owner of Larry Wymer & Associates Traffic Engineering (2009-present).
- Developed and managed Transportation Engineering Department at Gene E. Thorne & Associates in Cameron Park (2006-2009).
- Managed newly established Transportation Engineering Department of David Evans & Associates' Roseville office (2000-2002).
- Served as interim office manager of CCS Planning and Engineering's Sacramento office during the summer of 1997.
- Former licensed irrigator in Texas - Owner and operator of Forever Green Lawn Irrigation (June 1986 - June 1989) and Co-Operations Manager/Salesman at Sprinkler Engineering Corporation (Feb. 1982-June 1986).

SELECTED TRAFFIC IMPACT STUDIES

- ***Karuk Tribes Fee-to-Trust Residential Developments*** (Siskiyou County) – 18 single family residences.
- ***Shingle Springs Fee-to-Trust #2 Residential Development*** (El Dorado County) – ten single family residences.
- ***Coos Bay Casino TIS*** (City of Coos Bay, OR) –15,194 sq. ft. casino.
- ***Martin Ranch East Development TIS*** (City of Oroville, CA) – 71 acres with 267 single family residences, 795 apartment units, and 40,000 ft of nixed use retail and professional offices.
- ***Harrington Business Park TIS*** (El Dorado County) – 65.55 acre site with 35 industrial parcels totaling 501,507 sq. ft., and 7 commercial parcels totaling 212,370 sq. ft.
- ***Oak Highlands Subdivision TIS*** (El Dorado County) – 52.09 acre site with 220 single family residences, and 48 condominiums.
- ***Penobscot Ranch Subdivision TIS*** (El Dorado County) – 331.54 acre site with 33 single family residences.
- ***Diamond Plaza TIS*** (El Dorado County) – 1.80 acre site with 10,389 sq. ft. retail, 5,603 sq. ft. office, 3,644 sq. ft. restaurant, and 7 single family residential lots.
- ***Wild Chaparral Offices TIS*** (El Dorado County) – 2.00 acre site with 18,000 sq. ft. office.
- ***Ervin Ranch Subdivision TIS*** (El Dorado County) – 1,781.45 acre site with 181 single family residences, and 523.27 acre regional park.
- ***Harrington Business Park TIS*** (El Dorado County) – 65.55 acre site with 35 industrial parcels totaling 501,507 sq. ft., and 7 commercial parcels totaling 212,370 sq. ft.
- ***Oak Highlands Subdivision TIS*** (El Dorado County) – 52.09 acre site with 220 single family residences, and 48 condominiums.
- ***Piedmont Oaks Subdivision TIS*** (El Dorado County) – 46.26 acre site with 221 single family residences, 60 condominiums, and 22,542 sq. ft. retail.
- ***Shingle Creek Village TIS*** (El Dorado County) – 21.47 acre senior housing development with single and multi family residences, an assisted living facility, low income housing residences, and mixed retail/medical offices.
- ***Lakeside Avenue Sub-division TIS*** (City of Redding) – 25.9 acre site with 40 single family residences.
- ***Willows Wal-Mart Expansion TIS*** (City of Willows) – Replacement of existing Wal-Mart store with 187,348 sq. ft. Wal-Mart Supercenter, plus 3,206 sq. ft. fast food restaurant with drive through, and gas station.
- ***Sierra College Center TIS*** (City of Rocklin) – 9.83 acre site with 77,588 sq. ft. of retail/office development.
- ***West Ridge MP TIS*** (City of Redding) - 400 acre site with 296 single family residences.
- ***Chico Wal-Mart South TIS*** (City of Chico) – Expansion of existing 97,124 sq. ft. Wal-Mart store to a 223,013 sq. ft. Wal-Mart Superstore, plus a 5,000 sq. ft. fast food restaurant with drive through, and gas station.
- ***Woodcreek Terraces TIS*** (City of Roseville) – 10 acre site with 30,420 sq. ft. of mixed retail, and 53 single family dwelling units.
- ***Tierra Oaks TIS*** (City of Redding) – Expansion of subdivision to include an additional 57 single family residences.
- ***Oroville Retail NW of SR-70 & Nelson TIS*** (City of Oroville) – 15.56 acres with 271,117 sq. ft. of retail/business.
- ***Martin Ranch TIS*** (City of Oroville) – 70 acres with 238 single family residences.
- ***Fiddler Green TIS*** (Placer County) - 18.5 acre site 116 single family residences.
- ***Butte Woods 2 TIS*** (City of Oroville) - 55 acre site with 169 single family residences.
- ***Bella Ceda TIS*** (City of Oroville) - 24.1 acre site with 22,000 sq. ft. medical-dental office, 7,000 sq. ft. restaurant, and 87 single family residences.
- ***Javani Estates TIS*** (Sacramento County) - 7.67 acre site with 74,527 sq. ft. of grocery/retail.
- ***Oroville Los Olivos & Ceraolo TIS*** (City of Oroville) - 35 acre site 132 single family residences.
- ***Mercy San Juan Medical Center TIS*** (Sacramento County) – Expansion of existing hospital with new 142,683 sq. ft. hospital tower, and a new 40,000 sq. ft. medical office building, as well as two new parking structures.
- ***Auburn Fitness TIS*** (Placer County) – 3.5 acre site with 35,000 sq. ft fitness center.
- ***West Tuolumne Rd Subdivision*** (City of Turlock) – 48 single family residences.
- ***California Waste Recovery & Transfer Station*** (City of Galt) – 5 acre waste/recycling transfer facility.
- ***Walnut Avenue Theater / Retail Project*** (City of Galt) – 15.5 acre site with 117,000 sq. ft. retail and 43,000 sq. ft. (11 screen / 1,800 seat) movie theatre.
- ***Rocklin Pavilion*** (City of Rocklin) – 41.9 acre site with 415.1 sq. ft. of retail shopping center and 15,000 sq. ft.

office.

- ***Cache Creek Casino-Hotel*** (Yolo County) – 262,137 sq. ft. casino and 200 room hotel.
- ***Enterprise Rancheria Casino-Hotel*** (Yuba County) – 40 acre site including a 207,760 sq. ft. casino and 170 room hotel.
- ***Auburn Rancheria School*** (Placer County) – 2.84 acre site including 19,354 sq. ft. facility with school, administrative and tribal offices, health center, and assembly hall.
- ***Guenoc Winery*** (Lake and Napa County) – Expansion of irrigated winery vineyard, pasture, and forage cropland from 1,819 acres to 6,847 acres.
- ***Lincoln Gateway Development*** (City of Lincoln) – Analysis of three alternatives for 18 acre site: (1) Proposed Project: 52,500 sq. ft. retail, 5,000 sq. ft. restaurant, 12,500 sq. ft. fast food, 75,000 sq. ft. professional office, 25,000 sq. ft. medical office, and 150 affordable senior residences; (2) Reduced Commercial/Reduced Residential Alternative: 39,375 sq. ft. retail, 12,500 sq. ft. fast food, 56,250 sq. ft. professional office, 18,750 sq. ft. medical office, and 112 affordable senior residences; (3) Reduced Commercial/Increased Residential Alternative: 52,500 sq. ft. retail, 12,500 sq. ft. fast food, 5,000 sq. ft. restaurant, 44 single family residences, and 138 affordable senior residences.
- ***Latrobe Self Storage*** (El Dorado County) – Rezone of 7.0 acre site from Research/Development to self-storage facility containing 104,880 sq. ft. of enclosed storage space (containing up to 693 storage units), 121 RV parking spaces, and a 4,052 sq. ft. manager office/residence.
- ***Horizon Church*** (San Joaquin County) – 10, 880 sq. ft. church.
- ***Timbisha Shoshone Casino-Hotel*** (City of Hesperia) – 58.1 acres including 182,500 sq. ft. casino and 300 room hotel.
- ***Ione Casino-Hotel*** (City of Plymouth) – 120,000 sq. ft. casino and 250 room hotel.
- ***Sacramento Mormon Temple*** (Sacramento County) – 47 acre site containing 17,500 sq. ft. the Church of Jesus Christ of Latter-Day Saints temple, a clothing and curriculum supply distribution center, and two caretakers' residences.
- ***Evans Creek Storage*** (El Dorado County) – 122,000 sq. ft. of enclosed storage space consisting of up to 752 storage units.
- ***Travis Crossing Apartments*** (Solano County) – 9.52 acres with 181 apartments.
- ***All Outdoor Whitewater Rafting*** (El Dorado County) – Modification of existing 7.5 acre site to provide for commercial whitewater rafting put-ins and take-outs at the site.
- ***Chapa De Indian Health Program Medical Center*** (City of Grass Valley) – 26,980 sq. ft. medical clinic.
- ***Shingle Springs Casino-Hotel*** (El Dorado County) – 238,500 sq. ft. casino complex and 250 room hotel.
- ***Shingle Springs Clinic and Residential Development*** (El Dorado County) – 14,335 sq. ft. health clinic and six single family residences.
- ***Paskenta (Rolling Hills) Reservation Casino*** (Tehama County) – 50 acres including 60,000 sq. ft. casino.
- ***Santa Rosa Rancheria Fire Station*** (King County) – Relocation of Kings County Fire Station #7 to Santa Rosa Rancheria adjacent to The Palace Casino.
- ***Greenville Rancheria Casino*** (Tehama County) – Analysis of 2 alternatives: (1) 120,000 sq. ft. casino; (2) 122,250 sq. ft. commercial development.
- ***Mechoopda/Chico Rancheria Casino*** (Butte County) – 7.58 acres with 41,600 sq. ft. casino.
- ***Sienna Vista PCD Development*** (City of Phoenix, Arizona) – 260.6 acre mixed use development including 805 single family residences, elementary school, convenience market/gas station, and 13.5 acre park.
- ***North Coast Business Park*** (Clatsop County, Oregon) – Master plan of 270 acre community with analysis of 2 alternatives: (1) 59.4 acres light industrial, 80 bed youth correctional facility and county animal shelter; (2) 59.4 acres light industrial, 326,700 sq. ft. shopping center, 170 county jail, 80 bed youth correctional facility county animal shelter, and 2,100 student junior college.
- ***San Jose Continuation High School*** (City of San Jose)
- ***Coachella-Augustine Rancheria Casino*** (Riverside County) – Two studies: (1) 162,500 sq. ft. Casino, 200,000 sq. ft. Retail, 400 room hotel, and an 18 hole golf course; (2) scaled down development with a 31,200 sq. ft. casino.
- ***Sybil Women's Prison*** (Los Angeles County) – renovation of 900 bed Sybil Brand Institute and Correction Facility.
- ***5-Star Storage*** (El Dorado County) – 3.34 acres with 295 storage units.

- ***Cameron Park Storage*** (El Dorado County) – 5.9 acres with 90,790 sq. ft. of enclosed storage and 105 RV parking spaces.
- ***Rios Labor Farm Camp*** (San Joaquin County) – existing 80 acre farm with 75 proposed housing units to accommodate approximately 400 employees/labor camp residents.
- ***Delta Church*** (San Joaquin County) – 37,580 sq. ft. church including a 499 seat worship area, education, and administration facilities, as well as outdoor recreational facilities.
- ***Central Valley Baptist Church*** (San Joaquin County) – 10,000 sq. ft. church and 2,400 sq. ft. multi-purpose building.
- ***Granade Automotive*** (El Dorado County) – 4,000 sq. ft. automotive repair garage.
- ***March Industrial Park*** (City of Roseville) – 5.25 acres of light industrial development.
- ***Arbor View Development*** (City of Roseville) – 6.8 acres with 29, 909 sq. ft. retail, 7,477 sq. ft. office, and 4,500 sq. ft. restaurant.
- ***Lincoln Terrace Apartments*** (City of Lincoln) – 5.1 acres with 80 apartments.
- ***6th Street Extension*** (City of Lincoln) – Impacts associated with abandonment of proposed westward extension of 6th Street to accommodate 190 dwelling unit apartment complex.
- ***Warmington Homes*** (City of Auburn) – 16.98 acre rezone from commercial to residential to accommodate 83 single family residences.
- ***Forest Hill Retirement Community*** (Placer County) – 1700 unit active retiree community.
- ***Peabody Green Residential Development*** (City of Fairfield) – 17.9 acres with 146 single family residences.
- ***Pleasant Valley Executive Homes*** (City of Vacaville) – 629 acre single family residential development with planning level analysis of 500 units vs. 700 units vs. 900 units vs. 1,200 units.
- ***Pheasant Run*** (City of Dixon) – 37 acre rezone from light industrial to 132 single family residences and 4.71 acres of highway commercial development.
- ***Second Street Senior Apartments*** (City of Dixon) – 3.8 acres containing 81 affordable senior apartments.
- ***Vineyard Springs Comprehensive Plan Update*** (Sacramento County) – 2,560 acre community with analysis of 2 alternatives: (1) 5,409 single family residences, 1,160 multi-family residences, 100,000 sq. ft. medical/dental office, 100,000 sq. ft. general office, 2 elementary schools, 18-hole golf course, 10 neighborhood parks; (2) 5,399 single family residences, 1,170 multi-family residences, 14 acres shopping center, 5 acres limited commercial, 146,000 sq. ft. medical/dental office, 146,000 sq. ft. general office, 2 elementary schools, 18-hole golf course, 10 neighborhood parks.
- ***Arcadian Village Community Plan Amendment Update*** (Sacramento County) – 268 acres including 883 single family residences, 300 multi-family residences, 22 acres commercial, 11 acres office, 1 elementary school, 3 neighborhood parks, 1 community park.
- ***Riverwalk General Plan/Community Plan Amendment*** (Sacramento County) – 677 acres including 305 single family residences, 18-hole golf course, 35 acre equestrian center, swim/tennis club.
- ***Deer Creek Hills Community Plan*** (Sacramento County) – 1,892 acre seniors community including 2,224 single family residences, 775 multi-family residences, 150 dwelling unit congregate care facility, 50 bed nursing home, 80,000 sq. ft. shopping center, 30,000 sq. ft. medical/dental office, 18-hole golf course.
- ***Embassy Suites Waterfront Hotel*** (Downtown City of Sacramento) – 248 room hotel with meeting rooms, restaurant, bar, retail.
- ***Capitol East End Office Development*** (Downtown City of Sacramento) – 1.45 million sq. ft. state office park immediately east of State Capitol.

- ***Capitol Area Plan Update*** (Downtown City of Sacramento) – Master plan for downtown Sacramento including development of 2.8 million sq. ft. of new office, 4,211 new parking spaces, 90,000 sq. ft. of new commercial, and 725 new residential dwelling units.
- ***Neighborhood Preservation Transportation Plan (NPTP) Alternative Analysis*** (Downtown City of Sacramento) – Recirculation of traffic following implementation of complex network of traffic calming measures.
- ***Coral Business Park*** (City of Sacramento) – 18 acres including 360,000 sq. ft. office park, gas station/restaurant, 2 restaurants, 240 room hotel.
- ***Farmer's Market IV*** (City of Sacramento) – 90,000 sq. ft. office.
- ***Calvary Christian School*** (City of Sacramento) – 300 student elementary school/day care center.
- ***Citgo 7-11 Convenience Store*** (City of Sacramento)
- ***Taco Bell at Folsom/53rd*** (City of Sacramento)
- ***South Sacramento Streams*** (City of Sacramento) – Area wide levee improvement project.
- ***Arch Road Industrial Site*** (San Joaquin County) – 103 acres including 2,700,000 sq. ft. light industrial/warehouse.
- ***Woodson Road Trucking Facility*** (San Joaquin County) – 15 acre agricultural trucking facility.
- ***Morada Ranch*** (City of Stockton) – 265 acre rezone including 107 single family residences, 413,000 sq. ft. commercial.
- ***University of the Pacific Campus Plan*** (City of Stockton) – Reconfiguration of campus roadways and circulation.
- ***Sacramento Valley (Bill Graham Presents) Amphitheater*** (Yuba County) – 20,000 seat concert amphitheater.
- ***City of Dixon Multi-Modal Station*** (City of Dixon) – Commuter Rail Station.
- ***San Joaquin River Conservancy EIR*** (Fresno and Madera Counties) – Development of recreational facilities along 45 miles of San Joaquin River.
- ***Pleasant Grove/Foothills Commercial Center - Woodcreek Plaza*** (City of Roseville) – 14 acres including 12,300 sq. ft. shopping center, 16,800 sq. ft. quality restaurant, 2,000 sq. ft. fast food restaurant, 8,400 sq. ft. medical office, 8,400 sq. ft. general office, 7,800 sq. ft. day care center.
- ***Lifescan 2 Corporate Expansion*** (City of Milpitas) – 85,000 sq. ft. add on of administrative office to corporate park.
- ***Peery-Arrilliga Business Park*** (City of Milpitas) – 144 acres including 1,945,000 sq. ft. of research and development center, 150,000 sq. ft. general office, 110,000 sq. ft. commercial.
- ***Treefarm Condominium/Office Development*** (City of Los Altos) – Includes 90 multi-family residences, 72,000 sq. ft. office, 28,000 sq. ft. retail.
- ***Phil Lewis Property*** (West Palm Beach, Florida) – 100,000 sq. ft. light industrial development.
- ***Parkway Center*** (Downtown City of Las Vegas, Nevada) – 250 acres including 3 hotel/casinos (5,404,000 sq. ft.), 1,642,000 sq. ft. office, 1,690,000 sq. ft. County Administration Center, 773,000 sq. ft. commercial, 78,000 sq. ft. fast food, 65,000 sq. ft. quality restaurant, 65,000 sq. ft. high turnover restaurant.
- ***The Orchards Development*** (City of Las Vegas, Nevada) – 432 acres including 1,750 single family residences, 1,250 multi-family residences, 11.3 acres commercial, 600 student elementary school, 15,400 sq. ft. church, 13 acre city park.
- ***Meadow Valley Development – North & South*** (Clark County, Nevada) – 75 acres including 294 single family residences, 376 multi-family residences, 3,700 sq. ft. bank, and 58,000 sq. ft. commercial.
- ***Greenway Gardens Development*** (City of Henderson, Nevada) – 89 single family residences.
- ***Foothills North Development*** (City of Henderson, Nevada) – 43 acres including 205 single family residences.
- ***Wilson Tower Development*** (City of San Gabriel) – 25,000 sq. ft. 3-story commercial/office building.
- ***Huntington Plaza Development*** (City of South Pasadena) – 23,000 sq. ft. 2-story commercial/office building.
- ***Guasti Community*** (City of Ontario/Ontario International Airport) – 74 acres including 2,038,000 sq. ft. of office, 422,000 sq. ft. of office/industrial, 3 hotels with 1,100 rooms and commercial uses.
- ***Beach Blvd./La Mirada Blvd. Shopping Center*** (City of Buena Park) – 11 acres including 53,000 sq. ft. supermarket and 78,000 sq. ft. commercial.
- ***Villages of Palm Springs*** (City of Palm Springs) – 348 single family residences.
- ***Duoc Su Buddhist Temple*** (City of Garden Grove)
- ***San Juan Meadows Development*** (City of San Juan Capistrano) – Residential development with 18-hole golf course and driving range.
- ***Bixby Old Ranch Development*** (City of Seal Beach) – 231 acres including 168 single family residences, 125

multi-family residences, 15,000 sq. ft. restaurant, 180 room hotel.

- ***Santa Monica College Satellite Campus - Madison School Site*** (City of Santa Monica) – Use of old elementary school to accommodate 8 college classrooms and a day care center for 24 children.
- ***South Gate New Elementary and High Schools*** (City of South Gate) – 100 classroom (2,700 student) high school and 21 classroom (600 student) elementary school.

EXHIBIT B

AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE

April 2005

California Environmental Protection Agency
California Air Resources Board

Executive Summary

The Air Resources Board's (ARB) primary goal in developing this document is to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution. Recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. Other studies have shown that diesel exhaust and other cancer-causing chemicals emitted from cars and trucks are responsible for much of the overall cancer risk from airborne toxics in California. Also, ARB community health risk assessments and regulatory programs have produced important air quality information about certain types of facilities that should be considered when siting new residences, schools, day care centers, playgrounds, and medical facilities (i.e., sensitive land uses). Sensitive land uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the non-cancer effects of air pollution. There is also substantial evidence that children are more sensitive to cancer-causing chemicals.

Focusing attention on these siting situations is an important preventative action. ARB and local air districts have comprehensive efforts underway to address new and existing air pollution sources under their respective jurisdictions. The issue of siting is a local government function. As more data on the connection between proximity and health risk from air pollution become available, it is essential that air agencies share what we know with land use agencies. We hope this document will serve that purpose.

The first section provides ARB recommendations regarding the siting of new sensitive land uses near freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline dispensing facilities. This list consists of the air pollution sources that we have evaluated from the standpoint of the proximity issue. It is based on available information and reflects ARB's primary areas of jurisdiction – mobile sources and toxic air contaminants. A key air pollutant common to many of these sources is particulate matter from diesel engines. Diesel particulate matter (diesel PM) is a carcinogen identified by ARB as a toxic air contaminant and contributes to particulate pollution statewide.

Reducing diesel particulate emissions is one of ARB's highest public health priorities and the focus of a comprehensive statewide control program that is reducing diesel PM emissions each year. ARB's long-term goal is to reduce diesel PM emissions 85% by 2020. However, cleaning up diesel engines will take time as new engine standards phase in and programs to accelerate fleet turnover or retrofit existing engines are implemented. Also, these efforts are reducing diesel particulate emissions on a statewide basis, but do not yet capture every site where diesel vehicles and engines may congregate. Because living or going to school too close to such air pollution sources may increase both cancer and non-cancer health risks, we are recommending that proximity be considered in the siting of new sensitive land uses.

Table 1-1

Recommendations on Siting New Sensitive Land Uses Such As Residences, Schools, Daycare Centers, Playgrounds, or Medical Facilities*

Source Category	Advisory Recommendations
Freeways and High-Traffic Roads	• Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	• Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). • Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	• Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. • Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	• Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the ARB on the status of pending analyses of health risks.
Refineries	• Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	• Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloro-ethylene	• Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. • Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	• Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

*Notes:

- These recommendations are advisory. Land use agencies have to balance other considerations, including housing and transportation needs, economic development priorities, and other quality of life issues.

As mentioned above, air pollution levels in the immediate vicinity of large gasoline dispensing facilities may be higher than the surrounding area (although tailpipe emissions from motor vehicles dominates the health impacts). Very large gasoline dispensing facilities located at large wholesale and discount centers may dispense nine million gallons of gasoline per year or more. At nine million gallons, the potential risk could be around 25 in one million at 50 feet, dropping to about five in one million at 300 feet. Some facilities have throughputs as high as 19 million gallons.

Recommendation

- Avoid siting new sensitive land uses within 300 feet of a large gasoline dispensing facility (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

References

- *Gasoline Service Station Industry-wide Risk Assessment Guidelines.* California Air Pollution Control Officers Association (December 1997 and revised November 1, 2001)
- *Staff Report on Enhanced Vapor Recovery.* ARB (February 4, 2000)
- *The California Almanac of Emissions and Air Quality.* ARB (2004)
- *Staff Report on Enhanced Vapor Recovery Technology Review.* ARB (October 2002)

Other Facility Types that Emit Air Pollutants of Concern

In addition to source specific recommendations, Table 1-3 includes a list of other industrial sources that could pose a significant health risk to nearby sensitive individuals depending on a number of factors. These factors include the amount of pollutant emitted and its toxicity, the distance to nearby individuals, and the type of emission controls in place. Since these types of facilities are subject to air permits from local air districts, facility specific information should be obtained where there are questions about siting a sensitive land use close to an industrial facility.

Potential Sources of Odor and Dust Complaints

Odors and dust from commercial activities are the most common sources of air pollution complaints and concerns from the public. Land use planning and permitting processes should consider the potential impacts of odor and dust on surrounding land uses, and provide for adequate separation between odor and dust sources. As with other types of air pollution, a number of factors need to be considered when determining an adequate distance or mitigation to avoid odor or

EXHIBIT C

Based on its review of the entire record herein, the City Council makes the following findings:

1. A site plan architectural review ("SPAR") pursuant to Chapter 24 of the City's Implementing Zoning Ordinance ("IZO") is a discretionary entitlement that expressly includes the authority to "approve the project as applied for, approve the project with modifications or disapprove the project." (IZO, § 24.010, subd. (G).)

2. The City maintains authority under the IZO to deny a SPAR based on broad considerations including "the harmony of the development with its surroundings" and the "siting of the structure on the property, as compared to the siting of other structures in the immediate neighborhood." (IZO, § 24.010, subd. (G)(1).)

3. When the IZO authorizes the City to exercise discretion, "that discretion may be exercised to impose more stringent requirements than set forth in [the] Zoning Ordinance, as may be determined by the review authority to be necessary to promote appropriate land use and development, environmental resource protection, and other purposes of [the] Zoning Ordinance." (IZO, § 1.040.)

4. Any discretionary action by the City, including approving a SPAR, must be consistent with the City's General Plan. The City's General Plan provides that to avoid potential health effects and citizen complaints, the City should "[l]ocate new stationary sources of air pollutants . . . at sufficient distances away from residential areas and facilities that serve sensitive receptors to avoid significant impacts caused by odors, dust, and toxic air contaminants." (General Plan Policy 4-P-17.)

5. The California Air Resources Board ("CARB") provides land use guidance to local agencies in order to address human health risks in its Air Quality and Land Use Handbook ("CARB Handbook"). CARB advises that local agencies should "[a]void siting new sensitive land uses within 300 feet of a large gasoline dispensing facility (defined as a facility with a throughput of 3.6 million gallons per year or greater)." This guidance is cited with approval by the Bay Area Air Quality Management District and the California Air Pollution Control Officers' Association.

6. The proposed project would be located merely 60 feet from the nearest sensitive receptor, the 4CS Petaluma Child Development Center, at 401 S. McDowell Boulevard. Additional sensitive receptors within 300 feet include the North Bay Children's Center, McDowell Elementary School and several residential dwellings.

7. A site-specific health risk analysis was prepared for the proposed project, following current methodologies, which found that the project would result in significant health risks to nearby sensitive receptors.

8. Siting the proposed project at the proposed location in relation to the siting of other structures in the immediate neighborhood creates disharmony. (IZO, § 24.010) It is inconsistent with land use guidance advising at least 300 feet from sensitive receptors.

9. The proposed project is contrary to the public health, safety, and general welfare by exposing residents to health risks from toxic air contaminants. (IZO §1.040) Multiple regulatory guidance documents, as well as a site-specific health risk assessment, find that the proposed project is too close to existing sensitive receptors and will therefore result in significant human health impacts.

10. The proposed project is inconsistent with General Plan Policy 4-P-17 because the project is a new stationary source of air pollutants that is not a sufficient distance away from sensitive receptors, and would cause detrimental health effects.

EXHIBIT D

Equivalency Results

How are they calculated?

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

75,540 Metric Tons

Greenhouse gas emissions from

16,175

Passenger vehicles driven for one year

-or-

185,145,833

Miles driven by an average passenger vehicle

-or-

26,320

Tons of waste recycled instead of landfilled

-or-

3,764

Garbage trucks of waste recycled instead of landfilled

CO_2 emissions from

8,500,000

gallons of gasoline consumed

-or-

82,647,155

Pounds of coal burned

-or-

1,000

tanker trucks' worth of gasoline

-or-

8,157

homes' energy use for one year

-or-

19.1

Wind turbines running for a year

-or-

11,322

homes' electricity use for one year

-or-

412

railcars' worth of coal burned

-or-

2,528,096

Incandescent lamps switched to LEDs

-or-

174,890

barrels of oil consumed

-or-

3,088,033

propane cylinders used for home barbeques

-or-

0.019

coal-fired power plants in one year

Carbon sequestered by

1,957,693

88,975

tree seedlings grown for 10 years

-or-

acres of U.S. forests in one year

-or-

616

acres of U.S. forests preserved from conversion to cropland in one year

EXHIBIT E

Guidelines for

Traffic Impact Studies

Department of Transportation and Public Works & Permit and Resource Management Department | County of Sonoma | May 2016

The preparer should consider the selection of the weighted average rate or the fitted curve for the chosen ITE land use code when determining the project's trip generation. Selection of either the weighted average rate or the fitted curve should be justified and submitted to DTPW for review.

