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September 24, 2019

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**Re: Agenda Item No. 19-0988, Special Development Permit for
1390 Borregas Avenue Mechanical Facility (File #: 2019-7071)**

Dear Zoning Administrator Kin and Ms. Caliva-Lepe:

We are writing on behalf of Safe Fuel and Energy Resources California ("SAFER CA") to comment on the Zoning Administrator's ("Administrator") Agenda Item No. 19-0988, Special Development Permit for 1390 Borregas Avenue Mechanical Facility (File #: 2019-7071). The agenda item proposes to approve a Moffett Park Special Development Permit for the Google Mechanical Facility ("Project") proposed by Google, LLC ("Applicant"). The Project proposes to demolish an existing industrial building and construct an all-electric thermal energy mechanical facility to provide heating and cooling services to up to 3.7 million square feet of nearby Google office/R&D buildings within Moffett Park via underground pipelines through the public right-of-way.¹ The Project would be the "the first central utility plant in Moffett Park" of its kind, and would consist of three buildings, four thermal storage tanks, and ancillary equipment, including underground pipelines connecting the Project to adjacent buildings.²

¹ Staff Report, p. 2.

² 1390 Borregas Mechanical Facility: Schematic Design, May 10, 2019, at 2.1.0-1.4656-001acp

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The Staff Report incorrectly recommends approval of the Project in reliance on a categorical exemption from the California Environmental Quality Act (“CEQA”)³ for “In-Fill Development Projects” under 14 CCR § 15332 (“infill exemption”).⁴ However, the City’s reliance on the infill exemption is unsupported because the City has not completed the environmental analysis required by CEQA. The Staff Report’s Categorical Exemption Analysis fails comply with CEQA because it fails to accurately describe or analyze the full scope of the Project, fails to disclose or mitigate the Project’s potentially significant environmental impacts, fails to conclude that an environmental impact report (“EIR”) is required, and fails to require adequate mitigation measures to ensure that the Project’s potentially significant impacts are reduced to less than significant levels.

First, the Staff Report fails to describe the entire Project. The Staff Report and the Applicant’s supporting documents are impermissibly silent on the reasonably foreseeable future construction of the other Google facilities that will result from the Project and which the Project is admittedly designed to serve. The Staff Report and supporting documents also fail to describe or analyze the Project’s underground pipelines and associated structures that will physically connect the Project to these other buildings. The City’s failure to disclose and analyze the impacts from all of the Project’s physical structures and the nearby Google buildings to which it will connect results in an inaccurate and misleading Project description which understates the full scope of the Project. The City’s failure to disclose and analyze the impacts of the entire Project in a single CEQA document also constitutes piecemealing, which is prohibited under CEQA. The City must analyze the entire Project in an EIR, including not only the proposed Mechanical Facility, but all related physical structures and reasonably foreseeable future phases of the Project, including all Google facilities that will be connected to the Project.

Second, the Project is not exempt from CEQA because the Project does meet the requirements for an infill exemption: 1) the Project is plainly not a “Public utility building[] and service facilit[y]”⁵ as required by the City’s Zoning Code, and therefore requires a variance or amendment to the City’s General Plan and the

³ California Environmental Quality Act, Cal. Pub. Res. Code (“PRC”) §§ 21000 et seq.; 14 Cal. Code Regs. (“CCR”) §§ 15000 et seq.

⁴ See Staff Report, p. 5, Recommendation.

⁵ Sunnyvale Code 19.12.170.

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Moffett Park Specific Plan to be permitted as such; 2) the Project description omits necessary and fundamental components of the Project that, if included, would make the Project's size substantially larger than the 5 acres allowed by the infill exemption; 3) there is substantial evidence demonstrating that the Project will result in potentially significant impacts on the environment, and the City lacks substantial evidence to demonstrate that these impacts would be reduced to less than significant levels; and 4) the City lacks