Local trip generation rates may be used in place of trip generation rates in the *Trip Generation Manual.* This would apply to land uses not included in the *Trip Generation Manual*. Wineries, wine tasting facilities, and distilleries are examples of land uses not included in the *Trip Generation Manual.* Prior to use of local trip generation rates in a TIS, all data and assumptions for local trip generation rates shall be submitted to PRMD and DTPW staff for review and approval. Consult with DTPW staff regarding trip generation rates for wineries with tasting room(s).

Pass-by trip reductions consider site trips drawn from the existing traffic stream on an adjacent street, recognizing that trips drawn to a site would otherwise already traverse the adjacent street regardless of existence of the site. Pass-by trip reductions allow a percentage reduction in the forecast of trips otherwise added to the adjacent street from the proposed development. The reduction applies only to volumes on adjacent streets, not to ingress or egress volumes at entrances serving the proposed site. Unless otherwise approved by DTPW, the pass-by rates utilized shall be those reported in the most recent version of the ITE Trip Generation Handbook. Pass by rates shall only be used upon DTPW approval.

Internal capture rates consider site trips "captured" within a mixed use development, recognizing that trips from one land use can access another land use within a site development without having to access the adjacent street system. Internal trip reductions and modal split assumptions require analytical support and approval from DTPW.

Daily trips may be reduced by allowing for public transit when a transit stop is located within one thousand (1,000) feet of the development. The maximum reduction allowed is five (5) percent. Transit reductions do not apply to hotels, restaurants, retail, or financial uses.

Level of Service & Operation Analysis

Methodologies from the most recent version of the *Highway Capacity Manual* shall be used to determine operating conditions on roadway segments, and signalized and unsignalized intersections. Alternatives to the *Highway Capacity Manual* methodologies shall be approved by DTPW prior to use in a TIS. At intersections controlled by a traffic signal,

existing traffic signal timing data shall be used for all analysis conditions and is available from DTPW or Caltrans. For unsignalized intersections the study shall provide the overall intersection operating condition as well as the operating condition for the worst movement.

Analysis of traffic conditions using a microsimulation model may be required by DPTW. A minimum of ten (10) average model runs, excluding any outlying/anomalous results, shall be required when microsimulation is used.

Calculations, assumptions, and supporting data for the conclusions presented shall be submitted as part of the TIS. The calculations shall be comprehensive and easily understood.

3. **Future Roadway Improvements:** All assumed circulation network improvements used in the analysis shall be clearly stated in the report. Planned roadway improvements shall only be assumed completed for use in the TIS if the improvement project is fully funded and programmed for construction. The TIS must identify the specific improvements, funding source, and time-frame for completion of any included roadway improvements.

4. **Future Land Use:** Projection of future land uses and development should be made in consultation with planning staff at PRMD. A minimum 10-year growth projection is required for an interim evaluation (if necessary) and a long-term growth projection is required for cumulative impact analysis consistent with the General Plan. Long-term projected traffic volumes shall be developed using either the most recent version of the County wide transportation forecasting model from SCTA, or a list of projects approved but not yet constructed, projects that are pending approvals, as well as general projections of growth within or affecting the study area.

   Data on projects in the study area that have been approved but not yet constructed, projects that are pending approvals, as well as general projections of growth within or affecting the study area is available from PRMD. A tabulation of land uses by type and parcel number with the respective trip generation rates must be identified.

VI. THRESHOLDS

A project would have a significant traffic impact if it results in any of the following conditions:

1. **On-site Roads and Frontage Improvements:** Proposed on-site circulation and street frontage would not meet the County's minimum standards for roadway or driveway design, or potentially result in safety hazards, as determined by the County in consultation with a registered Traffic Engineer or Civil Engineer.

2. **Parking:** Proposed on-site parking supply does not meet County standards and does not adequately accommodate parking demand.

3. **Emergency Access:** The project site would have inadequate emergency access.

4. **Alternative Transportation:** The project provides inadequate facilities for alternative transportation modes (e.g., bus turnouts, bicycle racks, pedestrian pathways) and/or the project creates potential conflicts with the County's Complete Streets Policy, other adopted policies, plans, or programs supporting alternative transportation.

5. **Road Safety:** Road design features that do not meet standards (e.g., sharp curves or skewed intersections) or any perceived incompatible uses (e.g., farm equipment, major bicycle route, rail or pedestrian crossings).

6. **Vehicle Queues:** Project causes or exacerbates 95th percentile turning movement queues exceeding available turn pocket capacity.[2]

7. **Signal Warrants:** The addition of the project's vehicle or pedestrian traffic causes an intersection to meet or exceed Caltrans or CA-MUTCD signal warrant criteria.

8. **Turn Lanes:** The addition of project traffic causes an intersection to meet or exceed criteria for provision of a right or left turn lane on an intersection approach.[3]

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[2]Based upon HCS analysis methodology for signalized intersections and formula contained in November 2001 ITE Article *(Estimation of Queue Length at Unsignalized Intersections*) for side street stop sign controlled intersections, or its equivalent.

[3]Based upon Caltrans criteria for state highways and *Intersection Channelization Design Guide* (NCHRP Report 279, Transportation Research Board, 1985) for County roadways.

9. **Sight Lines:** The project constructs an unsignalized intersection (including driveways) and/or adds traffic to an existing unsignalized intersection approach that does not have adequate sight lines based upon Caltrans criteria for State highway intersections and AASHTO criteria for County roadway intersections.

10. **County Intersection Operations:** The County level of service standard for County intersection operations is to maintain a Level of Service D or better pursuant to General Plan Policy CT-4.2. The project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable level of service (LOS D or better) to operate at an unacceptable level (LOS E or worse).

    If the intersection currently operates or is projected to operate below the County standard, the project's impact is considered significant and cumulatively considerable if it causes the average delay to increase by five seconds or more.[4] The delay will be determined by comparing intersection operations with and without the project's traffic for both the existing baseline and projected future conditions.

    The above criteria applies to all controlled intersections except for driveways and minor side streets that have less than 30 vehicle trips per hour per approach or exclusive left turn movement.

11. **County Roadway Operations:** The County level of service standard for County roadway operations is to maintain a Level of Service C pursuant to General Plan Policy CT-4.1; or, for specific roadway segments, the level of service standard adopted in the General Plan Figure CT-3. The project would have a significant traffic impact if the project's traffic would cause a road currently operating at an acceptable level of service (LOS C or better) to operate at an unacceptable level (LOS D or worse).

    If a road segment currently operates or is projected to operate below the County standard, the project's impact is considered significant and cumulatively considerable if it causes the average speed to decrease by the amounts shown in Table 1. The change will be determined by comparing roadway conditions with and without the project's traffic for both the existing baseline and projected future conditions.

[4] Average delay shall be used as defined in the most recent version of the Highway Capacity Manual for the signalized and all-way stop intersections and delay for any approach or turning movement shall be used for side street stop sign controlled intersections.

TABLE 1: TRAFFIC IMPACT THRESHOLDS FOR 2-LANE COUNTY HIGHWAYS AND RURAL CLASS 1 ROADWAYS WITH LEVEL OF SERVICE BELOW LOS C

If the Existing or Projected LOS without project is:	Then the existing average travel speed is (miles per hour [mph])[5]:	The project impact is considered significant if the decrease in average travel speed associated with the project is:
D	40-45 mph	2 mph
E	40 mph or less	1 mph
F		0.5 mph

These criteria apply to Rural Class 1 roadways. Other roadways will be evaluated on a case-by-case basis.

State Highways: [6] Caltrans' general level of service policy on State highways is to maintain the level of service at the transition between LOS C and LOS D. However, level of service goals for specific Caltrans facilities should be taken from transportation planning documents for that facility. A project would have a significant impact if the project traffic would cause the operation of a State highway to operate below LOS C. If a State highway currently operates or is projected to operate below the standard, the project's impact is considered significant and cumulatively considerable if it does not maintain the existing "measure of effectiveness". Measures of effectiveness are: (a) control delay per vehicle for signalized intersections; (b) average control delay per vehicle for unsignalized intersections; (c) average speed for two lane highways, and (d) density for multi-lane highways.[7]

Mitigation Measures: In order to reduce project impacts to levels of insignificance, the proposed mitigation measures must result in post-development affected intersections and roadways that have an LOS that is no worse than the County General Plan LOS standard

[5]The year 2000 Highway Capacity Manual does not provide an average travel speed breakpoint between LOS E and LOS F operation.

[6]State Highway thresholds are based on *Caltrans Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, December 2002. The most recent version of this handbook may be found on the internet. (http://www.dot.ca.gov/hq/traffops/)

[7]Measures of effectiveness are defined in the most recent version of the *Highway Capacity Manual*, Transportation Research Board, National Research Council.

EXHIBIT F

After Petaluma highway funding, focus shifts to Rainier

MATT BROWN
ARGUS-COURIER STAFF | May 24, 2018

For decades, no single issue in Petaluma has been more controversial than the Rainier crosstown connector. The roadway, which is planned to one day connect east and west Petaluma, has divided city councils, fired up political campaigns and appeared on at least two ballot measures.

Depending on one's stance, Rainier is either a panacea for Petaluma's traffic woes and a way for often isolated east side residents to access the city's downtown core, or it is an expensive boondoggle that will open up 100 acres of land to unwanted development.

Politicians on both sides have in the past laid out positions on the issue comfortable in the knowledge that the project, so far, has been hypothetical, confined to an engineer's blue prints and heated discussions in the city council chambers.

That is, until now.

A decision by a state transportation agency last week thrust Rainier into reality. Rainier Avenue currently dead-ends at Highway 101 just north of the Deer Creek shopping center, and the extension project has always been contingent on Caltrans constructing an underpass at the spot in conjunction with its freeway widening work. The freeway project had been stalled due to a lack of funding.

Then, last Wednesday, the California Transportation Commission approved $85 million to complete the two-decade long Highway 101 widening project through Sonoma County, funding the final four-mile gap through the heart of Petaluma. The move opens up new hope for advocates of building Rainier, and officials have taken a flurry of steps to advance the project recently.

But, the Rainier project faces a significant funding gap, and some feel other city transportation projects would be more effective at relieving traffic and should be built first.

"Now, with the possibility of freeway funding, Rainier has taken on a reality it hasn't had to this point," City Manager John Brown said.

Contentious past

The history of the Rainier project is as long as the proposed roadway is short. The .65-mile four-lane extension, which will pass under Highway 101 and over the SMART train tracks and Petaluma River to connect with Petaluma Boulevard North, was first identified in 1965.

Caltrans and the city planned for a freeway interchange at Rainier Avenue in the 1980s, and the city certified an environmental report for the project in 1994. Then, in 1999, a city council opposed to development in the area removed Rainier from the city's General Plan, a controversial move that was subsequently overturned in 2004. Also in 2004, 72 percent of voters backed an advisory ballot measure supporting the construction of Rainier.

In 2006, Caltrans informed Petaluma officials that the Highway 101 interchange portion of the project did not meet minimum spacing requirements because it was less than a mile from the interchange at East Washington Street and would need a special exemption.

The city council in January 2010 voted to separate Rainier into two projects — the crosstown connector and the interchange — in order to work on the roadway extension first. In August 2015, the council voted 5-2 to approve the crosstown connector's environmental report, with Mayor David Glass and Councilwoman Teresa Barrett dissenting.

The report says the Rainier crosstown connector is needed to offset traffic that is expected after planned developments are built. There are currently five roads in Petaluma that cross Highway 101 — Old Redwood Highway, Corona Road, East Washington Street, Caulfield Lane and Lakeville Street.

Developer funded

A 2014 city staff report lists the estimated cost of just the crosstown connector at $61 million. The city has anticipated that developers would pay the cost of the project and the city council included a traffic impact fee in the General Plan in 2008. That fee has been altered by various councils over the years, and is currently around $15,000 per single family home, $20,000 per 1,000 square feet of office space and $30,000 per 1,000 square feet of commercial space.

The city's 2018-19 budget lists the total traffic impact fee fund at about $24 million, meaning a significant funding shortfall exists to complete the Rainier project, which is likely to get more expensive with time. But, as hundreds of new housing units are built in the next few years, the city's traffic impact fund should increase, City Councilman Mike Healy said.

"We don't have the funding in hand," he said. "But over the next two to three years, as more developments come on line, we'll collect more money."

In addition to traffic impact fees, about half of the funding for Rainier is anticipated to come from the owners of the properties that the future roadway will traverse, Brown said. That land, the vacant parcels that abut Highway 101 just south of the Petaluma outlet mall, are currently undevelopable because they lack street access. Connecting the future Rainier extension to the properties, which are zoned for housing in the General Plan, makes the land more valuable, Brown said.

"That's a key component," he said. "It generates the missing piece."

The city is currently exploring the option of financing construction of Rainier, including potentially issuing bonds backed by future developer fees Brown said, and the city council is expected to hold a public workshop on Rainier financing options this summer.

In the meantime, Brown has been negotiating access for the right of way of the future roadway with property owners, including Marin Sun Farms founder David Evans, who owns 20 acres around the slaughterhouse and future western terminus of Rainier, and the J. Cyril Johnson family trust, which owns 64 acres along the freeway.

"At this point, we have made contact with the property owners," Brown said.

Next steps

Barring an effort to repeal the state gas tax increase on the November ballot, which could negate the funding for the Highway 101 widening project, Caltrans is expected to break ground on the work next year and wrap up in 2022. This gives the city four years to finalize the details of the Rainier project.

Petaluma contributed $7 million to the Caltrans freeway widening project to pay for the undercrossing for Rainier, money from the city's former redevelopment agency. While negotiating for the right of way, the city is planning to begin a detailed survey of the land in order to complete the engineering work for the roadway, Brown said.

"I don't see this process syncing up with the highway process," he said. "The city needs to stay out of the way until Caltrans has done it's part. We've got plenty to do in the meantime."

Brown said the project's environmental report might need to be revisited in the future before construction begins.

Contentious future?

Even as the city moves forward with plans for Rainier, the project will likely remain a political hot potato and a key issue in the November mayoral race. The two declared candidates, Councilwoman Barrett and former Councilman Mike Harris, have staked out contrasting positions on the issue in the past.

Barrett said she is pleased Caltrans has the money to widen Highway 101, but she is skeptical the city will have the funding in place to build Rainier. She said past city councils went easy on developers and did not set traffic impact fees high enough to fund the project.

"I'm in favor of looking at the financing," she said. "I've never felt Rainier is cost effective. I'm not convinced that Rainier is the solution. I am in favor of looking at increasing crosstown viability. Part of being feasible is being affordable."

She said she would not support a sales tax measure to fund Rainier. While a sales tax is not being considered as a current financing option, Rainier was included in the ballot language for the failed Measure Q one-cent sales tax in 2014, which Barrett and Glass opposed.

Barrett said she is also interested in looking at using the traffic impact fund for other crosstown road projects, like a new bridge over the Petaluma River at Caulfield Lane connecting the new Riverfront development with Quarry Heights, or perhaps upgrading the Corona Road overpass.

Harris said he took steps to advance the Rainier project as a council member, and he still supports the project "100 percent." He said all funding options are on the table, but said that developers fees in Petaluma are already quite high.

If elected mayor, Harris said he would continue to advocate for the project.

"I've always been a staunch supporter of the Rainier crosstown connector," he said. "It is an important component of traffic relief. I'm glad we can see a light at the end of the tunnel."

(Contact Matt Brown at matt.brown@arguscourier.com.)

Comments

on the

Initial Study/Mitigated Negative Declaration (IS/MND)

for the

Safeway Fuel Center

Petaluma, California

September 17, 2018

Phyllis Fox, PhD, PE
and
Ray Kapahi, BSC, M. Eng.

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1. INTRODUCTION AND SUMMARY

Safeway proposes to develop a fuel station at 335 South McDowell Boulevard in Petaluma (Project) in the Washington Square Shopping Center. The fuel station will have 16 fuel positions (8 pumps with two fuel positions per pump) to accommodate the simultaneous fueling of SUVS, full-size pickup trucks, and passenger vehicles. The annual throughput of gasoline is asserted not to exceed 8.5 million gallons. The fuel dispensers will be served by two 20,000-gallon underground storage tanks that will be serviced by twice-daily truck deliveries of fuel, lasting 30 to 40 minutes. The Project also includes a 697-square foot convenience store, vehicle parking adjacent to the convenience store, landscaping, and an exit driveway.[1]

We reviewed the Initial Study/Mitigated Negative Declaration (IS/MND) and supporting appendices. Based on our review and analysis, the Project will result in significant cancer risks at residences along South McDowell Boulevard, at the North Bay Children's Center, 60 feet away, and in the recreational playfield.

A Negative Declaration can be prepared only when there is no substantial evidence in light of the whole record before the lead agency that the project may have a significant effect on the environment.[2] An environmental impact report (EIR) must be prepared when there is substantial evidence in the record that supports a fair argument that significant effects may occur.[3] Our analysis below indicates that there is substantial evidence that the Project will result in significant cancer impacts, requiring that an EIR be prepared.

2. CANCER HEALTH RISKS OF THE PROJECT ARE SIGNIFICANT

The operation of fuel dispensing stations results in emissions of criteria air pollutants and toxic air contaminants ("TACs") from vehicle exhaust, fuel storage tanks, refueling, and tanker truck deliveries of fuels. Of particular concern are emissions from gasoline refueling and gasoline deliveries, which result in fugitive emissions from dispensing pumps, vents, and spills. These emissions include a number of TACs, including benzene—a potent carcinogen. The California Air Resources Board ("CARB") considers benzene as one of the highest risk air pollutants it regulates, finding that near-source exposures for large gasoline dispensing facilities can be significant and exceed district health risk thresholds. The agency is particularly concerned with the emergence of very high gasoline throughput at large retail or wholesale outlets, as "these types of outlets are projected to account for an increasing market share in the next few years."[4] The Project, with its eight dispensing stations, is one of these facilities.

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[1] City of Petaluma, Safeway Fuel Center Initial Study/Mitigated Negative Declaration (IS/MND), 335 South McDowell Boulevard, March 29, 2018, pp. 5–6; available at http://cityofpetaluma.net/cdd/major-projects.html.

[2] Public Resources Code, § 21080, subd. (c), California Code of Regulations, title 14, § 15070.

[3] Public Resources Code, § 21080, subd. (d).

[4] CARB, Air Quality and Land Use Handbook: A Community Health Perspective, April 2005 (hereafter "CARB Land Use Handbook"), p. 31; available at http://www.arb.ca.gov/ch/handbook.pdf.

The Project site is bounded by commercial retail to the north and west; single-family residential to the south, across South McDowell Boulevard; and institutional and recreational uses to the east, across Maria Drive.[5] Sensitive receptors are nearby. These include

- 4Cs Petaluma Child Development Center, located at 401 South McDowell, 60 feet away;
- North Bay Children's Center,[6] 405 South McDowell Boulevard, 60 feet away, located at the northeast corner of South McDowell and Maria Drive;
- McDowell Elementary School, 421 South McDowell Boulevard, 60 feet away;[7]
- an associated recreational playfield 60 feet away; and
- residences along South McDowell Boulevard, 80 feet away.[8]

Figure 1 shows 401 and 405 South McDowell Boulevard.[9] The North Bay Children's Center provides comprehensive high-quality child care and early education programs and includes an on-site garden, as shown in Figure 2.[10,11] The 4Cs Petaluma Child Development Center, located in the same building, also provides high-quality child care. The McDowell Elementary School covers kindergarten (4 years old) to sixth grade and has 255 students and 16 teachers. The campus is shared with Petaluma Adult School and the McDowell Family Resource Center, and hosts "lunchtime boys' and girls' soccer leagues." The school also provides significant outdoor activities.[12] The IS/MND did not evaluate the impact of the Project on these various ancillary activities.

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[5] IS/MND, p. 7.
[6] https://www.nbcc.net/
[7] The MND incorrectly notes that the McDowell Elementary School is 475 feet from the proposed Project site (IS/MND, Air Quality Section 3.3(d)) and 150 feet (Hazards/Hazardous Materials Section 3.8(c)). The standard for assessing impacts to schools is to use the property line of the school and include all areas that may be available to students, staff, and faculty. Thus, the distance to McDowell Elementary School is the width of Maria Drive, or approximately 50 feet from the proposed Project as the McDowell playfield is adjacent to Maria Drive.
[8] IS/MND, p. 19.
[9] Google Maps, 405 S McDowell Boulevard.
[10] https://www.nbcc.net/about/.
[11] McDowell Elementary School, https://www.petalumacityschools.org/Page/11. See photographs at: https://www.google.com/search?q=photos+of+mcdowell+elementary+school&sa=X&biw=1868&bih=843&tbm=isch&source=iu&ictx=1&fir=YEAdJYe24aUadM%253A%252CKuzKHQT8Y6SGqM%252C_&usg=AFrqEzckSbv7WnVLUnazH5m8hHxwO1IQNQ&ved=2ahUKEwjcvrDNn6ndAhXNwMQHHawBDC4Q9QEwA3oECAEQCg#imgrc=YEAdJYe24aUadM:.
[12] Images for McDowell Elementary School; available at https://www.google.com/search?q=photos+of+mcdowell+elementary+school&spell=1&sa=X&ved=0ahUKEwi8ub3Ln6ndAhVqi1QKHdfUBmoQBQgmKAA&biw=1868&bih=843.

Figure 1: 401 and 405 South McDowell Boulevard[13]

Figure 2: Garden at North Bay Children's Center

The IS/MND includes a health risk assessment (HRA)[14] that concludes health impacts are not significant.[15] We reviewed the HRA in Appendix B to the IS/MND and identified many errors and omissions, all of which underestimate health risks to nearby sensitive receptors. Thus, we prepared a revised health risk assessment from scratch, using standard methods and correcting the errors and omissions in the IS/MND's analysis. Our revised HRA indicates that

[13] Google Maps, 405 S McDowell Boulevard.
[14] IS/MND, Appendix B: James A. Reyff and William Popenuck, Illingworth & Rodkin, Inc., Safeway Fuel Center Health Risk Assessment Petaluma, California, Revised September 19, 2017; available at http://cityofpetaluma.net/cdd/major-projects.html.
[15] IS/MND, Table 5 and Appendix B.

cancer risks are highly significant at local residences and a nearby school and playfield. We also extrapolated Project health risks from analyses published by both the California Air Resources Board (CARB) and the South Coast Air Quality Management District (SCAQMD), both of which confirm significant cancer risks, consistent with our *de novo* analysis. Our results are also consistent with those reported in a CEQA document for another similar Safeway fueling station. Finally, our results are consistent with many peer-reviewed, scientific studies that have linked residential and school proximity to gas stations to an increased risk of adverse health outcomes,[16] including cancer and, specifically, leukemia in children.

The following sections first discuss the major errors in the Project's HRA analysis, followed by our *de novo* analysis and extrapolations from CARB and SCAQMD analyses of similar fuel stations. All of these analyses indicate that cancer impacts at nearby sensitive receptors, including at a school and residences, are highly significant.

2.1. Errors and Omissions in the IS/MND Health Risk Assessment

The review and evaluation of the HRA requires the underlying modeling files. The modeling files used to estimate health impacts were not included in the IS/MND, were not in possession of the County, and were not provided in response to a Public Record Act (PRA) request and follow-up telephone calls. Thus, these comments are based on information in the IS/MND and other publicly available information. The HRA asserts that it followed OEHHA, CARB, and BAAQMD guidelines in its preparation.[17] However, as discussed below, the HRA did not follow these guidelines, thus significantly underestimating health impacts.

2.1.1. Air Dispersion Model

The IS/MND's HRA used the ISCST model to estimate ambient concentrations of HAPs.[18] However, as of December 2006, this model was withdrawn by the EPA and the American Meteorological Society and replaced by a more accurate one.[19] The OEHHA risk assessment guidelines, which the IS/MND relied on, explain that "The United States Environmental Protection Agency (U.S. EPA) has adopted the AERMOD air dispersion model into its list of regulatory approved models, in place of the previously used ISCST3 model…The Air Resources Board recommends AERMOD for risk assessments."[20] The IS/MND relied on these OEHHA risk assessment guidelines and should have used AERMOD for the HRA. We used AERMOD in our revised analysis, presented in Comment 2.2.

The OEHHA guidelines require that the output from AERMOD be entered into the HARP2 model[21] to estimate health risks. The OEHHA risk assessment guidelines explain: "HARP is computer software used by the ARB, OEHHA, Districts, and facility operators to

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[16] J. D. Brender et al., "Residential Proximity to Environmental Hazards and Adverse Health Outcomes," *American Journal of Public Health* 101, no. S1 (2011): S37–S52. Exhibit 1.
[17] IS/MND, Appendix B, p. 4.
[18] IS/MND, Appendix B, pp. 12/13.
[19] https://www.epa.gov/scram/air-quality-dispersion-modeling-alternative-models.
[20] OEHHA, Section 2.3, p. 2-2, February 2015.
[21] OEHHA, Section 1.4, p. 1-4, February 2015.

promote statewide consistency, efficiency, and cost-effective implementation of HRAs…"[22] Thus, the HRA, which did not use either AERMOD or the HARP model (which requires the use of the AERMOD dispersion model), does not even cite the HARP model and did not follow standard HRA procedures and guidelines cited in the HRA. It also used an outdated and withdrawn air dispersion model and failed to provide any support for the risk calculations that were made. We used the HARP2 risk model in our revised analysis, presented in Comment 2.2. HARP 2 (Version 18159) incorporates the latest OEHHA Risk Guidelines as well as the AERMOD model (Version 18081).

2.1.2. Receptor Grid

The HRA modeled the impacts at "existing locations of nearby sensitive receptors (residences, schools, etc.)"[23] and at the "hypothetical maximum exposed individual (MEI) located at the maximum impact sensitive receptor."[24] However, the HRA fails to disclose the locations(s) of nearby sensitive receptors, the points of maximum impact, or how they were identified. They appear to have been plucked out of thin air.

The standard procedure to identify sensitive receptors is to use a receptor grid designed to include the Point of Maximum Impact (PMI). Impacts at each point on the grid are determined to identify the maximum impact point. The sensitive receptor points selected in the IS/MND's HRA are arbitrary and unsupported. A receptor grid is the standard method and would far more accurately map the risk to all sensitive receptors in the surrounding area and allow the maximum impact points to be identified. The OEHHA risk assessment guidance, for example, explains:[25]

> **4.7.1 *Receptor Points***
>
> The modeling analysis should contain a network of receptor points with sufficient detail (in number and density) to permit the estimation of the maximum concentrations. Locations that must be identified include:
>
> - The maximum estimated off-site impact or point of maximum impact (PMI),
> - The maximum exposed individual at an existing residential receptor (MEIR),
> - The maximum exposed individual at an existing occupational worker receptor (MEIW).

Similarly, the BAAQMD risk assessment guidance[26] requires:

> BAAQMD recommends that all receptors located within a 1,000 foot radius of the project's fence line be assessed for potentially significant impacts from the incremental increase in risks or hazards from the proposed new source. A lead agency should enlarge the 1,000-foot radius on a case-by-case basis if an unusually large source or sources of risk or hazard emissions that may affect a proposed project is beyond the recommended radius.

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[22] *Id*.
[23] IS/MND, Appx. B, p. 3.
[24] *Id*., p. 2.
[25] Office of Environmental Health Hazard Assessment (OEHHA), Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, February 2015, p. 4–20; available at https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.
[26] BAAQMD, California Environmental Quality Act, Air Quality Guidelines, May 2017, p. 5–7 (pdf 61); available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

Further, the California Air Pollution Control Officers Association's (CAPCOA's) HRA guidance discusses the various types of receptor grids that can be used[27] and notes that "[t]he receptor grid must be designed to include the Point of Maximum Impact (PMI)."[28] This guidance was prepared specifically to assist lead agencies in complying with the requirements of CEQA.[29]

There is no evidence in the record that the HRA followed either guidance. Instead, the HRA selected a small number of sensitive receptors—without explaining how they were chosen or where they are located—and only calculated health risks at these points.

Further, the HRA failed to display the results of its analysis on a map or identify the physical location of the sensitive receptors. It is standard practice to summarize health risks on isopleth maps (an isopleth is a line connecting points of a given value). The absence of an isopleth map deprives the public and potentially affected parties of determining if they are at risk.

2.1.3. Exposure Duration: Operating Hours

The HRA assumed the fuel station would operate 19 hours per day (hr/day), between 5:00 AM and 12:00 AM.[30] However, many similar fuel stations operate 24 hr/day. The IS/MND does not include any enforceable conditions to ensure the fuel station operates only 19 hr/day over its lifetime. Absent such a condition, the HRA should be based on 24 hr/day operation. Assuming 24 hr/day operation, the IS/MND's estimate of the increase in annual PM2.5 concentration would increase from 0.21 ug/m^3 to 0.27 ug/m^3,[31] which rounds to 0.3 ug/m^3.[32] This equals the PM2.5 significance threshold of 0.3 ug/m^3 and is therefore significant. Absent a practically enforceable condition requiring operation for only 19 hr/day over its lifetime, the IS/MND's analysis indicates that the Project would result in significant health impacts to school children from increases in PM2.5 emissions.

2.1.4. Type of Fuel

Health risks depend upon the amount of each TAC that is emitted. The TAC emissions in turn depend on the relative amounts of gasoline and diesel that are pumped and the types of vehicles that are fueled. The IS/MND asserts that the fueling pumps will dispense both unleaded gasoline and diesel fuel from 8 multi-product fuel dispensers. The IS/MND then states that the annual throughput of gasoline will not exceed 8.5 million gallons but is silent on the amount of diesel that would be pumped.[33] Similarly, the PTO issued by the BAAQMD

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[27] CAPCOA, Health Risk Assessments for Proposed Land Use Projects, July 2009, Sections 6.1 and 6.2; available at http://www.capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.
[28] CAPCOA, p. 70.
[29] *Id.*, p. 1.
[30] IS/MND, Appx. B, p. 13.
[31] IS/MND, Table 5.
[32] Increase in PM2.5, assuming 24 hr/day operation: (0.21)(24/19) = 0.265 = 0.3 ug/m^3.
[33] IS/MND, p. 6.

assumes that only gasoline will be pumped.[34] The emissions, and hence health risk, depend upon the relative amounts of gasoline and diesel fuel that are dispensed.

The IS/MND appears to assume that only gasoline will be pumped. The text of the HRA asserts: "All vehicles using the fueling station were assumed to be light-duty autos, light-duty trucks or medium-duty trucks. The percentage breakdown was based on the Sonoma County fleet average as reported by EMFAC2014."[35] However, buried in the HRA input files, the emission calculations assumed that 4% of the serviced vehicles would be diesel LS, LHDT1 (Light-Heavy-Duty Trucks: GVWR 8501–10,000 lbs), and LHDT2 (Light-Heavy-Duty Trucks: GVWR 10,001–140,000 lbs).[36] This fleet mix is inaccurate if the fuel station sells diesel. The IS/MND and the PTO are silent on the amount of diesel fuel that would be sold.

The vehicle idle emissions from queuing at the fuel station are a source of diesel particulate matter (DPM), which is a major source of cancer risk. The files available for review contain no support for the 4% diesel estimate. They also do not disclose the relative amounts of diesel and gasoline that will be pumped. Thus, the IS/MND fails as an informational document under CEQA. Further, the PTO issued by the BAAQMD cannot be relied on to assure that health impacts are less than significant because it fails to identify diesel as a fuel that will be delivered. We expect substantially more diesel would be supplied than 4% for the following reasons.

First, surveys by the California Energy Commission (CEC) for the period 2009 to 2016 indicate that California retail sale volumes of diesel at fueling stations in California range from 8.6% to 11.2% of the total fuel sales, where fuel includes gasoline, diesel, E85, propane, and natural gas.[37] These actual survey results are factors of 2 to 3 times higher than assumed in the HRA, thus significantly underestimating health risks from DPM from idling diesel vehicles.

Second, the CEC data for Solano County, where the Project is located, indicate that 5.5% to 11.6% of fuel sales are diesel, where fuel includes gasoline and diesel, consistent with statewide totals. The other fuels make up a small percentage of the fuel delivered statewide.[38] Thus, the IS/MND has significantly underestimated DPM emissions from supplying diesel.

Third, the streets adjacent to the Project site—McDowell and East Washington—are designated truck haul routes.[39] Official truck haul routes, especially ones so close to I-101, as here, would attract more truck customers to the Project than fueling stations in other areas.

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[34] IS/MND, Appx. A, Attach. 3: BAAQMD Permit Evaluation.
[35] IS/MND, Appx. A, p. 11.
[36] IS/MND, Appx. B, Attach. 2, pdf 36, Vehicle Idle Emissions From Queuing at Gas Station and EMFAC2017 Volume I—User's Guide, March 1, 2018 p. 76; available at https://www.arb.ca.gov/msei/downloads/emfac2017-volume-i-users-guide.pdf.
[37] California Energy Commissions (CEC), California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2009–2016, Retail Sales Volumes—Survey Responses (Millions of Gallons); available at https://www.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html.
[38] *Id*. and Exhibit 1.
[39] https://cityofpetaluma.net/police/pdf/truck_route_map.pdf.

Fourth, the fueling station will be located adjacent to a very large Safeway and an entrance to I-101, both of which will attract more diesel-fueled truck customers into the local area than would otherwise occur at locations that are not proximate to a freeway entrance and huge Safeway.

Fifth, the presence of a new fuel station adjacent to a large Safeway and I-101 would attract more truck traffic into the area for fueling than would otherwise be present. This would increase diesel-fueled trucks on streets adjacent to sensitive receptors, increasing DPM emissions at the same sensitive receptors as the new fueling station itself, increasing health risk.

Sixth, the IS/MND states that the fuel dispensers will be serviced by two 20,000-gallon underground storage tanks and that operation of the fuel station will require twice-daily truck deliveries of fuel, lasting 30 to 40 minutes.[40] The IS/MND does not indicate that either storage tank is partitioned, to accommodate the storage of two fuels. Thus, half the fuel stored on site can be assumed to be diesel. The IS/MND also fails to disclose the volume and type of fuel delivered each day in the twice-daily truck deliveries—thus failing as an informational document under CEQA. The largest road tankers in the US can deliver just under 12,000 gallons of fuel.[41]

Seventh, given that the adjacent Safeway is huge and will be serviced and visited by many diesel-fueled vehicles, it is likely that the number of diesel-fueled truck visits is at the upper end of the 5.5% to 11.6% range for diesel.

Finally, the CalEEMod fleet mix used to estimate emissions is inaccurate if a gas station sells diesel.[42] The HRA states: "All vehicles using the fueling station were assumed to be light-duty autos, light-duty trucks or medium-duty trucks. The percentage breakdown was based on the Sonoma County fleet average as reported by EMFAC2014."

2.1.5. Exposure Duration

The IS/MND's exposure durations are too short. The HRA calculated cancer risks for residential and worker receptors based on 30- and 9-year exposure durations, respectively. Section 2.2 of the BAAQMD Air Toxics NSR Program and HRA Guidelines requires that the cancer risk calculation for residential and worker (*e.g.,* teachers) receptors of gasoline dispensing facilities to be based on 70- and 40-year exposure durations, respectively.[43]

Further, the 9-year exposure duration used for children is not health protective. It does not capture worst-case scenarios (e.g., a mother who drops her infant off at the North Bay

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[40] IS/MND, p. 6.
[41] See: Quora, How Big Is a Gas Station's Fuel Storage Tank; available at https://www.quora.com/How-big-is-a-gas-stations-fuel-storage-tank.
[42] CalEEMod Users' Guide, September 2016; available at http://www.aqmd.gov/docs/default-source/caleemod/upgrades/2016.3/01_user-39-s-guide2016-3-1.pdf.
[43] BAAQMD, Air Toxics NSR Program Health Risk Assessment Guidelines, December 2016, Section 2.2.1.3, p. 8; available at http://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf.

Children's Center and whose child then attends McDowell elementary *and* who lives across the street). Many of the children living in the Project area attend the local schools. An 18-year period would be more health protective.

2.1.6. Construction Emissions

The same sensitive receptors will be present in the same locations during both construction and operation of the Project. The HRA failed to include exposures that would occur during the construction phase of the Project, thus underestimating health risks.

2.2. Revised Health Risk Assessment Indicates Cancer Risks Are Significant

We prepared a health risk assessment from scratch due to the numerous errors and omissions in the IS/MND's analysis and the absence of supporting files. We also extrapolated Project risks from other similar projects. The resulting analyses summarized below indicate that cancer health risks at across-the-street residences and the local playfield are highly significant.

A Negative Declaration can be prepared only when there is no substantial evidence in light of the whole record before the lead agency that the project may have a significant effect on the environment.[44] An EIR must be prepared when there is substantial evidence in the record that supports a fair argument that significant effects may occur.[45] When the initial study reveals a project "may" have a significant environmental effect, an EIR must be prepared; the word "may" connotes a reasonable possibility.[46] The evidence presented below demonstrates the Project will result in a significant cancer risk, requiring the preparation of an EIR.

2.2.1. Emissions

We estimated storage tank filling, vehicle refueling, storage tank breathing loss, and spillage TAC emissions using the CAPCOA/SJVAPCD spreadsheet model[47] based on a throughput of 7.48 million gal/yr of gasoline. This assumes that of the total of 8.5 million gallons of fuel, 12% will be diesel and 88% will be gasoline. Eighty-eight percent of 8.5 million gallons equates to 7.48 million gallons. Emissions associated with diesel fuel storage and refueling are considered to be negligible. The results of our calculations are summarized in Tables 1 through 3. (See attached Exhibit A, Table 1 Calculation of TACs from Gasoline Dispensing and Spillage.)

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[44] Public Resources Code, § 21080, subd. (c), California Code of Regulations, title 13, § 15070.
[45] Public Resources Code, § 21080, subd. (d).
[46] *No Oil, Inc. v. City of Los Angeles*, 13 Cal. 3d 68, 74, 83 fn. 16 (1974); *Sundstrom v. County of Mendocino*, supra, 202 Cal. App. 3d 296, 309 (1988).
[47] San Joaquin Valley Air Pollution Control District (SJVAPCD), AB2588 "Hot Spots" Air Toxics Profiles, March 27, 2017; available at https://www.valleyair.org/busind/pto/AB-2588-Toxics-Profiles.docx.

Table 1: Volatile HAP Emissions Analyzed in Revised HRA

Source	HAP Emissions (lb/yr) Benzene	Ethyl Benzene	Toluene	Xylenes
Tank Filling	1.88	10.05	50.27	15.08
Vehicle Refueling	9.42	50.27	251.33	75.40
Breathing Losses	0.56	2.99	14.96	4.49
Spillage	31.42	50.27	251.33	75.40
TOTAL	43.29	113.58	567.88	170.36

We also calculated delivery truck idling and diesel customer idling emissions using the same CAPCOA/SJVAPCD spreadsheet model and assuming that PM2.5 is equivalent to diesel particulate matter (DPM).[48] These calculations are based on 984,405 customer vehicles per year visiting the facility, of which 12% would be diesel. Each vehicle is assumed to idle for 5 minutes. There would be 2 fuel deliveries per day, 365 days per year. Each delivery truck was assumed to idle for 5 minutes. The results of our calculations are summarized in Tables 2 and 3. Supporting calculations are included in Exhibit B.

[48] BAAQMD CEQA Guidelines, p. 8-8.

Table 2: Diesel Particulate Matter (DPM) Emissions from Idling Customer Vehicles Analyzed in Revised HRA

Idling Emissions	Unit	Result
Annual number of vehicles	*vehicles/yr*	984,405
% of vehicles that are diesel		12%
Number of diesel vehicles per year		118,129
DPM emissions from idling (per vehicle):		
Average emission factor, @ 5 mph	*grams/mile*	0.22152
DPM emissions per vehicle (assuming 5-minute idle/running time per vehicle)	*grams/vehicle*	0.0908
Annual DPM Emissions	*grams/yr*	10,726
	lb/yr	23.6

Calculation of Emission Factors (Note 1)	*grams/mile*
LDT1	0.6598
LDT2	0.0283
LHDT1	0.13328
LHDT2	0.09284
Average for trucks	0.228555
Average for diesel cars	0.0878
Composite EF (95% trucks + 5% cars)	0.22152

NOTES

1. Emission Factors and Annual Vehicle/Yr. from Safeway Fuel Center Health Risk Assessment Petaluma, CA. Revised Sept 19, 2017. Attachment 2.

2. The composite emission factor includes emissions from vehicle travel within the fuel center, vehicle start-up and idling

3. Estimate of percentage ov diesel cars (5%) based on 2016 registration in California.

Table 3: Diesel Particulate Matter (DPM) Emissions from Idling Fuel Delivery Trucks Analyzed in Revised HRA

Idling Emissions—Delivery Trucks	Unit	Result
Trucks/day	*number*	2
Idle time/truck	*min*	5
Total idle time/day	*min*	10
Idle time/yr	*min*	3,650
	hrs	60.8
PM-2.5 emission factor for vehicle idling (Note 1) (assume PM2.5 = DPM)	*(grams/ vehicle/hr)*	0.120921
Annual DPM emissions	*grams/yr*	7.3560
	lb/yr	0.016
Note 1. Idle emission factor from ARB compilation for statewide analysis by calendar year and by air basin. Excerpts from ARB report provided in Exhibit B.		

2.2.2. Meteorological Data

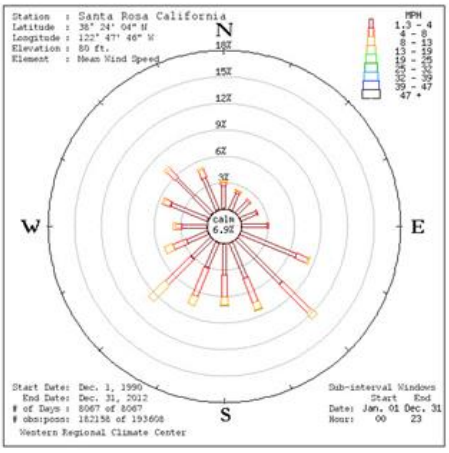
We ran the HARP2 model[49] using the emissions summarized in Tables 1 to 3; 5 years (2013–2017) of surface meteorological data from Santa Rosa and upper air data from Oakland for the years 2013 to 2017. AIEMET (Version 18081) was used to prepare the AERMOD meteorological data.

We were unable to obtain any wind data for Petaluma that was formatted for use in AERMOD but did find some historic Petaluma wind data.[50] The wind roses for the two stations are shown in Figure 3. The wind patterns are very different in Petaluma and Santa Rosa. In Petaluma, the winds blow predominantly from the west/northwest, which would carry emissions directly toward the schools and residences across the street from the Project.[51] For Santa Rosa, the winds blow mostly from the S-W-SE, placing the school and residences upwind of the gas station. Thus, our use of Santa Rosa wind data significantly underestimates health risks at the schools and nearby residences.

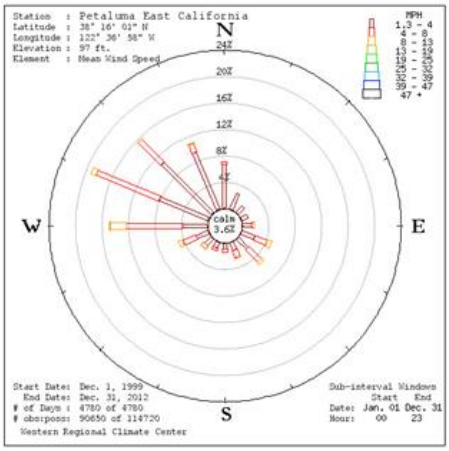
[49] https://www.arb.ca.gov/toxics/harp/harp.htm.
[50] Western Regional Climate Center, Reno, NV.
[51] Memo from James A. Reyff, Illingworth & Rodkin, Inc., to Natalie Mattei, Albertsons Companies, June 6, 2018, Attached to Memorandum from Matthew D. Francois, Rutan & Tucker, LLP, to Heather Hines, Planning Manager, City of Petaluma, Re: Safeway Fuel Center Project, June 6, 2018, pdf 10: Wind Rose for Applicant's HRA, which was based on the Petaluma Municipal Airport Data.

Figure 3: Wind Roses for Santa Rosa and Petaluma

Santa Rosa California



Petaluma East California



2.2.3. Modeling Grid

We used a Cartesian receptor grid (1,200 meters x 1,200 meters with a grid spacing of 50 meters). Risks were evaluated at 625 individual grid points and 11 discrete receptors to denote nearby homes and the schools. Each grid point and sensitive receptor was assigned an X-Y coordinate consistent with the WGS 84 coordinate system implemented in Google Earth. Coordinates of individual receptors, rather than distances, were used in the risk calculations. See Exhibit C showing excerpts of the coordinate used for individual grid points and sensitive receptors. This grid was used to identify the Points of Maximum Impact (PMIs) and to summarize the results on a standard isopleth map, presented later in these comments.

2.2.4. Exposure Duration

We calculated cancer risks for three exposure durations: 9 years (for school children), 25 years (teachers and workers at nearby daycare), and 70 years (residents). The 70-year exposure

duration is consistent with BAAQMD guidance. The BAAQMD Air Toxics Health Risk Assessment Guidelines indicate "the Air District will estimate cancer risk to residential receptors for gasoline dispensing facilities based on a 70-year lifetime exposure. Although 9-year and 25-year exposure scenarios may be presented for information purposes, risk management decisions will be made based on 70-year exposure duration for residential receptors."[52]

Similarly, the BAAQMD's CEQA guidelines specifically identify a 70-year exposure duration,[53] noting: "Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million, assuming a 70-year lifetime exposure." The EPA also uses a 70-year exposure duration to assess the significance of health impacts.[54]

2.2.5. Revised HRA Results

Excerpts from the HARP2 model results are provided in Exhibit C. Electronic copies are available on request. The 70-year residential risk is between 27 to 69 cancers per million at homes across the street along South McDowell Avenue. The overall spatial variation of 70-year cancer risk is shown in Figure 4. This figure shows there are large areas surrounding the proposed refueling facility that have cancer risk above 10 in a million (blue isopleth).

The spatial variation of 25-year cancer risk is shown in Figure 5. The results indicate that cancer risk at the nearby daycare would be 12.5 for students and 8.2 for teachers at the elementary school. This figure shows that student cancer risk at the daycare would be significant, as the risk exceeds 10 in a million. The results assuming 9-year exposure (for school children) is estimated to be 8.2 cancers per million. While not significant, this result is an underestimate as it does not include cumulative exposure from construction, increases in traffic due to location of the fueling station, and cumulative exposure from residences in adjacent housing, among other factors.

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[52] BAAQMD, BAAQMD Air Toxics NSR Program Health Risk Assessment Guidelines, December 2016, Section 2.2.1.1, p. 8; available at http://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf.

[53] BAAQMD, CEQA Guidelines, May 2017, Appendix D, p. D-40.

[54] NESHAPS 54 Federal Register 38044, September 14, 1989; CAA Section 112(f). See also BAAQMD, CEQA Guidelines, Appendix D, p. D-35.

Figure 4: Cancer Risk Isopleth for 70-Year Exposure from Idling Cars, Fuel Delivery Trucks, and Gasoline Dispensing

Figure 5: Cancer Risk Isopleth for 25-Year (Worker) Exposure (includes emissions from idling cars, fuel delivery trucks, and gasoline dispensing)

Our revised analyses indicate that cancer risks are significant at several residences across the street from the proposed fueling station, as well as at the school playfield and for teachers at the North Bay Children's Center. Our analyses also indicate that benzene and DPM are the primary drivers for cancer risk and are consistent with similar health risk assessments prepared by both CARB and the SCAQMD, as summarized below in Comments 2.3.2 and 2.3.3. Our analyses are also consistent with extensive scientific research that demonstrates a significant association between gasoline stations and the risk of childhood leukemia.[55] See referred journal articles compiled in Exhibit 1.

Our HRA analysis underestimates cancer risk for the following reasons: *First*, the sensitive receptors (residences, schools) are upwind of the fuel station (i.e., the wind data used in our analysis show that the pollution from the fuel station is blown away from the sensitive receptors), because the HRA is based on Santa Rosa wind data.[56] Our analysis should be

[55] Peter F. Infante, "Residential Proximity to Gasoline Stations and Risk of Childhood Leukemia," *American Journal of Epidemiology* 185, no. 1 (December 6, 2016). Exhibit 1.
[56] We were unable to obtain the Petaluma wind data in the proper format for use in the AERMOD model.

repeated using Petaluma wind data, which we were unable to obtain in time to prepare this study. *Second*, our analysis excludes the emissions from the increase in traffic on South McDowell Boulevard and other nearby streets, attracted due to the location of the Project, thus underestimating exposures to DPM and benzene.[57] *Third*, our analysis excludes emissions from vehicles that visit the convenience store without pumping fuel. *Fourth*, our analysis excludes exposure from ingestion of soils during schoolyard playing, ingesting locally grown produce (Figure 2) and contamination of mother's milk from, for example, polynuclear aromatic hydrocarbons (PAHs) from idling diesel vehicles (see Comment 2). *Fifth*, our analysis excludes several important TACs that are present in diesel and gasoline exhaust, including PAHs, formaldehyde, and acrolein.

2.3. Agency Analyses Confirm Project Cancer Risks are Significant

2.3.1. CAPCOA

The CAPCOA guidance states, with respect to "gasoline dispensing facilities: "Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater)."[58] The Project is a large gas station that will be located within 300 feet of sensitive land uses. Thus, this guidance is violated for the Project, indicating a significant impact.

2.3.2. CARB Gas Station HRA

For gasoline dispensing facilities with a throughput of 3.6 million gallons per year, CARB established risk levels of about 10 cases of cancer per million exposed at a distance of 50 feet from the fenceline.[59] (A risk level of 10 per million is commonly established as a threshold of significance in health risk assessments.) Consequently, CARB recommends a minimum 50-foot distance between receptors and typical gasoline dispensing facilities—that is, facilities with an annual throughput of less than 3.6 million gallons per year.[60] CARB notes that as the throughput at the gasoline dispensing facility increases, the potential risk also increases,[61] and expresses concern over the "growing number of extremely large GDFs with sales over 3.6 and as high as 19 million gallons per year."[62] For these facilities, CARB determined an upper end of the risk range of 120 in a million as a hypothetical worst case scenario under rural air dispersion conditions.[63] Based on these findings, CARB recommends: "Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater)."[64] The BAAQMD's CEQA Guidelines expressly reference CARB's

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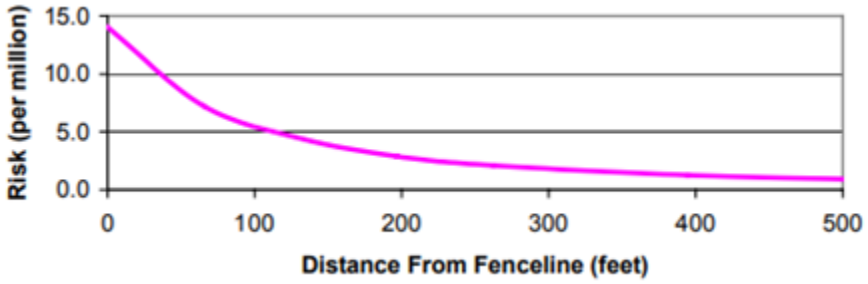
[57] See, for example, IS/MND, pp. 53/57 and A U. Raysoni and others, Evaluation of VOC concentrations in Indoor and Outdoor Microenvironments at Near-Road Schools, Environmental Pollution, v. 231, pp. 681-696, 2017. Exhibit 1.
[58] CAPCOA 2009, Table 2.
[59] CARB Land Use Handbook, p. 31.
[60] *Id.*, Table 1-1.
[61] *Id.*, p. 31.
[62] *Id.*, Table 1-2.
[63] *Id.*, Footnote 5 to Table 1-2.
[64] *Id.*, Table 1-1.

recommendation for siting TAC sources such as gasoline dispensing facilities and recommend that a lead agency refer to the CARB's document for buffer distances.[65]

CARB used standard risk assessment procedures to estimate the cancer risk for fuel stations delivering 3.6 million gallons of gasoline per year. The results are summarized in Figure 6.[66] This figure indicates that the cancer risk levels for a gasoline dispensing facility with a throughput of only 3.6 MMgal/yr is about 6.5 per million at a distance of 60 feet from the fenceline, the same distance from the Project as the boundary of the North Bay Children's Center. Adjusting this estimate for the higher throughput of the Project, 8.5 MMgal/yr, CARB's analysis indicates that the risk at the North Bay Children's Center would be 15 per million.[67] This exceeds the cancer significance threshold of 10 per million and is a significant health impact not disclosed in the IS/MND.

Figure 6: Gasoline Dispensing Facility Health Risk for 3,600,000 gal/yr Throughput



The local school district, in comments by ESA, previously cited to this report to support higher cancer risk levels than estimated in the IS/MND.[68] The response to these comments asserted that the Handbook is "inapplicable and outdated."[69] However, the Handbook is still posted on CARB's website, without any modifications. CARB routinely updates its guidance. See, for example, the technical advisory for high-volume roadways.[70] Further, the Handbook is cited in the May 2017 BAAQMD CEQA Guidelines as applicable in this specific case—the siting of fuel dispensing stations.[71] The IS/MND relied on the BAAQMD CEQA Guidelines.

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[65] BAAQMD, California Environmental Quality Act Air Quality Guidelines, May 2017, p. 9-7; available at http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.
[66] CARB Land Use Handbook, Figure 1-6.
[67] Cancer risk at 60 feet for 8.5 MMgal/yr of gasoline: (6.5 per million)(8.5/3.6) = 15 per million.
[68] Memorandum from Heidi Rous and Tina Su, ESA, to Philip J. Henderson and others; Re: Peer Review of the Health Risk Assessment Impact Analysis (September 19, 2017) for the Safeway Fuel Center Project, May 7, 2018.
[69] May 8, 2018 Illingworth & Rodkin Memo, p. 1.
[70] CARB Land Use Handbook.
[71] BAAQMD, May 2017, p. 9-7.

2.3.3. SCAQMD Gas Station HRA

The South Coast Air Quality Management District (SCAQMD) performed an industry-wide risk assessment for the 3,140 retail gas stations in the district, based solely on benzene emissions.[72] As idling diesel vehicles are a major source of cancer risk, the SCAQMD analysis underestimates cancer risk from fuel stations.

The residential cancer risk ranged from 2.31 to 5.77 per million at 25 meters for a gasoline throughput of 1 MMgal/yr.[73] As cancer risk is directly proportional to gasoline throughput, adjusting this range to 8.5 MMgal/yr for the Project would result in a residential cancer risk at 82 feet from the source (along South McDowell Boulevard) ranging from 20 to 49 per million.[74] This is consistent with our analysis, summarized in Figures 4 and 5, and CARB's analysis, discussed in Comment 2.3.2.

2.3.4. HRAs for Other Similar Facilities

Our results are consistent with HRAs conducted for similar fuel dispensing stations in other CEQA analyses.

The CEQA analysis for an almost identical facility to the Project, the 24-hour Cottle Safeway Fuel Station at the Hitachi Campus and Transit Village in San José, estimated a fuel throughput of 7 MMgal/yr from 8 dispensers (16 pumps).[75] The Final Environmental Impact Report (FEIR) identified incremental cancer risks of 33 per million at 50 feet to less than 7 per million at 300 feet.[76] Because the proposed fuel station would be located more than 300 feet from the nearest residences, the document concluded that lifetime cancer risks would be less than the 10 per million significance threshold and would therefore constitute a less-than-significant impact under CEQA.[77] However, as housing is just across the street from the Project (at 80 feet), based on the Cottle analysis, which is consistent with ours, the Project's cancer risk would be highly significant.

Further, adjusting the Cottle results to 8.5 MMgal/yr, the incremental cancer risk would range from 40 per million at 50 feet (33x8.5/7=40) to 8.5 per million at 300 feet (7x8.5/7=8.5). In contrast, the Project's similarly-sized proposed fuel dispensing station would be located 80 feet away from residences along South McDowell Boulevard. Thus, given the location of the

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[72] SCAQMD, Retail Gasoline Dispensing Facilities; available at http://www.aqmd.gov/home/rules-compliance/compliance/toxic-hot-spots-ab-2588/iws-facilities/iws-gas-station.
[73] SCAQMD, Emission Inventory and Risk Assessment Guidelines for Gasoline Dispensing Stations, January 2007, Table 3; available at http://www.aqmd.gov/docs/default-source/planning/risk-assessment/gas_station_hra.pdf?sfvrsn=0.
[74] Revised cancer risk for 8.5 MMgal/yr of gasoline throughput: (2.31)(8.5 = 19.6 per million; (5.77)(8.5) = 49.0 per million.
[75] City of San José, Addendum to the Hitachi Campus and Transit Village Final EIR, SCH #2004072110, Cottle Safeway Fuel Station, File No. CP12-053, March, 2013, p. 11; http://www.sanjoseca.gov/DocumentCenter/View/13016.
[76] Addendum to Hitachi Campus and Transit Village Final EIR, *op. cit.*, p. 25.
[77] *Id.*

Project, health risks to residents along South McDowell Boulevard can be assumed to be significant.

2.4. Scientific Research Confirms Health Impacts are Significant

Confirming the results of our health risk assessment, a number of peer-reviewed, scientific studies have linked residential and school proximity to gas stations to an increased risk of adverse health outcomes[78]—including increased risk for cancer[79] and, specifically, leukemia in children.[80] Living next to a gas station quadruples the risk of acute leukemia in children and increases the risk of developing acute non-lymphoblastic childhood leukemia by 7 times, compared with children who do not live near a gas station.[81] Moreover, a significant exposure-response relationship exists between the likelihood of childhood leukemia and the number of gasoline stations per square mile.[82] Thus, gas stations should not be located in areas where housing or vulnerable populations and activities exist or are proposed, including settings such as those near the Project, with residences across the street and schools within 300 feet.

Studies show that living within 300 feet of a gas station damages health and that a 300-foot minimum separation should apply to vulnerable facilities such as schools.[83] A link between childhood leukemia and residence within 328 feet of a gas station has been reported by one group of researchers.[84] Safe distances between gas stations and schools depend on the number of gas pumps, the amount of fuel drawn from them, and the traffic intensity. The USEPA publishes School Siting Guidelines that recommend careful evaluation for any potential school location within 1,000 feet of a LARGE gas station (defined as dispensing more than 3.6 million gal/yr).[85]

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[78] J. D. Brender et al., "Residential Proximity to Environmental Hazards and Adverse Health Outcomes," *American Journal of Public Health* 101, no. S1 (2011): S37–S52. Exhibit 1.
[79] E. O. Talbot, "Risk of Leukemia as a Result of Community Exposure to Gasoline Vapors: A Follow-Up Study," *Environmental Research* 111, no. 4 (2011): 597–602. Exhibit 1.
[80] P. Brosselin et al., "Acute Childhood Leukaemia and Residence Next to Petrol Stations and Automotive Repair Garages: The ESCALE Study (SFCE)," *Occupational and Environmental Medicine* 66, no. 9 (2009): 598–606 (Exhibit 1); P. F. Infante, "Residential Proximity to Gasoline Stations and Risk of Childhood Leukemia," *American Journal of Epidemiology* 185, no. 1 (2017): 1–4 (Exhibit 1); C. Steffen et al., "Acute Childhood Leukaemia and Environmental Exposure to Potential Sources of Benzene and Other Hydrocarbons: A Case-Control Study," *Occupational and Environmental Medicine* 61, no. 9 (2004): 773–778 (Exhibit 1); C. Steinmaus and M. Smith, "Parental, In Utero, and Early-Life Exposure to Benzene and the Risk of Childhood Leukemia: A Meta-Analysis," *American Journal of Epidemiology* 183, no. 1 (2016): 1–14. Exhibit 1.
[81] Brosselin et al., 2009; Steffen et al., 2004.
[82] H. H. Weng et al., "Childhood Leukemia and Traffic Air Pollution in Taiwan: Petrol Station Density as an Indicator," *Journal of Toxicology and Environmental Health A* 72, no. 2 (2009): 83–87. Exhibit 1.
[83] I. M. Morales Terres et al., "Assessing the Impact of Petrol Stations on Their Immediate Surrounding," *Journal of Environmental Management* 91, no. 12 (2010): 2754–2762. Exhibit 1.
[84] Steffen et al., 2004.
[85] U.S. EPA, School Siting Guidelines, p. 59; available at https://www.epa.gov/sites/production/files/2015-06/documents/school_siting_guidelines-2.pdf.

A number of scientific studies have found that environmental exposure to gasoline and automobile exhaust are associated with significant elevations in the risk of childhood cancers (leukemia and central nervous system tumors).[86,87] Childhood leukemia has been significantly associated with living near gasoline stations.[88] Moreover, a significant exposure-response relationship exists between the likelihood of childhood leukemia and the number of gasoline stations per square mile.[89]

See additional peer-reviewed journal articles supporting these conclusions in Exhibit 1.

ATTACHMENTS:

Exhibit A	Table 1 Calculation of TACs from Gasoline Dispensing and Spillage Basis: 7.48 million Gallons/year Throughput
Exhibit B	Excerpts of Idling Emissions from Heavy Duty Trucks for the San Francisco Air Basin
Exhibit C	Excerpts of HARP2 Risk Model
Exhibit D	Resume of Phyllis Fox, Ph.D, PE
Exhibit E	Resume of Ray Kapahi, BSC, M. Eng.

(Exhibits 1 and 2 via separate email to only Heather Hines and City Clerk)

Exhibit 1	Peer Reviewed Journal Articles
Exhibit 2	Various Guidance Materials, Technical Reports, and Other Supporting Documents

[86] A. E. Janitz et al., "Benzene and Childhood Acute Leukemia in Oklahoma," *Environmental Research* 158 (2017): 167–173. Exhibit 1.
[87] O. Raaschou-Nielsen et al., "Ambient Benzene at the Residence and Risk for Subtypes of Childhood Leukemia, Lymphoma and CNS Tumor," *International Journal of Cancer* 143, no. 6 (2018): 1367–1373; available in Exhibit 1 and at: https://onlinelibrary.wiley.com/doi/abs/10.1002/ijc.31421?af=R.
[88] Brosselin et al., 2009; Steffen et al., 2004.
[89] Weng et al., 2009.

EXHIBIT A

Table 1
Calculation of TACs from Gasoline Dispensing and Spillage
Basis: 7.48 million Gallons/year Throughput

	- - - From CAPCOA/SJVAPCD Spreadsheet - - - VOC Emissions Based on 7.48 million gallons/yr	
	lbs/yr	lbs/hr
Tank Filling	6.28E+02	
Vehicle Re-Fueling	3.14E+03	
Breathing Losses	1.87E+02	
Spillage	3.14E+03	
Amt of VOC (From Gasoline Dispensing, etc.)	3.96E+03	5.13E-01
Amt of VOCs (From Gasoline Spillage)	3.14E+03	4.08E-01

TACs from Tank Filling	EF (lbs/lb VOC)	Emissions (lbs/yr)	Emissions (Lbs/hr)
Benzene	3.00E-03	1.88E+00	
Ethyl Benzene	1.60E-02	1.01E+01	
Toluene	8.00E-02	5.03E+01	
Xylenes	2.40E-02	1.51E+01	

TACs from Vehicle Re-fuelling	EF (lbs/lb VOC)	Emissions (lbs/yr)	Emissions (Lbs/hr)
Benzene	3.00E-03	9.42E+00	
Ethyl Benzene	1.60E-02	5.03E+01	
Toluene	8.00E-02	2.51E+02	
Xylenes	2.40E-02	7.54E+01	

TACs from Breathing Losses	EF (lbs/lb VOC)	Emissions (lbs/yr)	Emissions (Lbs/hr)
Benzene	3.00E-03	5.61E-01	
Ethyl Benzene	1.60E-02	2.99E+00	
Toluene	8.00E-02	1.50E+01	
Xylenes	2.40E-02	4.49E+00	

TACs from Gasoline Spillage	EF (lbs/lb VOC)	Emissions (lbs/yr)	Emissions (Lbs/hr)
Benzene	1.00E-02	3.14E+01	
Ethyl Benzene	1.60E-02	5.03E+01	
Toluene	8.00E-02	2.51E+02	
Xylenes	2.40E-02	7.54E+01	

NOTES
1. VOC emission rates from CAPCOA/SJVAPCD spreadsheet (copy attached)
2. TAC Emission Factors from CAPCCOA/SJVAPCD Speciation Profiles (copy attached)

Table 2
Calculation of VOC Emissions

Gasoline Dispensing Operations VOC Calculator

Applicability	Use this spreadsheet to calculate VOC emissions from gasoline dispensing operations. Entries required in yellow areas, output in grey areas.		
Author or updater	Matthew Cegielski	*Last Update*	January 25, 2017
Facility: **ID#:** **Project #:**	Petaluma Safeway Gas Station 8.5 million gallons/yr Max Annual Throughput		

Inputs	gal/day	gal/yr	**Formula**
	2.33E+04	7.48E+06	
	1,000 gal /hr	1,000 gal /yr	
Gasoline Throughput	9.70E-01	7.48E+03	Enter the **change** in gas station throughput in units of gallons/day and gallons/yr. Select the Phase I and Phase II type using the drop down provided. VOC emissions are calculated by the multiplication of Throughput Rates and Emission Factors.
Application Type	Type #		
EVR Phase I and EVR Phase II Installed Underground Tank	9		

Substances	**lb VOC/ 1,000 gal**	**LB/HR**	**LB/YR**
Vapor Tank Filling Loss VOC	0.08	8.15E-02	6.28E+02
Vehicle Refueling VOC	0.42	4.08E-01	3.14E+03
Breathing Loss VOC	0.03	2.43E-02	1.87E+02
Spillage VOC	0.42	4.08E-01	3.14E+03
Total VOC	0.95	9.21E-01	7.10E+03

References:

* The emission factors are derived from Appendix A in the 1997 CAPCOA Air Toxics "Hot Spots" Program document, *Gasoline Service Station Industrywide Risk Asessment Guidelines* .

Table 3
Calculation of DPM Emissions from Idling
Assume 2 trucks/day x 365 days/year, 5 minutes idle/truck

IDLING EMISSIONS - DELIVERY TRUCKS	Units	
Trucks/day		2
Idle time/truck	*min*	5
Total Idle time/day	*min*	10
Idle time/yr	*min*	3,650
	hrs	60.8
PM-2.5 Emission Factor for Vehicle Idling (Note 1)	*(grams/veh-hr)*	0.120921
Assume PM-2.5 = DPM		
Annual DPM emissions	*grams/yr*	7.3560
	lbs/yr	0.016

Note 1. Idle emission factor from ARB compilation for statewide analysis by calendar year and by air basin. Excerpts of ARB report shown below.

Table 4
Calculation of DPM Emissions from Idling Diesel Cars
(Assume 5 minutes Title time per vehicle)

IDLING EMISSIONS	Units	
Annual # of Vehicles/year	*vehicles/yr.*	984,405
% of Vehicles that are Diesel		12%
Number of Diesel Vehicles/year		118,129
DPM Emissions from Idling (per vehicle)		
Average EF @ 5 mph	*gram/mile*	0.22152
DPM Emissions/hr. per vehicle (assume 5 minute idle/running time per vehicle)	*grams/vehicle*	0.0908
Annual DPM Emissions	*grams/yr.*	10,729
	lbs./yr.	23.6

Calculation of Emission Factors (Note 1)		
LDT1	0.6598	grams/mile
LDT2	0.0283	grams/mile
LHDT1	0.13328	grams/mile
LHDT2	0.09284	grams/mile
Average for trucks	0.228555	grams/mile
Average for diesel cars	0.0878	grams/mile
Composite EF (95% trucks + 5% cars)	0.22152	grams/mile

NOTES

1. Emission Factors and Annual Vehicle/Yr. from Safeway Fuel Center Health Risk Assessment Petaluma, CA. Revised Sept 19, 2017. Attachment 2.
2. The composite emission factor includes emissions from vehicle travel within the fuel center,
3. Estimate of percentage of diesel cars (5%) based on 2016 registration in California.

EXHIBIT B

Exhibit B

Excerpts of Idling Emissions from Heavy Duty Trucks for the San Francisco Air Basin

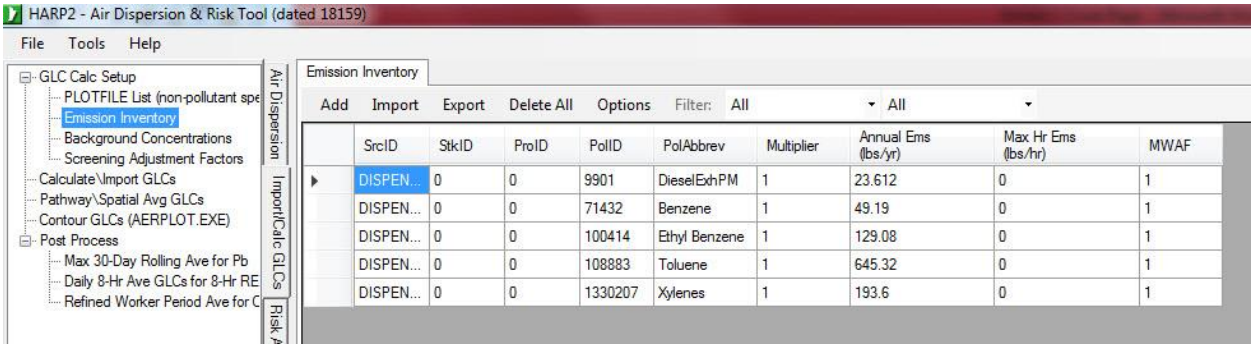
Source: California Air Resources Board Compilation for EMFAC 2011 Vehicle Categories

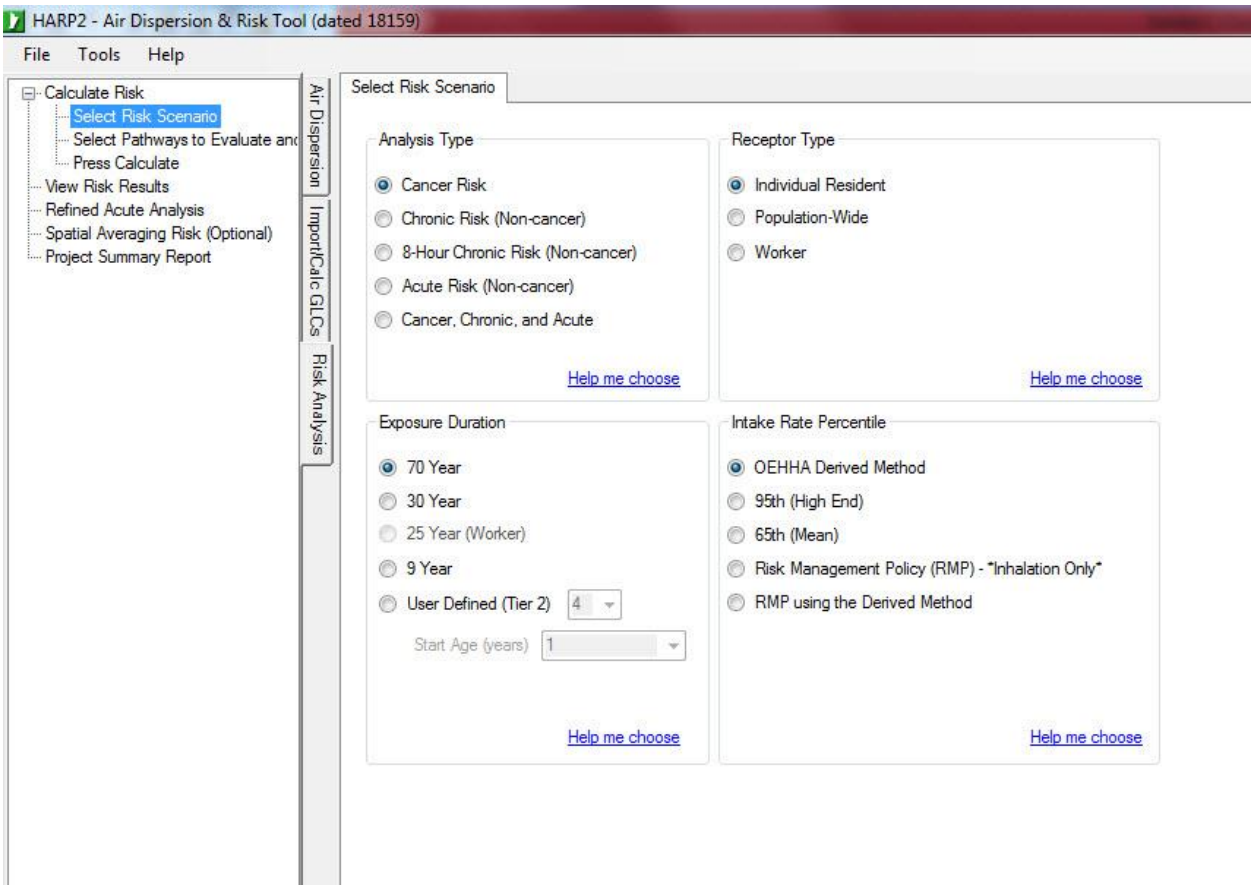
CY	EMFAC2007 Vehicle C	Fuel_Type	air_basin	season	HC (g/hr-veh)	CO (g/	NOX (g	PM10	PM2.5	CO2 (g
2018	HHDT	D	NC	w	5.605598274	49.84313	51.14514	0.223154	0.205301	6457.132
2018	HHDT	D	NCC	a	5.257784092	37.01311	50.76323	0.154797	0.142414	7039.493
2018	HHDT	D	NCC	s	4.954968026	26.89525	52.39617	0.130495	0.120055	7457.721
2018	HHDT	D	NCC	w	5.675958659	50.9854	48.50821	0.188358	0.173289	6461.941
2018	HHDT	D	NEP	a	5.388959968	38.00424	48.12444	0.148797	0.136893	7036.061
2018	HHDT	D	NEP	s	5.078588978	27.61545	49.6725	0.125436	0.115401	7454.085
2018	HHDT	D	NEP	w	5.817567527	52.35067	45.98664	0.181056	0.166572	6458.79
2018	HHDT	D	SC	a	5.031719389	35.78542	52.0009	0.122677	0.112862	7043.596
2018	HHDT	D	SC	s	4.741923261	26.00316	53.67365	0.103417	0.095144	7462.067
2018	HHDT	D	SC	w	5.431914042	49.29426	49.6909	0.149273	0.137331	6465.707
2018	HHDT	D	SCC	a	4.936788464	34.55234	56.67876	0.168871	0.155361	7040.174
2018	HHDT	D	SCC	s	4.652459774	25.10715	58.502	0.142359	0.13097	7458.442
2018	HHDT	D	SCC	w	5.329432845	47.59569	54.16097	0.205482	0.189044	6462.565
2018	HHDT	D	SD	a	5.017691698	35.639	52.73329	0.12771	0.117493	7045.531
2018	HHDT	D	SD	s	4.728703479	25.89676	54.42961	0.10766	0.099047	7464.118
2018	HHDT	D	SD	w	5.416770667	49.09256	50.39076	0.155398	0.142966	6467.483
2018	HHDT	D	SF	a	5.013150032	35.55969	53.03835	0.131436	0.120921	7044.947
2018	HHDT	D	SF	s	4.724423385	25.83914	54.74448	0.110801	0.101937	7463.498
2018	HHDT	D	SF	w	5.411867782	48.98332	50.68227	0.159931	0.147137	6466.947
2018	HHDT	D	SJV	a	5.275867508	37.29919	49.72021	0.142429	0.131035	7041.621
2018	HHDT	D	SJV	s	4.972009948	27.10313	51.31961	0.120069	0.110463	7459.975
2018	HHDT	D	SJV	w	5.695480329	51.37947	47.51153	0.173308	0.159444	6463.894
2018	HHDT	D	SS	a	5.280110081	37.53706	48.54586	0.12561	0.115561	7043.819
2018	HHDT	D	SS	s	4.976008175	27.27598	50.10747	0.10589	0.097418	7462.304
2018	HHDT	D	SS	w	5.700060332	51.70714	46.38934	0.152842	0.140615	6465.911
2018	HHDT	D	SV	a	5.199345562	36.5815	51.41951	0.154446	0.14209	7037.289
2018	HHDT	D	SV	s	4.899895197	26.58162	53.07357	0.130198	0.119782	7455.386
2018	HHDT	D	SV	w	5.612872258	50.39085	49.13534	0.18793	0.172895	6459.917
2018	MHDT	D	GBV	a	1.605433892	20.99667	76.58593	0.334317	0.307572	7438.649
2018	MHDT	D	GBV	s	1.512970762	15.25705	79.04953	0.281831	0.259284	7880.591
2018	MHDT	D	GBV	w	1.733121072	28.92282	73.18381	0.406798	0.374254	6828.348
2018	MHDT	D	LC	a	2.173488309	25.00289	76.9982	0.574315	0.52837	7415.476
2018	MHDT	D	LC	s	2.048308734	18.16813	79.47507	0.48415	0.445418	7856.042
2018	MHDT	D	LC	w	2.346355342	34.44138	73.57777	0.698828	0.642922	6807.076
2018	MHDT	D	LT	a	1.460010512	21.29111	68.83254	0.208405	0.191732	7540.721
2018	MHDT	D	LT	s	1.375922875	15.471	71.04673	0.175686	0.161631	7988.728
2018	MHDT	D	LT	w	1.576131534	29.32842	65.77484	0.253587	0.2333	6922.046
2018	MHDT	D	MC	a	1.592431268	21.92325	69.99059	0.278308	0.256043	7495.245

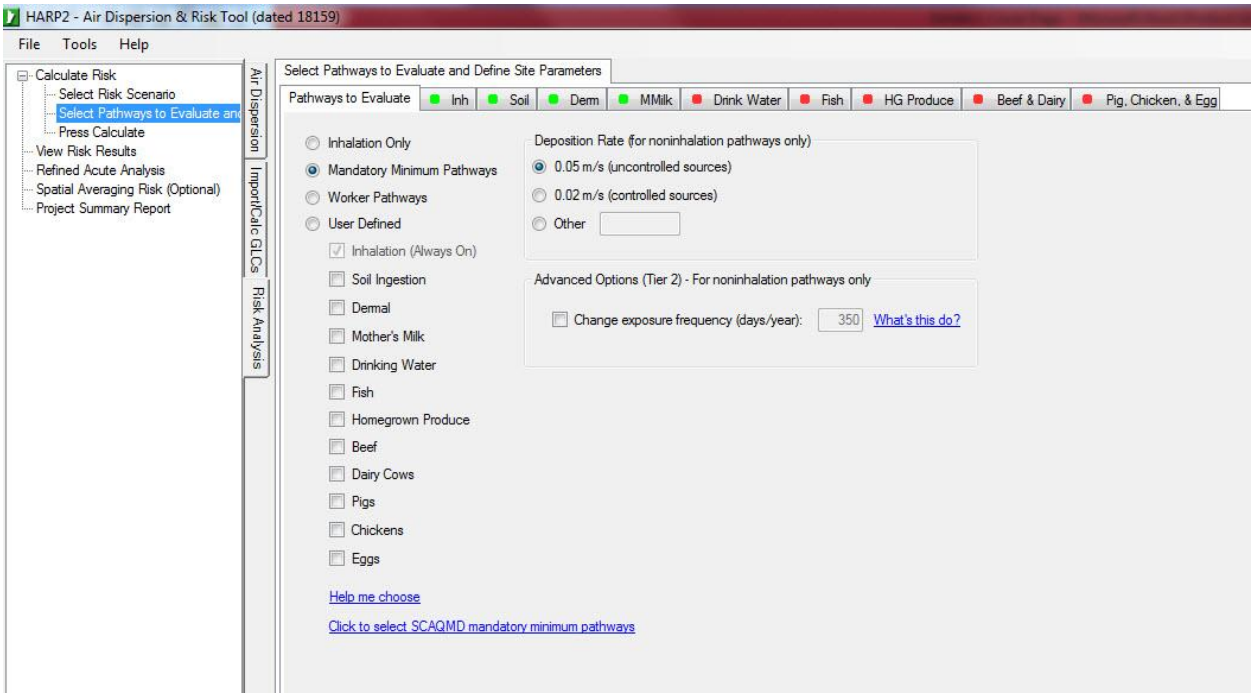
EXHIBIT C

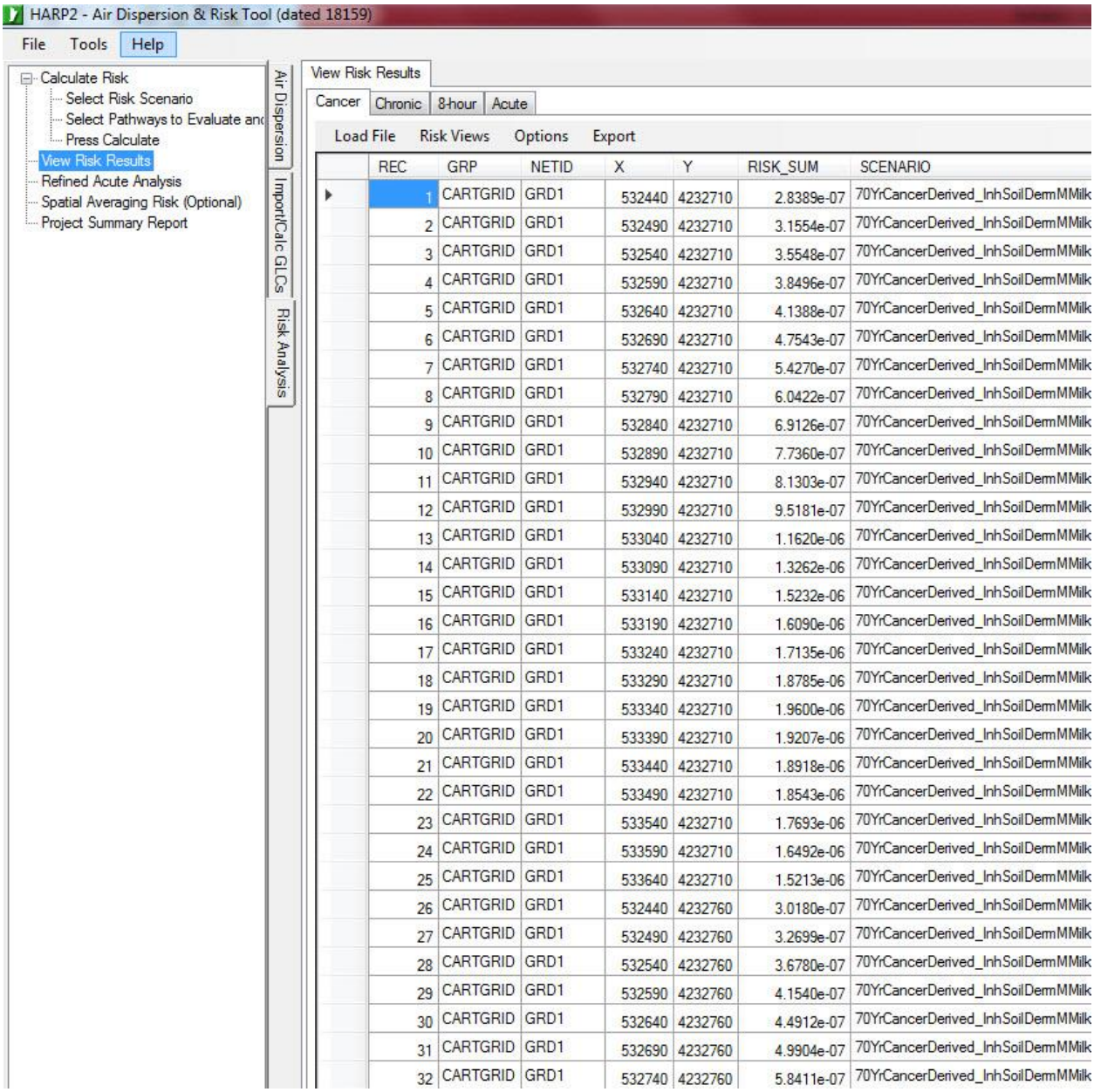
Exhibit C

Excerpts of HARP2 Risk Model


HARP2 - Air Dispersion & Risk Tool (dated 18159)
File
Tools
Help
GLC Calc Setup
PLOTFILE List (non-pollutant spe
Emission Inventory
Background Concentrations
Screening Adjustment Factors
Calculate\Import GLCs
Pathway\Spatial Avg GLCs
Contour GLCs (AERPLOT.EXE)
Post Process
Max 30-Day Rolling Ave for Pb
Daily 8-Hr Ave GLCs for 8-Hr RE
Refined Worker Period Ave for C
Air Dispersion
Import/Calc GLCs
Risk A
Emission Inventory
Add
Import
Export
Delete All
Options
Filter:
All
All
SrcID
StkID
ProID
PolID
PolAbbrev
Multiplier
Annual Ems (lbs/yr)
Max Hr Ems (lbs/hr)
MWAF
DISPEN... 0 0 9901 DieselExhPM 1 23.612 0 1
DISPEN... 0 0 71432 Benzene 1 49.19 0 1
DISPEN... 0 0 100414 Ethyl Benzene 1 129.08 0 1
DISPEN... 0 0 108883 Toluene 1 645.32 0 1
DISPEN... 0 0 1330207 Xylenes 1 193.6 0 1


HARP2 - Air Dispersion & Risk Tool (dated 18159)
File
Tools
Help
Calculate Risk
Select Risk Scenario
Select Pathways to Evaluate and
Press Calculate
View Risk Results
Refined Acute Analysis
Spatial Averaging Risk (Optional)
Project Summary Report
Air Dispersion
Import/Calc GLCs
Risk Analysis
Select Risk Scenario
Analysis Type
Cancer Risk
Chronic Risk (Non-cancer)
8-Hour Chronic Risk (Non-cancer)
Acute Risk (Non-cancer)
Cancer, Chronic, and Acute
Help me choose
Receptor Type
Individual Resident
Population-Wide
Worker
Help me choose
Exposure Duration
70 Year
30 Year
25 Year (Worker)
9 Year
User Defined (Tier 2)
4
Start Age (years)
1
Help me choose
Intake Rate Percentile
OEHHA Derived Method
95th (High End)
65th (Mean)
Risk Management Policy (RMP) - "Inhalation Only"
RMP using the Derived Method
Help me choose


HARP2 - Air Dispersion & Risk Tool (dated 18159)
File
Tools
Help
Calculate Risk
Select Risk Scenario
Select Pathways to Evaluate and
Press Calculate
View Risk Results
Refined Acute Analysis
Spatial Averaging Risk (Optional)
Project Summary Report
Air Dispersion
Import/Calc GLCs
Risk Analysis
Select Pathways to Evaluate and Define Site Parameters
Pathways to Evaluate
Inh
Soil
Derm
MMilk
Drink Water
Fish
HG Produce
Beef & Dairy
Pig, Chicken, & Egg
Inhalation Only
Mandatory Minimum Pathways
Worker Pathways
User Defined
Inhalation (Always On)
Soil Ingestion
Dermal
Mother's Milk
Drinking Water
Fish
Homegrown Produce
Beef
Dairy Cows
Pigs
Chickens
Eggs
Deposition Rate (for noninhalation pathways only)
0.05 m/s (uncontrolled sources)
0.02 m/s (controlled sources)
Other
Advanced Options (Tier 2) - For noninhalation pathways only
Change exposure frequency (days/year):
350
What's this do?
Help me choose
Click to select SCAQMD mandatory minimum pathways



REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
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2	CARTGRID	GRD1	532490	4232710	3.1554e-07	70YrCancerDerived_InhSoilDermMMilk
3	CARTGRID	GRD1	532540	4232710	3.5548e-07	70YrCancerDerived_InhSoilDermMMilk
4	CARTGRID	GRD1	532590	4232710	3.8496e-07	70YrCancerDerived_InhSoilDermMMilk
5	CARTGRID	GRD1	532640	4232710	4.1388e-07	70YrCancerDerived_InhSoilDermMMilk
6	CARTGRID	GRD1	532690	4232710	4.7543e-07	70YrCancerDerived_InhSoilDermMMilk
7	CARTGRID	GRD1	532740	4232710	5.4270e-07	70YrCancerDerived_InhSoilDermMMilk
8	CARTGRID	GRD1	532790	4232710	6.0422e-07	70YrCancerDerived_InhSoilDermMMilk
9	CARTGRID	GRD1	532840	4232710	6.9126e-07	70YrCancerDerived_InhSoilDermMMilk
10	CARTGRID	GRD1	532890	4232710	7.7360e-07	70YrCancerDerived_InhSoilDermMMilk
11	CARTGRID	GRD1	532940	4232710	8.1303e-07	70YrCancerDerived_InhSoilDermMMilk
12	CARTGRID	GRD1	532990	4232710	9.5181e-07	70YrCancerDerived_InhSoilDermMMilk
13	CARTGRID	GRD1	533040	4232710	1.1620e-06	70YrCancerDerived_InhSoilDermMMilk
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15	CARTGRID	GRD1	533140	4232710	1.5232e-06	70YrCancerDerived_InhSoilDermMMilk
16	CARTGRID	GRD1	533190	4232710	1.6090e-06	70YrCancerDerived_InhSoilDermMMilk
17	CARTGRID	GRD1	533240	4232710	1.7135e-06	70YrCancerDerived_InhSoilDermMMilk
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19	CARTGRID	GRD1	533340	4232710	1.9600e-06	70YrCancerDerived_InhSoilDermMMilk
20	CARTGRID	GRD1	533390	4232710	1.9207e-06	70YrCancerDerived_InhSoilDermMMilk
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27	CARTGRID	GRD1	532490	4232760	3.2699e-07	70YrCancerDerived_InhSoilDermMMilk
28	CARTGRID	GRD1	532540	4232760	3.6780e-07	70YrCancerDerived_InhSoilDermMMilk
29	CARTGRID	GRD1	532590	4232760	4.1540e-07	70YrCancerDerived_InhSoilDermMMilk
30	CARTGRID	GRD1	532640	4232760	4.4912e-07	70YrCancerDerived_InhSoilDermMMilk
31	CARTGRID	GRD1	532690	4232760	4.9904e-07	70YrCancerDerived_InhSoilDermMMilk
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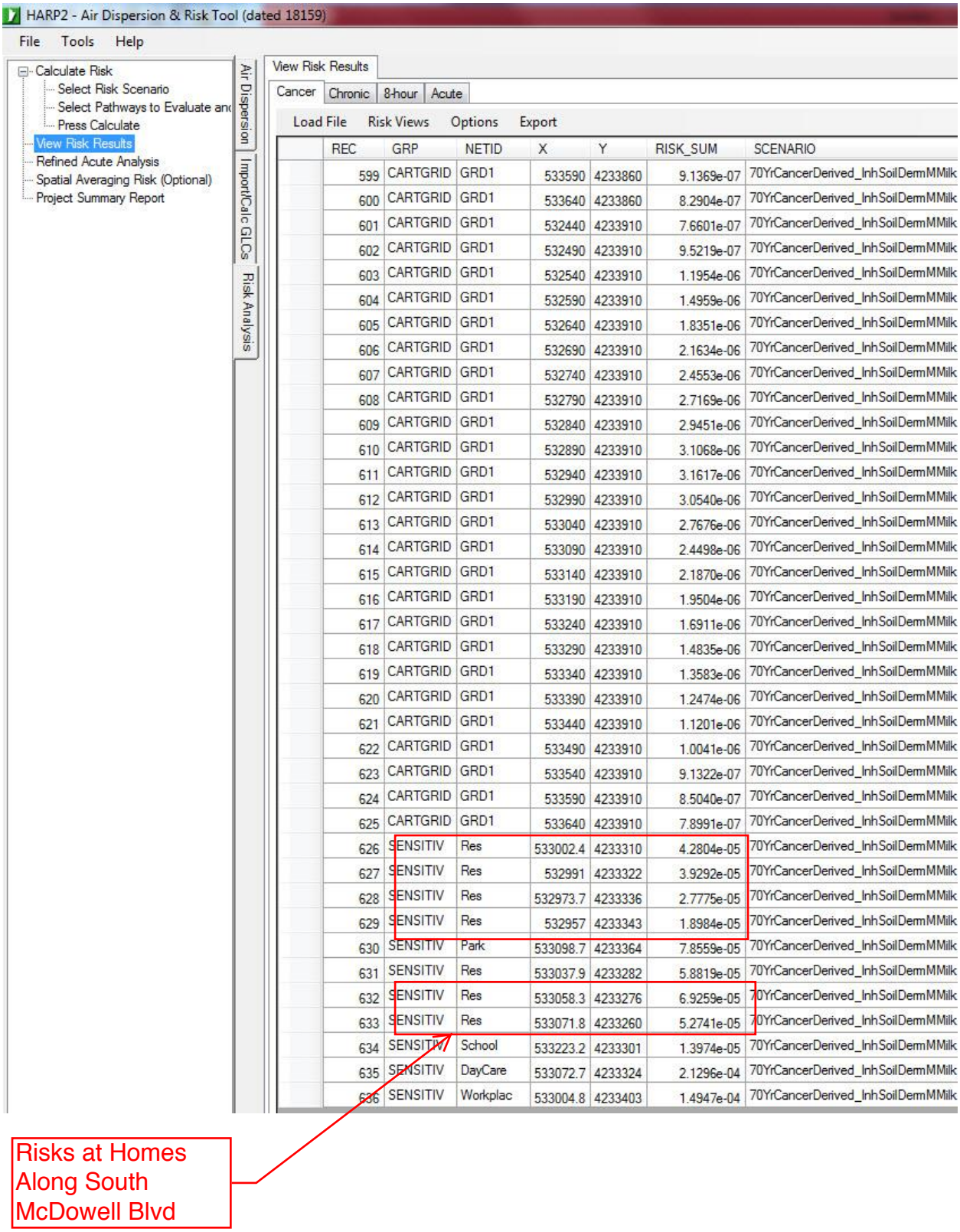

Risks at Homes Along South McDowell Blvd

EXHIBIT D

Phyllis Fox, Ph.D, PE
Environmental Management
745 White Pine Ave.
Rockledge, FL 32955
321-626-6885
phyllisfox@gmail.com

Dr. Fox has over 40 years of experience in the field of environmental engineering, including air pollution control (BACT, BART, MACT, LAER, RACT), greenhouse gas emissions and control, cost effectiveness analyses, water quality and water supply investigations, hydrology, hazardous waste investigations, environmental permitting, nuisance investigations (odor, noise), environmental impact reports, CEQA/NEPA documentation, risk assessments, and litigation support.

EDUCATION

Ph.D. Environmental/Civil Engineering, University of California, Berkeley, 1980.
M.S. Environmental/Civil Engineering, University of California, Berkeley, 1975.
B.S. Physics (with high honors), University of Florida, Gainesville, 1971.

REGISTRATION

Registered Professional Engineer: Arizona (2001-2014: #36701; retired), California (2002-present; CH 6058), Florida (2001-2016; #57886; retired), Georgia (2002-2014; #PE027643; retired), Washington (2002-2014; #38692; retired), Wisconsin (2005-2014; #37595-006; retired)
Board Certified Environmental Engineer, American Academy of Environmental Engineers, Certified in Air Pollution Control (DEE #01-20014), 2002-2014; retired)
Qualified Environmental Professional (QEP), Institute of Professional Environmental Practice (QEP #02-010007, 2001-2015: retired).

PROFESSIONAL HISTORY

Environmental Management, Principal, 1981-present
Lawrence Berkeley National Laboratory, Principal Investigator, 1977-1981
University of California, Berkeley, Program Manager, 1976-1977
Bechtel, Inc., Engineer, 1971-1976, 1964-1966

PROFESSIONAL AFFILIATIONS

American Chemical Society (1981-2010)
Phi Beta Kappa (1970-present)
Sigma Pi Sigma (1970-present)
Who's Who Environmental Registry, PH Publishing, Fort Collins, CO, 1992.
Who's Who in the World, Marquis Who's Who, Inc., Chicago, IL, 11th Ed., p. 371, 1993-present.

Who's Who of American Women, Marquis Who's Who, Inc., Chicago, IL, 13th Ed., p. 264, 1984-present.
Who's Who in Science and Engineering, Marquis Who's Who, Inc., New Providence, NJ, 5th Ed., p. 414, 1999-present.
Who's Who in America, Marquis Who's Who, Inc., 59th Ed., 2005.
Guide to Specialists on Toxic Substances, World Environment Center, New York, NY, p. 80, 1980.
National Research Council Committee on Irrigation-Induced Water Quality Problems (Selenium), Subcommittee on Quality Control/Quality Assurance (1985-1990).
National Research Council Committee on Surface Mining and Reclamation, Subcommittee on Oil Shale (1978-80)

REPRESENTATIVE EXPERIENCE

Performed environmental and engineering investigations, as outlined below, for a wide range of industrial and commercial facilities including: petroleum refineries and upgrades thereto; reformulated fuels projects; refinery upgrades to process heavy sour crudes, including tar sands and light sweet crudes from the Eagle Ford and Bakken Formations; petroleum, gasoline and ethanol distribution terminals; coal, coke, and ore/mineral export terminals; LNG export, import, and storage terminals; crude-by-rail projects; shale oil plants; crude oil/condensate marine and rail terminals; coal gasification and liquefaction plants; oil and gas production, including conventional, thermally enhanced, hydraulic fracking, and acid stimulation techniques; underground storage tanks; pipelines; compressor stations; gasoline stations; landfills; railyards; hazardous waste treatment facilities; nuclear, hydroelectric, geothermal, wood, biomass, waste, tire-derived fuel, gas, oil, coke and coal-fired power plants; transmission lines; airports; hydrogen plants; petroleum coke calcining plants; coke plants; activated carbon manufacturing facilities; asphalt plants; cement plants; incinerators; flares; manufacturing facilities (e.g., semiconductors, electronic assembly, aerospace components, printed circuit boards, amusement park rides); lanthanide processing plants; ammonia plants; nitric acid plants; urea plants; food processing plants; wineries; almond hulling facilities; composting facilities; grain processing facilities; grain elevators; ethanol production facilities; soy bean oil extraction plants; biodiesel plants; paint formulation plants; wastewater treatment plants; marine terminals and ports; gas processing plants; steel mills; iron nugget production facilities; pig iron plant, based on blast furnace technology; direct reduced iron plant; acid regeneration facilities; railcar refinishing facility; battery manufacturing plants; pesticide manufacturing and repackaging facilities; pulp and paper mills; olefin plants; methanol plants; ethylene crackers; alumina plants, desalination plants; battery storage facilities; selective catalytic reduction (SCR) systems; selective noncatalytic reduction (SNCR) systems; halogen acid furnaces; contaminated property redevelopment projects (e.g., Mission Bay, Southern Pacific Railyards, Moscone Center expansion, San Diego Padres Ballpark); residential developments; commercial office parks,

campuses, and shopping centers; server farms; transportation plans; and a wide range of mines including sand and gravel, hard rock, limestone, nacholite, coal, molybdenum, gold, zinc, and oil shale.

EXPERT WITNESS/LITIGATION SUPPORT

- For the California Attorney General, assist in determining compliance with probation terms in the matter of People v. Chevron USA.
- For plaintiffs, assist in developing Petitioners' proof brief for National Parks Conservation Association et al v. U.S. EPA, Petition for Review of Final Administrative Action of the U.S. EPA, In the U.S. Court of Appeals for the Third Circuit, Docket No. 14-3147.
- For plaintiffs, expert witness in civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for historic modifications (1997-2000) at the Cemex cement plant in Lyons, Colorado. Reviewed produced documents, prepared expert and rebuttal reports on PSD applicability based on NOx emission calculations for a collection of changes considered both individually and collectively. Deposed August 2011. *United States v. Cemex, Inc.*, In U.S. District Court for the District of Colorado (Civil Action No. 09-cv-00019-MSK-MEH). Case settled June 13, 2013.
- For plaintiffs, in civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for historic modifications (1988 – 2000) at James De Young Units 3, 4, and 5. Reviewed produced documents, analyzed CEMS and EIA data, and prepared netting and BACT analyses for NOx, SO2, and PM10 (PSD case). Expert report February 24, 2010 and affidavit February 20, 2010. *Sierra Club v. City of Holland, et al.*, U.S. District Court, Western District of Michigan (Civil Action 1:08-cv-1183). Case settled. Consent Decree 1/19/14.
- For plaintiffs, in civil action alleging failure to obtain MACT permit, expert on potential to emit hydrogen chloride (HCl) from a new coal-fired boiler. Reviewed record, estimated HCl emissions, wrote expert report June 2010 and March 2013 (Cost to Install a Scrubber at the Lamar Repowering Project Pursuant to Case-by-Case MACT), deposed August 2010 and March 2013. *Wildearth Guardian et al. v. Lamar Utilities Board*, Civil Action No. 09-cv-02974, U.S. District Court, District of Colorado. Case settled August 2013.
- For plaintiffs, expert witness on permitting, emission calculations, and wastewater treatment for coal-to-gasoline plant. Reviewed produced documents. Assisted in preparation of comments on draft minor source permit. Wrote two affidavits on key issues in case. Presented direct and rebuttal testimony 10/27 - 10/28/10 on permit enforceability and failure to properly calculate potential to emit, including underestimate of flaring emissions and omission of VOC and CO emissions from wastewater treatment, cooling tower, tank roof landings, and malfunctions. *Sierra Club, Ohio Valley Environmental Coalition, Coal River*

Mountain Watch, West Virginia Highlands Conservancy v. John Benedict, Director, Division of Air Quality, West Virginia Department of Environmental Protection and TransGas Development System, LLC, Appeal No. 10-01-AQB. Virginia Air Quality Board remanded the permit on March 28, 2011 ordering reconsideration of potential to emit calculations, including: (1) support for assumed flare efficiency; (2) inclusion of startup, shutdown and malfunction emissions; and (3) inclusion of wastewater treatment emissions in potential to emit calculations.

- For plaintiffs, expert on BACT emission limits for gas-fired combined cycle power plant. Prepared declaration in support of CBE's Opposition to the United States' Motion for Entry of Proposed Amended Consent Decree. Assisted in settlement discussions. *U.S. EPA, Plaintiff, Communities for a Better Environment, Intervenor Plaintiff, v. Pacific Gas & Electric Company, et al.*, U.S. District Court, Northern District of California, San Francisco Division, Case No. C-09-4503 SI.
- Technical expert in confidential settlement discussions with large coal-fired utility on BACT control technology and emission limits for NOx, SO2, PM, PM2.5, and CO for new natural gas fired combined cycle and simple cycle turbines with oil backup. (July 2010). Case settled.
- For plaintiffs, expert witness in remedy phase of civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for historic modifications (1998-99) at Gallagher Units 1 and 3. Reviewed produced documents, prepared expert and rebuttal reports on historic and current-day BACT for SO2, control costs, and excess emissions of SO2. Deposed 11/18/09. *United States et al. v. Cinergy, et al.*, In U.S. District Court for the Southern District of Indiana, Indianapolis Division, Civil Action No. IP99-1693 C-M/S. Settled 12/22/09.
- For plaintiffs, expert witness on MACT, BACT for NOx, and enforceability in an administrative appeal of draft state air permit issued for four 300-MW pet-coke-fired CFBs. Reviewed produced documents and prepared prefiled testimony. Deposed 10/8/09 and 11/9/09. Testified 11/10/09. *Application of Las Brisas Energy Center, LLC for State Air Quality Permit*; before the State Office of Administrative Hearings, Texas. Permit remanded 3/29/10 as LBEC failed to meet burden of proof on a number of issues including MACT. Texas Court of Appeals dismissed an appeal to reinstate the permit. The Texas Commission on Environmental Quality and Las Brisas Energy Center, LLC sought to overturn the Court of Appeals decision but moved to have their appeal dismissed in August 2013.
- For defense, expert witness in unlawful detainer case involving a gasoline station, minimart, and residential property with contamination from leaking underground storage tanks. Reviewed agency files and inspected site. Presented expert testimony on July 6, 2009, on causes of, nature and extent of subsurface contamination. *A. Singh v. S. Assaedi,* in Contra Costa County Superior Court, CA. Settled August 2009.

- For plaintiffs, expert witness on netting and enforceability for refinery being upgraded to process tar sands crude. Reviewed produced documents. Prepared expert and rebuttal reports addressing use of emission factors for baseline, omitted sources including coker, flares, tank landings and cleaning, and enforceability. Deposed. *In the Matter of Objection to the Issuance of Significant Source Modification Permit No. 089-25484-00453 to BP Products North America Inc., Whiting Business Unit, Save the Dunes Council, Inc., Sierra Club., Inc., Hoosier Environmental Council et al., Petitioners, B. P. Products North American, Respondents/Permittee,* before the Indiana Office of Environmental Adjudication. Case settled.
- For plaintiffs, expert witness on BACT, MACT, and enforceability in appeal of Title V permit issued to 600 MW coal-fired power plant burning Powder River Basin coal. Prepared technical comments on draft air permit. Reviewed record on appeal, drafted BACT, MACT, and enforceability pre-filed testimony. Drafted MACT and enforceability pre-filed rebuttal testimony. Deposed March 24, 2009. Testified June 10, 2009. *In Re: Southwestern Electric Power Company*, Arkansas Pollution Control and Ecology Commission, Consolidated Docket No. 08-006-P. Recommended Decision issued December 9, 2009 upholding issued permit. Commission adopted Recommended Decision January 22, 2010.
- For plaintiffs, expert witness in remedy phase of civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for historic modifications (1989-1992) at Wabash Units 2, 3 and 5. Reviewed produced documents, prepared expert and rebuttal report on historic and current-day BACT for NOx and SO2, control costs, and excess emissions of NOx, SO2, and mercury. Deposed 10/21/08. *United States et al. v. Cinergy, et al.*, In U.S. District Court for the Southern District of Indiana, Indianapolis Division, Civil Action No. IP99-1693 C-M/S. Testified 2/3/09. Memorandum Opinion & Order 5-29-09 requiring shutdown of Wabash River Units 2, 3, 5 by September 30, 2009, run at baseline until shutdown, and permanently surrender SO2 emission allowances.
- For plaintiffs, expert witness in liability phase of civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for three historic modifications (1997-2001) at two portland cement plants involving three cement kilns. Reviewed produced documents, analyzed CEMS data covering subject period, prepared netting analysis for NOx, SO_2 and CO, and prepared expert and rebuttal reports. *United States v. Cemex California Cement,* In U.S. District Court for the Central District of California, Eastern Division, Case No. ED CV 07-00223-GW (JCRx). Settled 1/15/09.
- For intervenors Clean Wisconsin and Citizens Utility Board, prepared data requests, reviewed discovery and expert report. Prepared prefiled direct, rebuttal and surrebuttal testimony on cost to extend life of existing Oak Creek Units 5-8 and cost to address future regulatory requirements to determine whether to control or shutdown one or more of the units. Oral testimony 2/5/08. Application for a Certificate of Authority to Install Wet Flue Gas Desulfurization and Selective Catalytic Reduction Facilities and Associated Equipment

for Control of Sulfur Dioxide and Nitrogen Oxide Emissions at Oak Creek Power Plant Units 5, 6, 7 and 8, WPSC Docket No. 6630-CE-299.

- For plaintiffs, expert witness on alternatives analysis and BACT for NOx, SO2, total PM10, and sulfuric acid mist in appeal of PSD permit issued to 1200 MW coal fired power plant burning Powder River Basin and/or Central Appalachian coal (Longleaf). Assisted in drafting technical comments on NOx on draft permit. Prepared expert disclosure. Presented 8+ days of direct and rebuttal expert testimony. Attended all 21 days of evidentiary hearing from 9/5/07 – 10/30/07 assisting in all aspects of hearing. *Friends of the Chatahooche and Sierra Club v. Dr. Carol Couch, Director, Environmental Protection Division of Natural Resources Department, Respondent, and Longleaf Energy Associates, Intervener*. ALJ Final Decision 1/11/08 denying petition. ALJ Order vacated & remanded for further proceedings, Fulton County Superior Court, 6/30/08. Court of Appeals of GA remanded the case with directions that the ALJ's final decision be vacated to consider the evidence under the correct standard of review, July 9, 2009. The ALJ issued an opinion April 2, 2010 in favor of the applicant. Final permit issued April 2010.
- For plaintiffs, expert witness on diesel exhaust in inverse condemnation case in which Port expanded maritime operations into residential neighborhoods, subjecting plaintiffs to noise, light, and diesel fumes. Measured real-time diesel particulate concentrations from marine vessels and tug boats on plaintiffs' property. Reviewed documents, depositions, DVDs, and photographs provided by counsel. Deposed. Testified October 24, 2006. *Ann Chargin, Richard Hackett, Carolyn Hackett, et al. v. Stockton Port District*, Superior Court of California, County of San Joaquin, Stockton Branch, No. CV021015. Judge ruled for plaintiffs.
- For plaintiffs, expert witness on NOx emissions and BACT in case alleging failure to obtain necessary permits and install controls on gas-fired combined-cycle turbines. Prepared and reviewed (applicant analyses) of NOx emissions, BACT analyses (water injection, SCR, ultra low NOx burners), and cost-effectiveness analyses based on site visit, plant operating records, stack tests, CEMS data, and turbine and catalyst vendor design information. Participated in negotiations to scope out consent order. *United States v. Nevada Power*. Case settled June 2007, resulting in installation of dry low NOx burners (5 ppm NOx averaged over 1 hr) on four units and a separate solar array at a local business.
- For plaintiffs, expert witness in appeal of PSD permit issued to 850 MW coal fired boiler burning Powder River Basin coal (Iatan Unit 2) on BACT for particulate matter, sulfuric acid mist and opacity and emission calculations for alleged historic violations of PSD. Assisted in drafting technical comments, petition for review, discovery requests, and responses to discovery requests. Reviewed produced documents. Prepared expert report on BACT for particulate matter. Assisted with expert depositions. Deposed February 7, 8, 27, and 28, 2007. *In Re PSD Construction Permit Issued to Great Plains Energy, Kansas City Power & Light – Iatan Generating Station, Sierra Club v. Missouri Department of Natural Resources,*

Great Plains Energy, and Kansas City Power & Light. Case settled March 27, 2007, providing offsets for over 6 million ton/yr of CO2 and lower NOx and SO_2 emission limits.

- For plaintiffs, expert witness in remedy phase of civil action relating to alleged violations of the Clean Air Act, Prevention of Significant Deterioration, for historic modifications of coal-fired boilers and associated equipment. Reviewed produced documents, prepared expert report on cost to retrofit 24 coal-fired power plants with scrubbers designed to remove 99% of the sulfur dioxide from flue gases. Prepared supplemental and expert report on cost estimates and BACT for SO2 for these 24 complaint units. Deposed 1/30/07 and 3/14/07. *United States and State of New York et al. v. American Electric Power*, In U.S. District Court for the Southern District of Ohio, Eastern Division, Consolidated Civil Action Nos. C2-99-1182 and C2-99-1250. Settlement announced 10/9/07.
- For plaintiffs, expert witness on BACT, enforceability, and alternatives analysis in appeal of PSD permit issued for a 270-MW pulverized coal fired boiler burning Powder River Basin coal (City Utilities Springfield Unit 2). Reviewed permitting file and assisted counsel draft petition and prepare and respond to interrogatories and document requests. Reviewed interrogatory responses and produced documents. Assisted with expert depositions. Deposed August 2005. Evidentiary hearings October 2005. *In the Matter of Linda Chipperfield and Sierra Club v. Missouri Department of Natural Resources*. Missouri Supreme Court denied review of adverse lower court rulings August 2007.
- For plaintiffs, expert witness in civil action relating to plume touchdowns at AEP's Gavin coal-fired power plant. Assisted counsel draft interrogatories and document requests. Reviewed responses to interrogatories and produced documents. Prepared expert report "Releases of Sulfuric Acid Mist from the Gavin Power Station." The report evaluates sulfuric acid mist releases to determine if AEP complied with the requirements of CERCLA Section 103(a) and EPCRA Section 304. This report also discusses the formation, chemistry, release characteristics, and abatement of sulfuric acid mist in support of the claim that these releases present an imminent and substantial endangerment to public health under Section 7002(a)(1)(B) of the Resource Conservation and Recovery Act ("RCRA"). *Citizens Against Pollution v. Ohio Power Company*, In the U.S. District Court for the Southern District of Ohio, Eastern Division, Civil Action No. 2-04-cv-371. Case settled 12-8-06.

- For petitioners, expert witness in contested case hearing on BACT, enforceability, and emission estimates for an air permit issued to a 500-MW supercritical Power River Basin coal-fired boiler (Weston Unit 4). Assisted counsel prepare comments on draft air permit and respond to and draft discovery. Reviewed produced file, deposed (7/05), and prepared expert report on BACT and enforceability. Evidentiary hearings September 2005. *In the Matter of an Air Pollution Control Construction Permit Issued to Wisconsin Public Service Corporation for the Construction and Operation of a 500 MW Pulverized Coal-fired Power Plant Known as Weston Unit 4 in Marathon County, Wisconsin*, Case No. IH-04-21. The

Final Order, issued 2/10/06, lowered the NOx BACT limit from 0.07 lb/MMBtu to 0.06 lb/MMBtu based on a 30-day average, added a BACT SO2 control efficiency, and required a 0.0005% high efficiency drift eliminator as BACT for the cooling tower. The modified permit, including these provisions, was issued 3/28/07. Additional appeals in progress.

- For plaintiffs, adviser on technical issues related to Citizen Suit against U.S. EPA regarding failure to update New Source Performance Standards for petroleum refineries, 40 CFR 60, Subparts J, VV, and GGG. *Our Children's Earth Foundation and Sierra Club v. U.S. EPA et al*. Case settled July 2005. CD No. C 05-00094 CW, U.S. District Court, Northern District of California – Oakland Division. Proposed revisions to standards of performance for petroleum refineries published 72 FR 27178 (5/14/07).
- For interveners, reviewed proposed Consent Decree settling Clean Air Act violations due to historic modifications of boilers and associated equipment at two coal-fired power plants. In response to stay order, reviewed the record, selected one representative activity at each of seven generating units, and analyzed to identify CAA violations. Identified NSPS and NSR violations for NOx, SO_2, PM/PM10, and sulfuric acid mist. Summarized results in an expert report. *United States of America, and Michael A. Cox, Attorney General of the State of Michigan, ex rel. Michigan Department of Environmental Quality, Plaintiffs, and Clean Wisconsin, Sierra Club, and Citizens' Utility Board, Intervenors, v. Wisconsin Electric Power Company, Defendant*, U.S. District Court for the Eastern District of Wisconsin, Civil Action No. 2:03-CV-00371-CNC. Order issued 10-1-07 denying petition.
- For a coalition of Nevada labor organizations (ACE), reviewed preliminary determination to issue a Class I Air Quality Operating Permit to Construct and supporting files for a 250-MW pulverized coal-fired boiler (Newmont). Prepared about 100 pages of technical analyses and comments on BACT, MACT, emission calculations, and enforceability. Assisted counsel draft petition and reply brief appealing PSD permit to U.S. EPA Environmental Appeals Board (EAB). Order denying review issued 12/21/05. *In re Newmont Nevada Energy Investment, LLC, TS Power Plant*, PSD Appeal No. 05-04 (EAB 2005).
- For petitioners and plaintiffs, reviewed and prepared comments on air quality and hazardous waste based on negative declaration for refinery ultra low sulfur diesel project located in SCAQMD. Reviewed responses to comments and prepared responses. Prepared declaration and presented oral testimony before SCAQMD Hearing Board on exempt sources (cooling towers) and calculation of potential to emit under NSR. Petition for writ of mandate filed March 2005. Case remanded by Court of Appeals to trial court to direct SCAQMD to re-evaluate the potential environmental significance of NOx emissions resulting from the project in accordance with court's opinion. California Court of Appeals, Second Appellate Division, on December 18, 2007, affirmed in part (as to baseline) and denied in part. *Communities for a Better Environment v. South Coast Air Quality Management District and ConocoPhillips and Carlos Valdez et al v. South Coast Air Quality Management District and*

ConocoPhillips. Certified for partial publication 1/16/08. Appellate Court opinion upheld by CA Supreme Court 3/15/10. *(2010) 48 Cal.4th 310*.

- For amici seeking to amend a proposed Consent Decree to settle alleged NSR violations at Chevron refineries, reviewed proposed settlement, related files, subject modifications, and emission calculations. Prepared declaration on emission reductions, identification of NSR and NSPS violations, and BACT/LAER for FCCUs, heaters and boilers, flares, and sulfur recovery plants. *U.S. et al. v. Chevron U.S.A.*, Northern District of California, Case No. C 03-04650. Memorandum and Order Entering Consent Decree issued June 2005. Case No. C 03-4650 CRB.
- For petitioners, prepared declaration on enforceability of periodic monitoring requirements, in response to EPA's revised interpretation of 40 CFR 70.6(c)(1). This revision limited additional monitoring required in Title V permits. 69 FR 3203 (Jan. 22, 2004). *Environmental Integrity Project et al. v. EPA* (U.S. Court of Appeals for the District of Columbia). Court ruled the Act requires all Title V permits to contain monitoring requirements to assure compliance. *Sierra Club v. EPA*, 536 F.3d 673 (D.C. Cir. 2008).
- For interveners in application for authority to construct a 500 MW supercritical coal-fired generating unit before the Wisconsin Public Service Commission, prepared pre-filed written direct and rebuttal testimony with oral cross examination and rebuttal on BACT and MACT (Weston 4). Prepared written comments on BACT, MACT, and enforceability on draft air permit for same facility.
- For property owners in Nevada, evaluated the environmental impacts of a 1,450-MW coal-fired power plant proposed in a rural area adjacent to the Black Rock Desert and Granite Range, including emission calculations, air quality modeling, comments on proposed use permit to collect preconstruction monitoring data, and coordination with agencies and other interested parties. Project cancelled.
- For environmental organizations, reviewed draft PSD permit for a 600-MW coal-fired power plant in West Virginia (Longview). Prepared comments on permit enforceability; coal washing; BACT for SO_2 and PM10; Hg MACT; and MACT for HCl, HF, non-Hg metallic HAPs, and enforceability. Assist plaintiffs draft petition appealing air permit. Retained as expert to develop testimony on MACT, BACT, offsets, enforceability. Participate in settlement discussions. Case settled July 2004.
- For petitioners, reviewed record produced in discovery and prepared affidavit on emissions of carbon monoxide and volatile organic compounds during startup of GE 7FA combustion turbines to successfully establish plaintiff standing. *Sierra Club et al. v. Georgia Power Company* (Northern District of Georgia).
- For building trades, reviewed air quality permitting action for 1500-MW coal-fired power plant before the Kentucky Department for Environmental Protection (Thoroughbred).

- For petitioners, expert witness in administrative appeal of the PSD/Title V permit issued to a 1500-MW coal-fired power plant. Reviewed over 60,000 pages of produced documents, prepared discovery index, identified and assembled plaintiff exhibits. Deposed. Assisted counsel in drafting discovery requests, with over 30 depositions, witness cross examination, and brief drafting. Presented over 20 days of direct testimony, rebuttal and sur-rebuttal, with cross examination on BACT for NOx, SO_2, and PM/PM10; MACT for Hg and non-Hg metallic HAPs; emission estimates for purposes of Class I and II air modeling; risk assessment; and enforceability of permit limits. Evidentiary hearings from November 2003 to June 2004. *Sierra Club et al. v. Natural Resources & Environmental Protection Cabinet, Division of Air Quality and Thoroughbred Generating Company et al*. Hearing Officer Decision issued August 9, 2005 finding in favor of plaintiffs on counts as to risk, BACT (IGCC/CFB, NOx, SO_2, Hg, Be), single source, enforceability, and errors and omissions. Assist counsel draft exceptions. Cabinet Secretary issued Order April 11, 2006 denying Hearing Offer's report, except as to NOx BACT, Hg, 99% SO2 control and certain errors and omissions.
- For citizens group in Massachusetts, reviewed, commented on, and participated in permitting of pollution control retrofits of coal-fired power plant (Salem Harbor).
- Assisted citizens group and labor union challenge issuance of conditional use permit for a 317,000 ft^2 discount store in Honolulu without any environmental review. In support of a motion for preliminary injunction, prepared 7-page declaration addressing public health impacts of diesel exhaust from vehicles serving the Project. In preparation for trial, prepared 20-page preliminary expert report summarizing results of diesel exhaust and noise measurements at two big box retail stores in Honolulu, estimated diesel PM10 concentrations for Project using ISCST, prepared a cancer health risk assessment based on these analyses, and evaluated noise impacts.
- Assisted environmental organizations to challenge the DOE Finding of No Significant Impact (FONSI) for the Baja California Power and Sempra Energy Resources Cross-Border Transmissions Lines in the U.S. and four associated power plants located in Mexico (DOE EA-1391). Prepared 20-page declaration in support of motion for summary judgment addressing emissions, including CO_2 and NH_3, offsets, BACT, cumulative air quality impacts, alternative cooling systems, and water use and water quality impacts. Plaintiff's motion for summary judgment granted in part. U.S. District Court, Southern District decision concluded that the Environmental Assessment and FONSI violated NEPA and the APA due to their inadequate analysis of the potential controversy surrounding the project, water impacts, impacts from NH_3 and CO_2, alternatives, and cumulative impacts. *Border Power Plant Working Group v. Department of Energy and Bureau of Land Management*, Case No. 02-CV-513-IEG (POR) (May 2, 2003).
- For Sacramento school, reviewed draft air permit issued for diesel generator located across from playfield. Prepared comments on emission estimates, enforceability, BACT, and health impacts of diesel exhaust. Case settled. BUG trap installed on the diesel generator.

- Assisted unions in appeal of Title V permit issued by BAAQMD to carbon plant that manufactured coke. Reviewed District files, identified historic modifications that should have triggered PSD review, and prepared technical comments on Title V permit. Reviewed responses to comments and assisted counsel draft appeal to BAAQMD hearing board, opening brief, motion to strike, and rebuttal brief. Case settled.
- Assisted California Central Coast city obtain controls on a proposed new city that would straddle the Ventura-Los Angeles County boundary. Reviewed several environmental impact reports, prepared an air quality analysis, a diesel exhaust health risk assessment, and detailed review comments. Governor intervened and State dedicated the land for conservation purposes April 2004.
- Assisted Central California city to obtain controls on large alluvial sand quarry and asphalt plant proposing a modernization. Prepared comments on Negative Declaration on air quality, public health, noise, and traffic. Evaluated process flow diagrams and engineering reports to determine whether proposed changes increased plant capacity or substantially modified plant operations. Prepared comments on application for categorical exemption from CEQA. Presented testimony to County Board of Supervisors. Developed controls to mitigate impacts. Assisted counsel draft Petition for Writ. Case settled June 2002. Substantial improvements in plant operations were obtained including cap on throughput, dust control measures, asphalt plant loadout enclosure, and restrictions on truck routes.
- Assisted oil companies on the California Central Coast in defending class action citizen's lawsuit alleging health effects due to emissions from gas processing plant and leaking underground storage tanks. Reviewed regulatory and other files and advised counsel on merits of case. Case settled November 2001.
- Assisted oil company on the California Central Coast in defending property damage claims arising out of a historic oil spill. Reviewed site investigation reports, pump tests, leachability studies, and health risk assessments, participated in design of additional site characterization studies to assess health impacts, and advised counsel on merits of case. Prepare health risk assessment.
- Assisted unions in appeal of Initial Study/Negative Declaration ("IS/ND") for an MTBE phaseout project at a Bay Area refinery. Reviewed IS/ND and supporting agency permitting files and prepared technical comments on air quality, groundwater, and public health impacts. Reviewed responses to comments and final IS/ND and ATC permits and assisted counsel to draft petitions and briefs appealing decision to Air District Hearing Board. Presented sworn direct and rebuttal testimony with cross examination on groundwater impacts of ethanol spills on hydrocarbon contamination at refinery. Hearing Board ruled 5 to 0 in favor of appellants, remanding ATC to district to prepare an EIR.
- Assisted Florida cities in challenging the use of diesel and proposed BACT determinations in prevention of significant deterioration (PSD) permits issued to two 510-MW simple cycle

peaking electric generating facilities and one 1,080-MW simple cycle/combined cycle facility. Reviewed permit applications, draft permits, and FDEP engineering evaluations, assisted counsel in drafting petitions and responding to discovery. Participated in settlement discussions. Cases settled or applications withdrawn.

- Assisted large California city in federal lawsuit alleging peaker power plant was violating its federal permit. Reviewed permit file and applicant's engineering and cost feasibility study to reduce emissions through retrofit controls. Advised counsel on feasible and cost-effective NOx, SOx, and PM10 controls for several 1960s diesel-fired Pratt and Whitney peaker turbines. Case settled.
- Assisted coalition of Georgia environmental groups in evaluating BACT determinations and permit conditions in PSD permits issued to several large natural gas-fired simple cycle and combined-cycle power plants. Prepared technical comments on draft PSD permits on BACT, enforceability of limits, and toxic emissions. Reviewed responses to comments, advised counsel on merits of cases, participated in settlement discussions, presented oral and written testimony in adjudicatory hearings, and provided technical assistance as required. Cases settled or won at trial.
- Assisted construction unions in review of air quality permitting actions before the Indiana Department of Environmental Management ("IDEM") for several natural gas-fired simple cycle peaker and combined cycle power plants.
- Assisted coalition of towns and environmental groups in challenging air permits issued to 523 MW dual fuel (natural gas and distillate) combined-cycle power plant in Connecticut. Prepared technical comments on draft permits and 60 pages of written testimony addressing emission estimates, startup/shutdown issues, BACT/LAER analyses, and toxic air emissions. Presented testimony in adjudicatory administrative hearings before the Connecticut Department of Environmental Protection in June 2001 and December 2001.
- Assisted various coalitions of unions, citizens groups, cities, public agencies, and developers in licensing and permitting of over 110 coal, gas, oil, biomass, and pet coke-fired power plants generating over 75,000 MW of electricity. These included base-load, combined cycle, simple cycle, and peaker power plants in Alaska, Arizona, Arkansas, California, Colorado, Georgia, Florida, Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, Oklahoma, Oregon, Texas, West Virginia, Wisconsin, and elsewhere. Prepared analyses of and comments on applications for certification, preliminary and final staff assessments, and various air, water, wastewater, and solid waste permits issued by local agencies. Presented written and oral testimony before various administrative bodies on hazards of ammonia use and transportation, health effects of air emissions, contaminated property issues, BACT/LAER issues related to SCR and SCONOx, criteria and toxic pollutant emission estimates, MACT analyses, air quality modeling, water supply and water quality issues, and methods to reduce water use, including dry cooling, parallel dry-wet cooling, hybrid cooling, and zero liquid discharge systems.

- Assisted unions, cities, and neighborhood associations in challenging an EIR issued for the proposed expansion of the Oakland Airport. Reviewed two draft EIRs and prepared a health risk assessment and extensive technical comments on air quality and public health impacts. The California Court of Appeals, First Appellate District, ruled in favor of appellants and plaintiffs, concluding that the EIR "2) erred in using outdated information in assessing the emission of toxic air contaminants (TACs) from jet aircraft; 3) failed to support its decision not to evaluate the health risks associated with the emission of TACs with meaningful analysis," thus accepting my technical arguments and requiring the Port to prepare a new EIR. See *Berkeley Keep Jets Over the Bay Committee, City of San Leandro, and City of Alameda et al. v. Board of Port Commissioners* (August 30, 2001) 111 Cal.Rptr.2d 598.
- Assisted lessor of former gas station with leaking underground storage tanks and TCE contamination from adjacent property. Lessor held option to purchase, which was forfeited based on misrepresentation by remediation contractor as to nature and extent of contamination. Remediation contractor purchased property. Reviewed regulatory agency files and advised counsel on merits of case. Case not filed.
- Advised counsel on merits of several pending actions, including a Proposition 65 case involving groundwater contamination at an explosives manufacturing firm and two former gas stations with leaking underground storage tanks.
- Assisted defendant foundry in Oakland in a lawsuit brought by neighbors alleging property contamination, nuisance, trespass, smoke, and health effects from foundry operation. Inspected and sampled plaintiff's property. Advised counsel on merits of case. Case settled.
- Assisted business owner facing eminent domain eviction. Prepared technical comments on a negative declaration for soil contamination and public health risks from air emissions from a proposed redevelopment project in San Francisco in support of a CEQA lawsuit. Case settled.
- Assisted neighborhood association representing residents living downwind of a Berkeley asphalt plant in separate nuisance and CEQA lawsuits. Prepared technical comments on air quality, odor, and noise impacts, presented testimony at commission and council meetings, participated in community workshops, and participated in settlement discussions. Cases settled. Asphalt plant was upgraded to include air emission and noise controls, including vapor collection system at truck loading station, enclosures for noisy equipment, and improved housekeeping.
- Assisted a Fortune 500 residential home builder in claims alleging health effects from faulty installation of gas appliances. Conducted indoor air quality study, advised counsel on merits of case, and participated in discussions with plaintiffs. Case settled.
- Assisted property owners in Silicon Valley in lawsuit to recover remediation costs from insurer for large TCE plume originating from a manufacturing facility. Conducted investigations to demonstrate sudden and accidental release of TCE, including groundwater

modeling, development of method to date spill, preparation of chemical inventory, investigation of historical waste disposal practices and standards, and on-site sewer and storm drainage inspections and sampling. Prepared declaration in opposition to motion for summary judgment. Case settled.

- Assisted residents in east Oakland downwind of a former battery plant in class action lawsuit alleging property contamination from lead emissions. Conducted historical research and dry deposition modeling that substantiated claim. Participated in mediation at JAMS. Case settled.
- Assisted property owners in West Oakland who purchased a former gas station that had leaking underground storage tanks and groundwater contamination. Reviewed agency files and advised counsel on merits of case. Prepared declaration in opposition to summary judgment. Prepared cost estimate to remediate site. Participated in settlement discussions. Case settled.
- Consultant to counsel representing plaintiffs in two Clean Water Act lawsuits involving selenium discharges into San Francisco Bay from refineries. Reviewed files and advised counsel on merits of case. Prepared interrogatory and discovery questions, assisted in deposing opposing experts, and reviewed and interpreted treatability and other technical studies. Judge ruled in favor of plaintiffs.
- Assisted oil company in a complaint filed by a resident of a small California beach community alleging that discharges of tank farm rinse water into the sanitary sewer system caused hydrogen sulfide gas to infiltrate residence, sending occupants to hospital. Inspected accident site, interviewed parties to the event, and reviewed extensive agency files related to incident. Used chemical analysis, field simulations, mass balance calculations, sewer hydraulic simulations with SWMM44, atmospheric dispersion modeling with SCREEN3, odor analyses, and risk assessment calculations to demonstrate that the incident was caused by a faulty drain trap and inadequate slope of sewer lateral on resident's property. Prepared a detailed technical report summarizing these studies. Case settled.
- Assisted large West Coast city in suit alleging that leaking underground storage tanks on city property had damaged the waterproofing on downgradient building, causing leaks in an underground parking structure. Reviewed subsurface hydrogeologic investigations and evaluated studies conducted by others documenting leakage from underground diesel and gasoline tanks. Inspected, tested, and evaluated waterproofing on subsurface parking structure. Waterproofing was substandard. Case settled.
- Assisted residents downwind of gravel mine and asphalt plant in Siskiyou County, California, in suit to obtain CEQA review of air permitting action. Prepared two declarations analyzing air quality and public health impacts. Judge ruled in favor of plaintiffs, closing mine and asphalt plant.

- Assisted defendant oil company on the California Central Coast in class action lawsuit alleging property damage and health effects from subsurface petroleum contamination. Reviewed documents, prepared risk calculations, and advised counsel on merits of case. Participated in settlement discussions. Case settled.
- Assisted defendant oil company in class action lawsuit alleging health impacts from remediation of petroleum contaminated site on California Central Coast. Reviewed documents, designed and conducted monitoring program, and participated in settlement discussions. Case settled.
- Consultant to attorneys representing irrigation districts and municipal water districts to evaluate a potential challenge of USFWS actions under CVPIA section 3406(b)(2). Reviewed agency files and collected and analyzed hydrology, water quality, and fishery data. Advised counsel on merits of case. Case not filed.
- Assisted residents downwind of a Carson refinery in class action lawsuit involving soil and groundwater contamination, nuisance, property damage, and health effects from air emissions. Reviewed files and provided advice on contaminated soil and groundwater, toxic emissions, and health risks. Prepared declaration on refinery fugitive emissions. Prepared deposition questions and reviewed deposition transcripts on air quality, soil contamination, odors, and health impacts. Case settled.
- Assisted residents downwind of a Contra Costa refinery who were affected by an accidental release of naphtha. Characterized spilled naphtha, estimated emissions, and modeled ambient concentrations of hydrocarbons and sulfur compounds. Deposed. Presented testimony in binding arbitration at JAMS. Judge found in favor of plaintiffs.
- Assisted residents downwind of Contra Costa County refinery in class action lawsuit alleging property damage, nuisance, and health effects from several large accidents as well as routine operations. Reviewed files and prepared analyses of environmental impacts. Prepared declarations, deposed, and presented testimony before jury in one trial and judge in second. Case settled.
- Assisted business owner claiming damages from dust, noise, and vibration during a sewer construction project in San Francisco. Reviewed agency files and PM10 monitoring data and advised counsel on merits of case. Case settled.
- Assisted residents downwind of Contra Costa County refinery in class action lawsuit alleging property damage, nuisance, and health effects. Prepared declaration in opposition to summary judgment, deposed, and presented expert testimony on accidental releases, odor, and nuisance before jury. Case thrown out by judge, but reversed on appeal and not retried.
- Presented testimony in small claims court on behalf of residents claiming health effects from hydrogen sulfide from flaring emissions triggered by a power outage at a Contra Costa County refinery. Analyzed meteorological and air quality data and evaluated potential health

risks of exposure to low concentrations of hydrogen sulfide. Judge awarded damages to plaintiffs.

- Assisted construction unions in challenging PSD permit for an Indiana steel mill. Prepared technical comments on draft PSD permit, drafted 70-page appeal of agency permit action to the Environmental Appeals Board challenging permit based on faulty BACT analysis for electric arc furnace and reheat furnace and faulty permit conditions, among others, and drafted briefs responding to four parties. EPA Region V and the EPA General Counsel intervened as amici, supporting petitioners. EAB ruled in favor of petitioners, remanding permit to IDEM on three key issues, including BACT for the reheat furnace and lead emissions from the EAF. Drafted motion to reconsider three issues. Prepared 69 pages of technical comments on revised draft PSD permit. Drafted second EAB appeal addressing lead emissions from the EAF and BACT for reheat furnace based on European experience with SCR/SNCR. Case settled. Permit was substantially improved. See *In re: Steel Dynamics, Inc*., PSD Appeal Nos. 99-4 & 99-5 (EAB June 22, 2000).
- Assisted defendant urea manufacturer in Alaska in negotiations with USEPA to seek relief from penalties for alleged violations of the Clean Air Act. Reviewed and evaluated regulatory files and monitoring data, prepared technical analysis demonstrating that permit limits were not violated, and participated in negotiations with EPA to dismiss action. Fines were substantially reduced and case closed.
- Assisted construction unions in challenging PSD permitting action for an Indiana grain mill. Prepared technical comments on draft PSD permit and assisted counsel draft appeal of agency permit action to the Environmental Appeals Board challenging permit based on faulty BACT analyses for heaters and boilers and faulty permit conditions, among others. Case settled.
- As part of a consent decree settling a CEQA lawsuit, assisted neighbors of a large west coast port in negotiations with port authority to secure mitigation for air quality impacts. Prepared technical comments on mobile source air quality impacts and mitigation and negotiated a $9 million CEQA mitigation package. Represented neighbors on technical advisory committee established by port to implement the air quality mitigation program. Program successfully implemented.
- Assisted construction unions in challenging permitting action for a California hazardous waste incinerator. Prepared technical comments on draft permit, assisted counsel prepare appeal of EPA permit to the Environmental Appeals Board. Participated in settlement discussions on technical issues with applicant and EPA Region 9. Case settled.
- Assisted environmental group in challenging DTSC Negative Declaration on a hazardous waste treatment facility. Prepared technical comments on risk of upset, water, and health risks. Writ of mandamus issued.

- Assisted several neighborhood associations and cities impacted by quarries, asphalt plants, and cement plants in Alameda, Shasta, Sonoma, and Mendocino counties in obtaining mitigations for dust, air quality, public health, traffic, and noise impacts from facility operations and proposed expansions.
- For over 100 industrial facilities, commercial/campus, and redevelopment projects, developed the record in preparation for CEQA and NEPA lawsuits. Prepared technical comments on hazardous materials, solid wastes, public utilities, noise, worker safety, air quality, public health, water resources, water quality, traffic, and risk of upset sections of EIRs, EISs, FONSIs, initial studies, and negative declarations. Assisted counsel in drafting petitions and briefs and prepared declarations.
- For several large commercial development projects and airports, assisted applicant and counsel prepare defensible CEQA documents, respond to comments, and identify and evaluate "all feasible" mitigation to avoid CEQA challenges. This work included developing mitigation programs to reduce traffic-related air quality impacts based on energy conservation programs, solar, low-emission vehicles, alternative fuels, exhaust treatments, and transportation management associations.

SITE INVESTIGATION/REMEDIATION/CLOSURE

- Technical manager and principal engineer for characterization, remediation, and closure of waste management units at former Colorado oil shale plant. Constituents of concern included BTEX, As, 1,1,1-TCA, and TPH. Completed groundwater monitoring programs, site assessments, work plans, and closure plans for seven process water holding ponds, a refinery sewer system, and processed shale disposal area. Managed design and construction of groundwater treatment system and removal actions and obtained clean closure.
- Principal engineer for characterization, remediation, and closure of process water ponds at a former lanthanide processing plant in Colorado. Designed and implemented groundwater monitoring program and site assessments and prepared closure plan.
- Advised the city of Sacramento on redevelopment of two former railyards. Reviewed work plans, site investigations, risk assessment, RAPS, RI/FSs, and CEQA documents. Participated in the development of mitigation strategies to protect construction and utility workers and the public during remediation, redevelopment, and use of the site, including buffer zones, subslab venting, rail berm containment structure, and an environmental oversight plan.
- Provided technical support for the investigation of a former sanitary landfill that was redeveloped as single family homes. Reviewed and/or prepared portions of numerous documents, including health risk assessments, preliminary endangerment assessments, site investigation reports, work plans, and RI/FSs. Historical research to identify historic waste

disposal practices to prepare a preliminary endangerment assessment. Acquired, reviewed, and analyzed the files of 18 federal, state, and local agencies, three sets of construction field notes, analyzed 21 aerial photographs and interviewed 14 individuals associated with operation of former landfill. Assisted counsel in defending lawsuit brought by residents alleging health impacts and diminution of property value due to residual contamination. Prepared summary reports.

- Technical oversight of characterization and remediation of a nitrate plume at an explosives manufacturing facility in Lincoln, CA. Provided interface between owners and consultants. Reviewed site assessments, work plans, closure plans, and RI/FSs.
- Consultant to owner of large western molybdenum mine proposed for NPL listing. Participated in negotiations to scope out consent order and develop scope of work. Participated in studies to determine premining groundwater background to evaluate applicability of water quality standards. Served on technical committees to develop alternatives to mitigate impacts and close the facility, including resloping and grading, various thickness and types of covers, and reclamation. This work included developing and evaluating methods to control surface runoff and erosion, mitigate impacts of acid rock drainage on surface and ground waters, and stabilize nine waste rock piles containing 328 million tons of pyrite-rich, mixed volcanic waste rock (andesites, rhyolite, tuff) Evaluated stability of waste rock piles. Represented client in hearings and meetings with state and federal oversight agencies.

REGULATORY (PARTIAL LIST)

- In July/August 2018, prepared 12 pages of comments on DEIR for proposed Doheny Desal Project, on GHG, criteria pollutant, and TAC emissions and public health impacts during construction and indirect emissions during operation.
- In June 2018, prepared 12 pages of technical comments rebutting NDDH responses to comments on Meridian Davis Refinery.
- In April 2018, prepared 26 pages of comments on greenhouse gas emissions and mitigation as proposed in the San Diego County Climate Action Plan.
- In March-June 2018, prepared 37 pages of comments on the IS/MND for the 2305 Mission College Boulevard Data Center, Santa Clara, California, respond to responses to comments.
- In March 2018, prepared 40 pages of comments on the IS/MND for the Diablo Energy Storage Facility in Pittsburg, California.

- In March 2018, prepared 19 pages of comments on Infill Checklist/Mitigated Negative Declaration for the Legacy@Livermore Project on CalEEMod emission calculations, including NOx and PM10 and construction health risk assessment.
- In January 2018, prepared 28 pages of comments on draft Permit to Construct for the Davis Refinery Project, North Dakota, as a minor source of criteria pollutants and HAPs.
- In December 2017, prepared 19 pages of comments on DEIR for the Rialto Bioenergy Facility, Rialto, California.
- In November and December 2017, prepared 6 pages of comments on the Ventura County Air Pollution Control District's Preliminary Determination if Compliance (PDOC) for Mission Rock Energy Center.
- In November 2017, prepared 11 pages of comments on control technology evaluation for the National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry Residual Risk and Technology Review.
- In September and November 2017, prepared comments on revised Negative Declaration for Delicato Winery in San Joaquin County, California.
- In October and November 2017, prepared comments on North City Project Pure Water San Diego Program DEIR/DEIS to reclaim wastewater for municipal use.
- In August 2017, reviewed DEIR on a new residential community in eastern San Diego County and research and wrote 60 pages of comments on air quality, greenhouse gas emissions, and health impacts.
- In August 2017, reviewed responses to comments on Part 70 operating permit for IGP Methanol's Gulf Coast Methanol Complex, near Myrtle Grove, Louisiana, and researched and wrote comments on metallic HAP issues.
- In July 2017, reviewed the FEIS for an expansion of the Port of Gulfport and researched and wrote 10 pages of comments on air quality and public health.
- In June 2017, reviewed and prepared technical report on an Application for a synthetic minor source construction permit for a new Refinery in North Dakota.
- In June 2017, reviewed responses to NPCA and other comments on the BP Cherry Point Refinery modifications and assisted counsel in evaluating issues to appeal, including GHG BACT, coker heater SCR cost effectiveness analysis, and SO_2 BACT.
- In June 2017, reviewed Part 70 Operating Permit Renewal/Modification for the Noranda Alumina LC/Gramercy Holdings I, LLC alumina processing plant, St. James, Louisiana, and prepared comments on HAP emissions from bauxite feedstock.
- In May and June 2017, reviewed FEIR on Tesoro Integration Project and prepared responses to comments on the DEIR.

- In May 2017, prepared comments on tank VOC and HAP emissions from Tesoro Integration Project, based on real time monitoring at the Tesoro and other refineries in the SCAQMD.
- In April 2017, prepared comments on Negative Declaration for Delicato Winery in San Joaquin County, California.
- In March 2017, reviewed Negative Declaration for Ellmore geothermal facility in Imperial County, California and prepared summary of issues.
- In March 2017, prepared response to Phillips 66 Company's Appeal of the San Luis Obispo County Planning Commission's Decision Denying the Rail Spur Extension Project Proposed for the Santa Maria Refinery.
- In February 2017, prepared comments on Kalama draft Title V permit for 10,000 MT/day methanol production and marine export facility in Kalama, Washington.
- In January 2017, researched and wrote 51 pages of comments on proposed Title V and PSD permits for the St. James Methanol Plant, St. James Louisiana, on BACT and enforceability of permit conditions.
- In December 2016, prepared comments on draft Title V Permit for Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana, responding to EPA Order addressing enforceability issues.
- In November 2016, prepared comments on Initial Study/Mitigated Negative Declaration for the AES Battery Energy Storage Facility, Long Beach, CA.
- In November 2016, prepared comments on Campo Verde Battery Energy Storage System Draft Environmental Impact Report.
- In October 2016, prepared comments on Title V Permit for NuStar Terminal Operations Partnership L.P, Stockton, CA.
- In October 2016, prepared expert report, Technical Assessment of Achieving the 40 CFR Part 423 Zero Discharge Standard for Bottom Ash Transport Water at the Belle River Power Plant, East China, Michigan. Reported resulted in a 2 year reduction in compliance date for elimination of bottom ash transport water. 1/30/17 DEQ Letter.
- In September 2016, prepared comments on Proposed Title V Permit and Environmental Assessment Statement, Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana.
- In September 2016, prepared response to "Further Rebuttal in Support of Appeal of Planning Commission Resolution No. 16-1, Denying Use Permit Application 12PLN-00063 and Declining to Certify Final Environmental Impact Report for the Valero Benicia Crude-by-Rail Project.
- In August 2016, reviewed and prepared comments on manuscript: Hutton et al., Freshwater Flows to the San Francisco Bay-Delta Estuary over Nine Decades: Trends Evaluation.

- In August/September 2016, prepared comments on Mitigated Negative Declaration for the Chevron Long Wharf Maintenance and Efficiency Project.
- In July 2016, prepared comments on the Ventura County APCD Preliminary Determination of Compliance and the California Energy Commission Revised Preliminary Staff Assessment for the Puente Power Project.
- In June 2016, prepared comments on an Ordinance (1) Amending the Oakland Municipal Code to Prohibit the Storage and Handling of Coal and Coke at Bulk Material Facilities or Terminals Throughout the City of Oakland and (2) Adopting CEQA Exemption Findings and supporting technical reports. Council approved Ordinance on an 8 to 0 vote on June 27, 2016.
- In May 2016, prepared comments on Draft Title V Permit and Draft Environmental Impact Report for the Tesoro Los Angeles Refinery Integration and Compliance Project.
- In March 2016, prepared comments on Valero's Appeal of Planning Commission's Denial of Valero Crude-by-Rail Project.
- In February 2016, prepared comments on Final Environmental Impact Report, Santa Maria Rail Spur Project.
- In February 2016, prepared comments on Final Environmental Impact Report, Valero Benicia Crude by Rail Project.
- In January 2016, prepared comments on Draft Programmatic Environmental Impact Report for the Southern California Association of Government's (SCAG) 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy.
- In November 2015, prepared comments on Final Environmental Impact Report for Revisions to the Kern County Zoning Ordinance – 2015(C) (Focused on Oil and Gas Local Permitting), November 2015.
- In October 2015, prepared comments on Revised Draft Environmental Report, Valero Benicia Crude by Rail Project.
- In September 2015, prepared report, "Environmental, Health and Safety Impacts of the Proposed Oakland Bulk and Oversized Terminal, and presented oral testimony on September 21, 2015 before Oakland City Council on behalf of the Sierra Club.
- In September 2015, prepared comments on revisions to two chapters of EPA's Air Pollution Control Cost Manual: Docket ID No. EPA-HQ-OAR-2015-0341.
- In June 2015, prepared comments on DEIR for the CalAm Monterey Peninsula Water Supply Project.
- In April 2015, prepared comments on proposed Title V Operating Permit Revision and Prevention of Significant Deterioration Permit for Arizona Public Service's Ocotillo Power

Plant Modernization Project (5 GE LMS100 105-MW simple cycle turbines operated as peakers), in Tempe, Arizona; Final permit appealed to EAB.

- In March 2015, prepared "Comments on Proposed Title V Air Permit, Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana". Client filed petition objecting to the permit. EPA granted majority of issues. In the Matter of Yuhuang Chemical Inc. Methanol Plant, St. James Parish, Louisiana, Permit No. 2560-00295-V0, Issued by the Louisiana Department of Environmental Quality, Petition No. VI-2015-03, Order Responding to the Petitioners' Request for Objection to the Issuance of a Title V Operating Permit, September 1, 2016.
- In February 2015, prepared compilation of BACT cost effectiveness values in support of comments on draft PSD Permit for Bonanza Power Project.
- In January 2015, prepared cost effectiveness analysis for SCR for a 500-MW coal fire power plant, to address unpermitted upgrades in 2000.
- In January 2015, prepared comments on Revised Final Environmental Impact Report for the Phillips 66 Propane Recovery Project. *Communities for a Better Environment et al. v. Contra Costa County et al. Contra Costa County (Superior Court, Contra Costa County, Case No. MSN15-0301, December 1, 2016).*
- In December 2014, prepared "Report on Bakersfield Crude Terminal Permits to Operate." In response, the U.S. EPA cited the Terminal for 10 violations of the Clean Air Act. The Fifth Appellate District Court upheld the finding in this report in CBE et al v. San Joaquin Valley Unified Air Pollution Control District and Bakersfield Crude Terminal LLC et al, Super. Ct. No. 284013, June 23, 2017.
- In December 2014, prepared comments on Revised Draft Environmental Impact Report for the Phillips 66 Propane Recovery Project.
- In November 2014, prepared comments on Revised Draft Environmental Impact Report for Phillips 66 Rail Spur Extension Project and Crude Unloading Project, Santa Maria, CA to allow the import of tar sands crudes.
- In November 2014, prepared comments on Draft Environmental Impact Report for Phillips 66 Ultra Low Sulfur Diesel Project, responding to the California Supreme Court Decision, *Communities for a Better Environment v. South Coast Air Quality Management Dist. (2010) 48 Cal.4th 310*.
- In November 2014, prepared comments on Draft Environmental Impact Report for the Tesoro Avon Marine Oil Terminal Lease Consideration.
- In October 2014, prepared: "Report on Hydrogen Cyanide Emissions from Fluid Catalytic Cracking Units", pursuant to the Petroleum Refinery Sector Risk and Technology Review and New Source Performance Standards, 79 FR 36880.

- In October 2014, prepared technical comments on Final Environmental Impact Reports for Alon Bakersfield Crude Flexibility Project to build a rail terminal to allow the import/export of tar sands and Bakken crude oils and to upgrade an existing refinery to allow it to process a wide range of crudes.
- In October 2014, prepared technical comments on the Title V Permit Renewal and three De Minimus Significant Revisions for the Tesoro Logistics Marine Terminal in the SCAQMD.
- In September 2014, prepared technical comments on the Draft Environmental Impact Report for the Valero Crude by Rail Project.
- In August 2014, for EPA Region 6, prepared technical report on costing methods for upgrades to existing scrubbers at coal-fired power plants.
- In July 2014, prepared technical comments on Draft Final Environmental Impact Reports for Alon Bakersfield Crude Flexibility Project to build a rail terminal to allow the import/export of tar sands and Bakken crude oils and to upgrade an existing refinery to allow it to process a wide range of crudes.
- In June 2014, prepared technical report on Initial Study and Draft Negative Declaration for the Tesoro Logistics Storage Tank Replacement and Modification Project.
- In May 2014, prepared technical comments on Intent to Approve a new refinery and petroleum transloading operation in Utah.
- In March and April 2014, prepared declarations on air permits issued for two crude-by-rail terminals in California, modified to switch from importing ethanol to importing Bakken crude oils by rail and transferring to tanker cars. Permits were issued without undergoing CEQA review. One permit was upheld by the San Francisco Superior Court as statute of limitations had run. The Sacramento Air Quality Management District withdrew the second one due to failure to require BACT and conduct CEQA review.
- In March 2014, prepared technical report on Negative Declaration for a proposed modification of the air permit for a bulk petroleum and storage terminal to the allow the import of tar sands and Bakken crude oil by rail and its export by barge, under the New York State Environmental Quality Review Act (SEQRA).
- In February 2014, prepared technical report on proposed modification of air permit for midwest refinery upgrade/expansion to process tar sands crudes.
- In January 2014, prepared cost estimates to capture, transport, and use CO2 in enhanced oil recovery, from the Freeport LNG project based on both Selexol and Amine systems.
- In January 2014, prepared technical report on Draft Environmental Impact Report for Phillips 66 Rail Spur Extension Project, Santa Maria, CA. Comments addressed project description (piecemealing, crude slate), risk of upset analyses, mitigation measures, alternative analyses and cumulative impacts.

- In November 2013, prepared technical report on the Phillips 66 Propane Recovery Project, Rodeo, CA. Comments addressed project description (piecemealing, crude slate) and air quality impacts.
- In September 2013, prepared technical report on the Draft Authority to Construct Permit for the Casa Diablo IV Geothermal Development Project Environmental Impact Report and Declaration in Support of Appeal and Petition for Stay, U.S. Department of the Interior, Board of Land Appeals, Appeal of Decision Record for the Casa Diablo IV Geothermal Development Project.
- In September 2013, prepared technical report on Effluent Limitation Guidelines for Best Available Technology Economically Available (BAT) for Bottom Ash Transport Waters from Coal-Fired Power Plants in the Steam Electric Power Generating Point Source Category.
- In July 2013, prepared technical report on Initial Study/Mitigated Negative Declaration for the Valero Crude by Rail Project, Benicia, California, Use Permit Application 12PLN-00063.
- In July 2013, prepared technical report on fugitive particulate matter emissions from coal train staging at the proposed Coyote Island Terminal, Oregon, for draft Permit No. 25-0015-ST-01.
- In July 2013, prepared technical comments on air quality impacts of the Finger Lakes LPG Storage Facility as reported in various Environmental Impact Statements.
- In July 2013, prepared technical comments on proposed Greenhouse Gas PSD Permit for the Celanese Clear Lake Plant, including cost analysis of CO2 capture, transport, and sequestration.
- In June/July 2013, prepared technical comments on proposed Draft PSD Preconstruction Permit for Greenhouse Gas Emission for the ExxonMobil Chemical Company Baytown Olefins Plant, including cost analysis of CO2 capture, transport, and sequestration.
- In June 2013, prepared technical report on a Mitigated Negative Declaration for a new rail terminal at the Valero Benicia Refinery to import increased amounts of "North American" crudes. Comments addressed air quality impacts of refining increased amounts of tar sands crudes.
- In June 2013, prepared technical report on Draft Environmental Impact Report for the California Ethanol and Power Imperial Valley 1 Project.
- In May 2013, prepared comments on draft PSD permit for major expansion of midwest refinery to process 100% tar sands crudes, including a complex netting analysis involving debottlenecking, piecemealing, and BACT analyses.

- In April 2013, prepared technical report on the Draft Supplemental Environmental Impact Statement (DSEIS) for the Keystone XL Pipeline on air quality impacts from refining increased amount of tar sands crudes at Refineries in PADD 3.
- In October 2012, prepared technical report on the Environmental Review for the Coyote Island Terminal Dock at the Port of Morrow on fugitive particulate matter emissions.
- In October 2012-October 2014, review and evaluate Flint Hills West Application for an expansion/modification for increased (Texas, Eagle Ford Shale) crude processing and related modification, including netting and BACT analysis. Assist in settlement discussions.
- In February 2012, prepared comments on BART analysis in PA Regional Haze SIP, 77 FR 3984 (Jan. 26, 2012). On Sept. 29, 2015, a federal appeals court overturned the U.S. EPA's approval of this plan, based in part on my comments, concluding "..we will vacate the 2014 Final Rule to the extent it approved Pennsylvania's source-specific BART analysis and remand to the EPA for further proceedings consistent with this Opinion." Nat'l Parks Conservation Assoc. v. EPA, 3d Cir., No. 14-3147, 9/19/15.
- Prepared cost analyses and comments on New York's proposed BART determinations for NOx, SO2, and PM and EPA's proposed approval of BART determinations for Danskammer Generating Station under New York Regional Haze State Implementation Plan and Federal Implementation Plan, 77 FR 51915 (August 28, 2012).
- Prepared cost analyses and comments on NOx BART determinations for Regional Haze State Implementation Plan for State of Nevada, 77 FR 23191 (April 18, 2012) and 77 FR 25660 (May 1, 2012).
- Prepared analyses of and comments on New Source Performance Standards for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, 77 FR 22392 (April 13, 2012).
- Prepared comments on CASPR-BART emission equivalency and NOx and PM BART determinations in EPA proposed approval of State Implementation Plan for Pennsylvania Regional Haze Implementation Plan, 77 FR 3984 (January 26, 2012).
- Prepared comments and statistical analyses on hazardous air pollutants (HAPs) emission controls, monitoring, compliance methods, and the use of surrogates for acid gases, organic HAPs, and metallic HAPs for proposed National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units, 76 FR 24976 (May 3, 2011).
- Prepared cost analyses and comments on NOx BART determinations and emission reductions for proposed Federal Implementation Plan for Four Corners Power Plant, 75 FR 64221 (October 19, 2010).

- Prepared cost analyses and comments on NOx BART determinations for Colstrip Units 1- 4 for Montana State Implementation Plan and Regional Haze Federal Implementation Plan, 77 FR 23988 (April 20, 2010).
- For EPA Region 8, prepared report: Revised BART Cost Effectiveness Analysis for Tail-End Selective Catalytic Reduction at the Basin Electric Power Cooperative Leland Olds Station Unit 2 Final Report, March 2011, in support of 76 FR 58570 (Sept. 21, 2011).
- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, November 2010, in support of 76 FR 52388 (Aug. 22, 2011).
- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Flue Gas Desulfurization at Coal-Fired Electric Generating Units in Oklahoma: Sooner Units 1 & 2, Muskogee Units 4 & 5, Northeastern Units 3 &4, October 2010, in support of 76 FR 16168 (March 26, 2011). My work was upheld in: *State of Oklahoma v. EPA*, App. Case 12-9526 (10th Cri. July 19, 2013).
- Identified errors in N_2O emission factors in the Mandatory Greenhouse Gas Reporting Rule, 40 CFR 98, and prepared technical analysis to support Petition for Rulemaking to Correct Emissions Factors in the Mandatory Greenhouse Gas Reporting Rule, filed with EPA on 10/28/10.
- Assisted interested parties develop input for and prepare comments on the Information Collection Request for Petroleum Refinery Sector NSPS and NESHAP Residual Risk and Technology Review, 75 FR 60107 (9/29/10).
- Technical reviewer of EPA's "Emission Estimation Protocol for Petroleum Refineries," posted for public comments on CHIEF on 12/23/09, prepared in response to the City of Houston's petition under the Data Quality Act (March 2010).
- Prepared comments on SCR cost effectiveness for EPA's Advanced Notice of Proposed Rulemaking, Assessment of Anticipated Visibility Improvements at Surrounding Class I Areas and Cost Effectiveness of Best Available Retrofit Technology for Four Corners Power Plant and Navajo Generating Station, 74 FR 44313 (August 28, 2009).
- Prepared comments on Proposed Rule for Standards of Performance for Coal Preparation and Processing Plants, 74 FR 25304 (May 27, 2009).
- Prepared comments on draft PSD permit for major expansion of midwest refinery to process up to 100% tar sands crudes. Participated in development of monitoring and controls to mitigate impacts and in negotiating a Consent Decree to settle claims in 2008.
- Reviewed and assisted interested parties prepare comments on proposed Kentucky air toxic regulations at 401 KAR 64:005, 64:010, 64:020, and 64:030 (June 2007).

- Prepared comments on proposed Standards of Performance for Electric Utility Steam Generating Units and Small Industrial-Commercial-Industrial Steam Generating Units, 70 FR 9706 (February 28, 2005).
- Prepared comments on Louisville Air Pollution Control District proposed Strategic Toxic Air Reduction regulations.
- Prepared comments and analysis of BAAQMD Regulation, Rule 11, Flare Monitoring at Petroleum Refineries.
- Prepared comments on Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electricity Utility Steam Generating Units (MACT standards for coal-fired power plants).
- Prepared Authority to Construct Permit for remediation of a large petroleum-contaminated site on the California Central Coast. Negotiated conditions with agencies and secured permits.
- Prepared Authority to Construct Permit for remediation of a former oil field on the California Central Coast. Participated in negotiations with agencies and secured permits.
- Prepared and/or reviewed hundreds of environmental permits, including NPDES, UIC, Stormwater, Authority to Construct, Prevention of Significant Deterioration, Nonattainment New Source Review, Title V, and RCRA, among others.
- Participated in the development of the CARB document, *Guidance for Power Plant Siting and Best Available Control Technology*, including attending public workshops and filing technical comments.
- Performed data analyses in support of adoption of emergency power restoration standards by the California Public Utilities Commission for "major" power outages, where major is an outage that simultaneously affects 10% of the customer base.
- Drafted portions of the Good Neighbor Ordinance to grant Contra Costa County greater authority over safety of local industry, particularly chemical plants and refineries.
- Participated in drafting BAAQMD Regulation 8, Rule 28, Pressure Relief Devices, including participation in public workshops, review of staff reports, draft rules and other technical materials, preparation of technical comments on staff proposals, research on availability and costs of methods to control PRV releases, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and cost of low-leak technology, and negotiations with staff.

- Participated in amending BAAQMD Regulation 8, Rule 25, Pumps and Compressors, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak and seal-less technology, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 5, Storage of Organic Liquids, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of controlling tank emissions, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors at Petroleum Refinery Complexes, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 22, Valves and Flanges at Chemical Plants, etc, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 25, Pump and Compressor Seals, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability of low-leak technology, and presentation of testimony before the Board.
- Participated in the development of the BAAQMD Regulation 2, Rule 5, Toxics, including participation in public workshops, review of staff proposals, and preparation of technical comments.
- Participated in the development of SCAQMD Rule 1402, Control of Toxic Air Contaminants from Existing Sources, and proposed amendments to Rule 1401, New Source Review of Toxic Air Contaminants, in 1993, including review of staff proposals and preparation of technical comments on same.
- Participated in the development of the Sunnyvale Ordinance to Regulate the Storage, Use and Handling of Toxic Gas, which was designed to provide engineering controls for gases that are not otherwise regulated by the Uniform Fire Code.
- Participated in the drafting of the Statewide Water Quality Control Plans for Inland Surface Waters and Enclosed Bays and Estuaries, including participation in workshops, review of draft plans, preparation of technical comments on draft plans, and presentation of testimony before the SWRCB.

- Participated in developing Se permit effluent limitations for the five Bay Area refineries, including review of staff proposals, statistical analyses of Se effluent data, review of literature on aquatic toxicity of Se, preparation of technical comments on several staff proposals, and presentation of testimony before the Bay Area RWQCB.
- Represented the California Department of Water Resources in the 1991 Bay-Delta Hearings before the State Water Resources Control Board, presenting sworn expert testimony with cross examination and rebuttal on a striped bass model developed by the California Department of Fish and Game.
- Represented the State Water Contractors in the 1987 Bay-Delta Hearings before the State Water Resources Control Board, presenting sworn expert testimony with cross examination and rebuttal on natural flows, historical salinity trends in San Francisco Bay, Delta outflow, and hydrodynamics of the South Bay.
- Represented interveners in the licensing of over 20 natural-gas-fired power plants and one coal gasification plant at the California Energy Commission and elsewhere. Reviewed and prepared technical comments on applications for certification, preliminary staff assessments, final staff assessments, preliminary determinations of compliance, final determinations of compliance, and prevention of significant deterioration permits in the areas of air quality, water supply, water quality, biology, public health, worker safety, transportation, site contamination, cooling systems, and hazardous materials. Presented written and oral testimony in evidentiary hearings with cross examination and rebuttal. Participated in technical workshops.
- Represented several parties in the proposed merger of San Diego Gas & Electric and Southern California Edison. Prepared independent technical analyses on health risks, air quality, and water quality. Presented written and oral testimony before the Public Utilities Commission administrative law judge with cross examination and rebuttal.
- Represented a PRP in negotiations with local health and other agencies to establish impact of subsurface contamination on overlying residential properties. Reviewed health studies prepared by agency consultants and worked with agencies and their consultants to evaluate health risks.

WATER QUALITY/RESOURCES

- Directed and participated in research on environmental impacts of energy development in the Colorado River Basin, including contamination of surface and subsurface waters and modeling of flow and chemical transport through fractured aquifers.
- Played a major role in Northern California water resource planning studies since the early 1970s. Prepared portions of the Basin Plans for the Sacramento, San Joaquin, and Delta basins including sections on water supply, water quality, beneficial uses, waste load

allocation, and agricultural drainage. Developed water quality models for the Sacramento and San Joaquin Rivers.

- Conducted hundreds of studies over the past 40 years on Delta water supplies and the impacts of exports from the Delta on water quality and biological resources of the Central Valley, Sacramento-San Joaquin Delta, and San Francisco Bay. Typical examples include:

    1. Evaluate historical trends in salinity, temperature, and flow in San Francisco Bay and upstream rivers to determine impacts of water exports on the estuary;
    2. Evaluate the role of exports and natural factors on the food web by exploring the relationship between salinity and primary productivity in San Francisco Bay, upstream rivers, and ocean;
    3. Evaluate the effects of exports, other in-Delta, and upstream factors on the abundance of salmon and striped bass;
    4. Review and critique agency fishery models that link water exports with the abundance of striped bass and salmon;
    5. Develop a model based on GLMs to estimate the relative impact of exports, water facility operating variables, tidal phase, salinity, temperature, and other variables on the survival of salmon smolts as they migrate through the Delta;
    6. Reconstruct the natural hydrology of the Central Valley using water balances, vegetation mapping, reservoir operation models to simulate flood basins, precipitation records, tree ring research, and historical research;
    7. Evaluate the relationship between biological indicators of estuary health and down-estuary position of a salinity surrogate (X2);
    8. Use real-time fisheries monitoring data to quantify impact of exports on fish migration;
    9. Refine/develop statistical theory of autocorrelation and use to assess strength of relationships between biological and flow variables;
    10. Collect, compile, and analyze water quality and toxicity data for surface waters in the Central Valley to assess the role of water quality in fishery declines;
    11. Assess mitigation measures, including habitat restoration and changes in water project operation, to minimize fishery impacts;
    12. Evaluate the impact of unscreened agricultural water diversions on abundance of larval fish;
    13. Prepare and present testimony on the impacts of water resources development on Bay hydrodynamics, salinity, and temperature in water rights hearings;

14. Evaluate the impact of boat wakes on shallow water habitat, including interpretation of historical aerial photographs;
15. Evaluate the hydrodynamic and water quality impacts of converting Delta islands into reservoirs;
16. Use a hydrodynamic model to simulate the distribution of larval fish in a tidally influenced estuary;
17. Identify and evaluate non-export factors that may have contributed to fishery declines, including predation, shifts in oceanic conditions, aquatic toxicity from pesticides and mining wastes, salinity intrusion from channel dredging, loss of riparian and marsh habitat, sedimentation from upstream land alternations, and changes in dissolved oxygen, flow, and temperature below dams.

- Developed, directed, and participated in a broad-based research program on environmental issues and control technology for energy industries including petroleum, oil shale, coal mining, and coal slurry transport. Research included evaluation of air and water pollution, development of novel, low-cost technology to treat and dispose of wastes, and development and application of geohydrologic models to evaluate subsurface contamination from in-situ retorting. The program consisted of government and industry contracts and employed 45 technical and administrative personnel.
- Coordinated an industry task force established to investigate the occurrence, causes, and solutions for corrosion/erosion and mechanical/engineering failures in the waterside systems (e.g., condensers, steam generation equipment) of power plants. Corrosion/erosion failures caused by water and steam contamination that were investigated included waterside corrosion caused by poor microbiological treatment of cooling water, steam-side corrosion caused by ammonia-oxygen attack of copper alloys, stress-corrosion cracking of copper alloys in the air cooling sections of condensers, tube sheet leaks, oxygen in-leakage through condensers, volatilization of silica in boilers and carry over and deposition on turbine blades, and iron corrosion on boiler tube walls. Mechanical/engineering failures investigated included: steam impingement attack on the steam side of condenser tubes, tube-to-tube-sheet joint leakage, flow-induced vibration, structural design problems, and mechanical failures due to stresses induced by shutdown, startup and cycling duty, among others. Worked with electric utility plant owners/operators, condenser and boiler vendors, and architect/engineers to collect data to document the occurrence of and causes for these problems, prepared reports summarizing the investigations, and presented the results and participated on a committee of industry experts tasked with identifying solutions to prevent condenser failures.
- Evaluated the cost effectiveness and technical feasibility of using dry cooling and parallel dry-wet cooling to reduce water demands of several large natural-gas fired power plants in California and Arizona.

- Designed and prepared cost estimates for several dry cooling systems (e.g., fin fan heat exchangers) used in chemical plants and refineries.
- Designed, evaluated, and costed several zero liquid discharge systems for power plants.
- Evaluated the impact of agricultural and mining practices on surface water quality of Central Valley steams. Represented municipal water agencies on several federal and state advisory committees tasked with gathering and assessing relevant technical information, developing work plans, and providing oversight of technical work to investigate toxicity issues in the watershed.

AIR QUALITY/PUBLIC HEALTH

- Prepared or reviewed the air quality and public health sections of hundreds of EIRs and EISs on a wide range of industrial, commercial and residential projects.
- Prepared or reviewed hundreds of NSR and PSD permits for a wide range of industrial facilities.
- Designed, implemented, and directed a 2-year-long community air quality monitoring program to assure that residents downwind of a petroleum-contaminated site were not impacted during remediation of petroleum-contaminated soils. The program included real-time monitoring of particulates, diesel exhaust, and BTEX and time integrated monitoring for over 100 chemicals.
- Designed, implemented, and directed a 5-year long source, industrial hygiene, and ambient monitoring program to characterize air emissions, employee exposure, and downwind environmental impacts of a first-generation shale oil plant. The program included stack monitoring of heaters, boilers, incinerators, sulfur recovery units, rock crushers, API separator vents, and wastewater pond fugitives for arsenic, cadmium, chlorine, chromium, mercury, 15 organic indicators (e.g., quinoline, pyrrole, benzo(a)pyrene, thiophene, benzene), sulfur gases, hydrogen cyanide, and ammonia. In many cases, new methods had to be developed or existing methods modified to accommodate the complex matrices of shale plant gases.
- Conducted investigations on the impact of diesel exhaust from truck traffic from a wide range of facilities including mines, large retail centers, light industrial uses, and sports facilities. Conducted traffic surveys, continuously monitored diesel exhaust using an aethalometer, and prepared health risk assessments using resulting data.
- Conducted indoor air quality investigations to assess exposure to natural gas leaks, pesticides, molds and fungi, soil gas from subsurface contamination, and outgasing of carpets, drapes, furniture and construction materials. Prepared health risk assessments using collected data.

- Prepared health risk assessments, emission inventories, air quality analyses, and assisted in the permitting of over 70 1 to 2 MW emergency diesel generators.
- Prepare over 100 health risk assessments, endangerment assessments, and other health-based studies for a wide range of industrial facilities.
- Developed methods to monitor trace elements in gas streams, including a continuous real-time monitor based on the Zeeman atomic absorption spectrometer, to continuously measure mercury and other elements.
- Performed nuisance investigations (odor, noise, dust, smoke, indoor air quality, soil contamination) for businesses, industrial facilities, and residences located proximate to and downwind of pollution sources.

PUBLICATIONS AND PRESENTATIONS (Partial List - Representative Publications)

J.P. Fox, P.H. Hutton, D.J. Howes, A.J. Draper, and L. Sears, Reconstructing the Natural Hydrology of the San Francisco Bay-Delta Watershed, Hydrology and Earth System Sciences, Special Issue: Predictions under Change: Water, Earth, and Biota in the Anthropocene, v. 19, pp. 4257-4274, 2015. http://www.hydrol-earth-syst-sci.net/19/4257/2015/hess-19-4257-2015.pdf. See also: Estimates of Natural and Unimpaired Flows for the Central Valley of California: Water Years 1922-2014 at: https://msb.water.ca.gov/documents/86728/a702a57f-ae7a-41a3-8bff-722e144059d6.

D. Howes, P. Fox, and P. Hutton, Evapotranspiration from Natural Vegetation in the Central Valley of California: Monthly Grass Reference Based Vegetation Coefficients and the Dual Crop Coefficient Approach, *Journal of Hydrologic Engineering*, v.20, no. 10, October 2015.

Phyllis Fox and Lindsey Sears, *Natural Vegetation in the Central Valley of California*, June 2014, Prepared for State Water Contractors and San Luis & Delta-Mendota Water Authority, 311 pg.

J.P. Fox, T.P. Rose, and T.L. Sawyer, Isotope Hydrology of a Spring-fed Waterfall in Fractured Volcanic Rock, 2007.

C.E. Lambert, E.D. Winegar, and Phyllis Fox, Ambient and Human Sources of Hydrogen Sulfide: An Explosive Topic, Air & Waste Management Association, June 2000, Salt Lake City, UT.

San Luis Obispo County Air Pollution Control District and San Luis Obispo County Public Health Department, *Community Monitoring Program,* February 8, 1999.

The Bay Institute, *From the Sierra to the Sea. The Ecological History of the San Francisco Bay-Delta Watershed*, 1998.

J. Phyllis Fox, *Well Interference Effects of HDPP's Proposed Wellfield in the Victor Valley Water District*, Prepared for the California Unions for Reliable Energy (CURE), October 12, 1998.

J. Phyllis Fox, *Air Quality Impacts of Using CPVC Pipe in Indoor Residential Potable Water Systems*, Report Prepared for California Pipe Trades Council, California Firefighters Association, and other trade associations, August 29, 1998.

J. Phyllis Fox and others, *Authority to Construct Avila Beach Remediation Project*, Prepared for Unocal Corporation and submitted to San Luis Obispo Air Pollution Control District, June 1998.

J. Phyllis Fox and others, *Authority to Construct Former Guadalupe Oil Field Remediation Project*, Prepared for Unocal Corporation and submitted to San Luis Obispo Air Pollution Control District, May 1998.

J. Phyllis Fox and Robert Sears, *Health Risk Assessment for the Metropolitan Oakland International Airport Proposed Airport Development Program*, Prepared for Plumbers & Steamfitters U.A. Local 342, December 15, 1997.

Levine-Fricke-Recon (Phyllis Fox and others), *Preliminary Endangerment Assessment Work Plan for the Study Area Operable Unit, Former Solano County Sanitary Landfill, Benicia, California*, Prepared for Granite Management Co. for submittal to DTSC, September 26, 1997.

Phyllis Fox and Jeff Miller, "Fathead Minnow Mortality in the Sacramento River," *IEP Newsletter*, v. 9, n. 3, 1996.

Jud Monroe, Phyllis Fox, Karen Levy, Robert Nuzum, Randy Bailey, Rod Fujita, and Charles Hanson, *Habitat Restoration in Aquatic Ecosystems. A Review of the Scientific Literature Related to the Principles of Habitat Restoration*, Part Two, Metropolitan Water District of Southern California (MWD) Report, 1996.

Phyllis Fox and Elaine Archibald, *Aquatic Toxicity and Pesticides in Surface Waters of the Central Valley*, California Urban Water Agencies (CUWA) Report, September 1997.

Phyllis Fox and Alison Britton, *Evaluation of the Relationship Between Biological Indicators and the Position of X2*, CUWA Report, 1994.

Phyllis Fox and Alison Britton, *Predictive Ability of the Striped Bass Model*, WRINT DWR-206, 1992.

J. Phyllis Fox, *An Historical Overview of Environmental Conditions at the North Canyon Area of the Former Solano County Sanitary Landfill*, Report Prepared for Solano County Department of Environmental Management, 1991.

J. Phyllis Fox, *An Historical Overview of Environmental Conditions at the East Canyon Area of the Former Solano County Sanitary Landfill*, Report Prepared for Solano County Department of Environmental Management, 1991.

Phyllis Fox, *Trip 2 Report, Environmental Monitoring Plan, Parachute Creek Shale Oil Program*, Unocal Report, 1991.

J. P. Fox and others, "Long-Term Annual and Seasonal Trends in Surface Salinity of San Francisco Bay," *Journal of Hydrology*, v. 122, p. 93-117, 1991.

J. P. Fox and others, "Reply to Discussion by D.R. Helsel and E.D. Andrews on Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 27, no. 2, 1991.

J. P. Fox and others, "Reply to Discussion by Philip B. Williams on Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 27, no. 2, 1991.

J. P. Fox and others, "Trends in Freshwater Inflow to San Francisco Bay from the Sacramento-San Joaquin Delta," *Water Resources Bulletin*, v. 26, no. 1, 1990.

J. P. Fox, "Water Development Increases Freshwater Flow to San Francisco Bay," *SCWC Update*, v. 4, no. 2, 1988.

J. P. Fox, *Freshwater Inflow to San Francisco Bay Under Natural Conditions*, State Water Contracts, Exhibit 262, 58 pp., 1987.

J. P. Fox, "The Distribution of Mercury During Simulated In-Situ Oil Shale Retorting," *Environmental Science and Technology*, v. 19, no. 4, pp. 316-322, 1985.

J. P. Fox, "El Mercurio en el Medio Ambiente: Aspectos Referentes al Peru," (Mercury in the Environment: Factors Relevant to Peru) Proceedings of Simposio Los Pesticidas y el Medio Ambiente," ONERN-CONCYTEC, Lima, Peru, April 25-27, 1984. (Also presented at Instituto Tecnologico Pesquero and Instituto del Mar del Peru.)

J. P. Fox, "Mercury, Fish, and the Peruvian Diet," *Boletin de Investigacion*, Instituto Tecnologico Pesquero, Lima, Peru, v. 2, no. 1, pp. 97-116, l984.

J. P. Fox, P. Persoff, A. Newton, and R. N. Heistand, "The Mobility of Organic Compounds in a Codisposal System," *Proceedings of the Seventeenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1984.

P. Persoff and J. P. Fox, "Evaluation of Control Technology for Modified In-Situ Oil Shale Retorts," *Proceedings of the Sixteenth Oil Shale Symposium*, Colorado School of Mines Press, Golden, CO, 1983.

J. P. Fox, *Leaching of Oil Shale Solid Wastes: A Critical Review*, University of Colorado Report, 245 pp., July 1983.

J. P. Fox, *Source Monitoring for Unregulated Pollutants from the White River Oil Shale Project*, VTN Consolidated Report, June 1983.

A. S. Newton, J. P. Fox, H. Villarreal, R. Raval, and W. Walker II, *Organic Compounds in Coal Slurry Pipeline Waters*, Lawrence Berkeley Laboratory Report LBL-15121, 46 pp., Sept. 1982.

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Bay Valley Consultants, *Water Quality Control Plan for Sacramento, Sacramento-San Joaquin and San Joaquin Basins*, Parts I and II and Appendices A-E, 750 pp., 1974.

POST GRADUATE COURSES
(Partial)

S-Plus Data Analysis, MathSoft, 6/94.
Air Pollutant Emission Calculations, UC Berkeley Extension, 6-7/94
Assessment, Control and Remediation of LNAPL Contaminated Sites, API and USEPA, 9/94
Pesticides in the TIE Process, SETAC, 6/96
Sulfate Minerals: Geochemistry, Crystallography, and Environmental Significance, Mineralogical Society of America/Geochemical Society, 11/00.
Design of Gas Turbine Combined Cycle and Cogeneration Systems, Thermoflow, 12/00
Air-Cooled Steam Condensers and Dry- and Hybrid-Cooling Towers, Power-Gen, 12/01
Combustion Turbine Power Augmentation with Inlet Cooling and Wet Compression, Power-Gen , 12/01
CEQA Update, UC Berkeley Extension, 3/02
The Health Effects of Chemicals, Drugs, and Pollutants, UC Berkeley Extension, 4-5/02
Noise Exposure Assessment: Sampling Strategy and Data Acquisition, AIHA PDC 205, 6/02
Noise Exposure Measurement Instruments and Techniques, AIHA PDC 302, 6/02
Noise Control Engineering, AIHA PDC 432, 6/02
Optimizing Generation and Air Emissions, Power-Gen, 12/02
Utility Industry Issues, Power-Gen, 12/02
Multipollutant Emission Control, Coal-Gen, 8/03
Community Noise, AIHA PDC 104, 5/04
Cutting-Edge Topics in Noise and Hearing Conservation, AIHA 5/04
Selective Catalytic Reduction: From Planning to Operation, Power-Gen, 12/05
Improving the FGD Decision Process, Power-Gen, 12/05
E-Discovery, CEB, 6/06
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McIlvaine Hot Topic Hour, What Mercury Technologies Are Available, 9/14/06
McIlvaine Hot Topic Hour, SCR Catalyst Choices, 10/12/06
McIlvaine Hot Topic Hour, Particulate Choices for Low Sulfur Coal, 10/19/06
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McIlvaine Hot Topic Hour, SO3 Issues and Answers, 3/27/08
McIlvaine Hot Topic Hour, Mercury Control, 4/24/08
McIlvaine Hot Topic Hour, Co-Firing Biomass, 5/1/08
McIlvaine Hot Topic Hour, Coal Gasification, 6/5/08
McIlvaine Hot Topic Hour, Spray Driers vs. CFBs, 7/3/08
McIlvaine Hot Topic Hour, Air Pollution Control Cost Escalation, 9/25/08
McIlvaine Hot Topic Hour, Greenhouse Gas Strategies for Coal Fired Power Plant Operators, 10/2/08
McIlvaine Hot Topic Hour, Mercury and Toxics Monitoring, 2/5/09
McIlvaine Hot Topic Hour, Dry Precipitator Efficiency Improvements, 2/12/09
McIlvaine Hot Topic Hour, Coal Selection & Impact on Emissions, 2/26/09
McIlvaine Hot Topic Hour, 98% Limestone Scrubber Efficiency, 7/9/09
McIlvaine Hot Topic Hour, Carbon Management Strategies and Technologies, 6/24/10
McIlvaine Hot Topic Hour, Gas Turbine O&M, 7/22/10

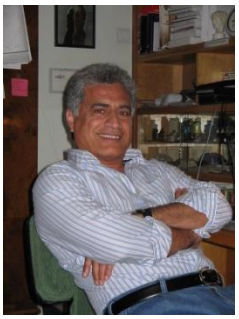
McIlvaine Hot Topic Hour, Industrial Boiler MACT – Impact and Control Options, March 10, 2011

McIlvaine Hot Topic Hour, Fuel Impacts on SCR Catalysts, June 30, 2011.
Interest Rates, PDH P204, 3/9/12
Mechanics Liens, PDHOnline, 2/24/13.
Understanding Concerns with Dry Sorbent Injection as a Coal Plant Pollution Control, Webinar #874-567-839 by Cleanenergy.Org, March 4, 2013
Webinar: Coal-to-Gas Switching: What You Need to Know to Make the Investment, sponsored by PennWell Power Engineering Magazine, March 14, 2013. Available at: https://event.webcasts.com/viewer/event.jsp?ei=1013472.

EXHIBIT E

Ray Kapahi

Senior Air Quality Consulting Engineer



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Practice Areas

- Air Quality Permitting
- Odor Investigation and Control
- Health Risk Assessment
- Computational Fluid Dynamics
- Greenhouse Gas Analysis
- Atmospheric Dispersion Modeling

Industries

- Solid Waste
- Power Generation
- Construction and Mining
- Food Industries
- Oil and Gas Production

Education and Training

- BSc. Physics (1972)
- MEng. Chemical Engineering (1975)
- CARB Accredited Green House Gas (GHG) Lead Verifier with Specialization in Process Emissions and Electricity Transactions (2009)

News

- Presentation "Numerical Modeling of Migration of Landfill gas and Odors to Nearby homes". 33rd International Conference on Solid Waste Technology , March 11-14, 2018, Annapolis, MD

- Presentation "Integrated Approach to Effective Odor Control at Landfills and Composting Facilities" Wastecon 2016, Indianapolis, IN.

Mr. Kapahi has over 30 years of experience in analyzing air quality and odor impacts, permitting of stationary sources, and preparation of environmental impact documents. He assists a broad range of clients to identify and meet their regulatory obligations.

The scope of his experience includes siting of new landfills, waste to energy plants, obtaining conditional use permits from city and county governments for new projects or expansion of existing projects. Specific experience and skills include preparation of emission inventories, analysis and measurements of odors, dispersion modeling, oversight of air quality monitoring, preparation of health risk assessments, and appearance before city and county planning boards and commissions as an expert witness on behalf of a wide range of clients.

Following approvals for new facilities or expansion of existing facilities, Mr. Kapahi continues to work with clients to ensure on-going compliance.

REPRESENTATIVE PROJECTS

Air Quality Permitting

- **Waste-to-Energy Project (Fort Irwin, CA)**

Responsible for securing air permits and providing CEQA support for a proposed 34 ton per day solid waste to synthetic gas waste conversion system. Worked cooperatively with the Mojave Desert AQMD, and staff at US Army to ensure timely issuance of the Authority to Construct and Permits to Operate from the air district. The permits were issued in 2017.

- **Permitting and CEQA Support for Almond Processing Facility (Turlock, CA)**

Assisted a large almond growing cooperative to site and permit a 100 ton per year almond processing facility. Prepared the air quality section of the CEQA environmental documents for approval by the Planning Board (Stanislaus County). Prepared the necessary applications and supporting documents to San Joaquin Valley APCD. The project was approved in 2017 and is in operation.

- **Biomass to Energy Project (Mariposa, CA)**

Mr. Kapahi was retained by the Mariposa County Air pollution Control District to review the proposed 2.4 MW (net) community based biomass to energy project. The project would use 12,000 bone dry tons of sustainably harvested biomass from forests to produce synthetic gas. The project would include two heat recovery turbine generators to improve overall plant efficiency. Power would be sold to PG&E under the State of California's BioMAT program. A detailed engineering evaluation was completed along with a recommendation to the District for the issuance of air permits.

News……

- Presentation "Use of Advanced Models to Control Fugitive Odors from Composting Sites". US Compost Council Annual Meeting, January 2015, Austin, TX.

- "Air Emissions from Landfills and Transfer Stations – Do they Increase Public Health Risks?" Presented at Quad State Environmental Conference, Pigeon Forge TN, Sept 2015.

Publications and Presentations

"Risks of Carbon Credit Invalidation Under California's Cap-and-Trade Program", Presented at the 2014 Air and Waste Management Association Annual Conference. June 24-27, 2014. Long Beach, CA

"Estimate of VOC Emissions from Sludge Drying", Presented at the 1995 SWANA Conference. November 1995, Baltimore, MD.

"Use of Biofilters to Control VOCs", Biocycle, February 1995.

"Impacts of the 1990 Clean Air Act Amendments", San Jose Business Journal, March 24, 1994.

"Modeling Fine Particulates" in Municipal Waste Incineration Risk Assessment, Edited by Curtis Travis, Plenum Press, 1990.

Specialized Training

HARP2 (Risk Assessment Model) Training at California Air Resources Board. Redding, CA April 2016.

Hearing Board Variance Training – California Air Resources Board (1995)

Air Emissions and Odors from Wastewater – University of Texas, Austin (1994)

Professional Affiliations

Air and Waste Management Association (Member)

American Institute of Chemical Engineers (Member)

ANALYSIS OF ODORS AND DUST

Analysis and Control of Fugitive Dust and Odors from a Soil Blending Facility (Stockton, CA)

Advanced computational fluid mechanics (CFD) models were used to predict the air flow and movement of fugitive dust at a soil blending facility. With this information, the client was able to install appropriate mitigate to minimize off-site fugitive dust and odors. View the movement of dust at: https://www.youtube.com/watch?v=wXEX6IT-54U

Analysis of Odors from Tomato Dehydration Plant (Port of Stockton, CA)

In response to odor complaints from the public, air sampling and analysis is being conducted to identify the odor causing compounds. The results of the measurements will be used to determine the best mitigation strategy.

Analysis of Public Health Risks

Analysis of Public Health Risks Associated with Composting Operations (Napa County, CA)

Estimate the types and amounts of toxic air contaminants (TAC) released from green waste and food waste composting. An air dispersion model was used with local wind data to determine the concentration of each TAC. The concentration estimates were supplemented with toxicity data to quantify public health risks from exposure to the various toxic pollutants.

Analysis of Public Health Risks from Proposed Asphalt Plant (Kern County, California)

Analyze emissions of any toxic air pollutants from a proposed 250 tons per day asphalt plant. Emissions from aggregate drying, propane combustion and asphalt oil were quantified. Acute and chronic public health risks from exposure to various toxic pollutants were calculated and compared with regulatory thresholds of significance. The results of this analysis were used to support an application for air permits.

CEQA Support

Drilling of Exploratory Oil and Gas Wells (Kern County, CA)

Analyze air emissions from proposed drilling of exploratory crude oil and gas wells. Evaluate significance of impacts to air quality and public health. Prepare the air and greenhouse gas section of environmental document for submittal to Kern County Planning department.

Current and Recent Projects

Project	Location	Description	Client
Preparation of Air Quality Impact Analysis for Proposed Meat Processing Plant	Turlock, CA	• Quantify air and greenhouse gas emissions from proposed expansion to 1,400 tons/day • Assess the significance of air quality and public health impacts • Recommend mitigation	Capital Cultivators, LLC, San Luis Obispo, CA
Permitting of Almond Processing Plant	Turlock, CA	• Prepare permit application and associated support documents for submittal to San Joaquin Valley Air Pollution Control District (SJVAPCD) • Demonstrate compliance with District's NSR and prohibitory rules • Prepare emission inventory of toxic air pollutants and potential health risks to the public	Blue Diamond Growers, Sacramento, CA
Permitting and CEQA Analysis of MSW Waste to Energy Plant	Fort Irwin (San Bernardino County) CA	• Prepare permit application and associated support documents for submittal to Mojave Desert Air Quality Management District (MDAQMD) • Demonstrate compliance with District's NSR and prohibitory rules	Siemens Building Technologies, Hayward, CA
Air Study for Proposed Milk Powder Plant	Turlock, CA	• Quantify air and greenhouse gas emissions from a proposed milk processing plant • Demonstrate that the project impacts are less than significant and therefore, is not subject to preparation of an EIR • Develop air quality and GHG sections of mitigated initial study and mitigated negative declaration (ISMND)	Valley Milk, LLC, CA
Air Impact Analysis for Waste Water Treatment Plant Expansion	San Jose, CA	• Analyze emissions from proposed expansion of digester • Determine significance of air quality and health impacts	Brown and Caldwell and City of San Jose, CA

Comments

on the

Initial Study/Mitigated Negative Declaration (IS/MND)

for the

Safeway Fuel Center

Petaluma, California

September 17, 2018

Phyllis Fox, PhD, PE
and
Ray Kapahi, BSC, M. Eng.

duration is consistent with BAAQMD guidance. The BAAQMD Air Toxics Health Risk Assessment Guidelines indicate "the Air District will estimate cancer risk to residential receptors for gasoline dispensing facilities based on a 70-year lifetime exposure. Although 9-year and 25-year exposure scenarios may be presented for information purposes, risk management decisions will be made based on 70-year exposure duration for residential receptors."[52]

Similarly, the BAAQMD's CEQA guidelines specifically identify a 70-year exposure duration,[53] noting: "Emissions from a new source or emissions affecting a new receptor would be considered significant where ground-level concentrations of carcinogenic TACs from any source result in an increased cancer risk greater than 10.0 in one million, assuming a 70-year lifetime exposure." The EPA also uses a 70-year exposure duration to assess the significance of health impacts.[54]

2.2.5. Revised HRA Results

Excerpts from the HARP2 model results are provided in Exhibit C. Electronic copies are available on request. The 70-year residential risk is between 27 to 69 cancers per million at homes across the street along South McDowell Avenue. The overall spatial variation of 70-year cancer risk is shown in Figure 4. This figure shows there are large areas surrounding the proposed refueling facility that have cancer risk above 10 in a million (blue isopleth).

The spatial variation of 25-year cancer risk is shown in Figure 5. The results indicate that cancer risk at the nearby daycare would be 12.5 for teachers~~students~~ and 8.2 for students~~teachers at the elementary school~~. This figure shows that teacher~~student~~ cancer risk at the daycare would be significant, as the risk exceeds 10 in a million. The results assuming 9-year exposure (for school children) is estimated to be 8.2 cancers per million. While not significant, this result is an underestimate as it does not account for the difference in prevailing winds between Santa Rosa and Petaluma as well as ~~include~~ cumulative exposure from construction, increases in traffic due to location of the fueling station, and cumulative exposure from residences in adjacent housing, among other factors.

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[52] BAAQMD, BAAQMD Air Toxics NSR Program Health Risk Assessment Guidelines, December 2016, Section 2.2.1.1, p. 8; available at http://www.baaqmd.gov/~/media/files/planning-and-research/permit-modeling/hra_guidelines_12_7_2016_clean-pdf.pdf.

[53] BAAQMD, CEQA Guidelines, May 2017, Appendix D, p. D-40.

[54] NESHAPS 54 Federal Register 38044, September 14, 1989; CAA Section 112(f). See also BAAQMD, CEQA Guidelines, Appendix D, p. D-35.

Figure 5: Cancer Risk Isopleth for 25-Year (Worker) Exposure (includes emissions from idling cars, fuel delivery trucks, and gasoline dispensing)

Our revised analyses indicate that cancer risks are significant at several residences across the street from the proposed fueling station, as well as at the school playfield and for teachers at the 4Cs Petaluma Child Development Center~~North Bay Children's Center~~. Our analyses also indicate that benzene and DPM are the primary drivers for cancer risk and are consistent with similar health risk assessments prepared by both CARB and the SCAQMD, as summarized below in Comments 2.3.2 and 2.3.3. Our analyses are also consistent with extensive scientific research that demonstrates a significant association between gasoline stations and the risk of childhood leukemia.[55] See referred journal articles compiled in Exhibit 1.

Our HRA analysis underestimates cancer risk for the following reasons: *First*, the sensitive receptors (residences, schools) are upwind of the fuel station (i.e., the wind data used in our analysis show that the pollution from the fuel station is blown away from the sensitive receptors), because the HRA is based on Santa Rosa wind data.[56] Our analysis should be

[55] Peter F. Infante, "Residential Proximity to Gasoline Stations and Risk of Childhood Leukemia," *American Journal of Epidemiology* 185, no. 1 (December 6, 2016). Exhibit 1.
[56] We were unable to obtain the Petaluma wind data in the proper format for use in the AERMOD model.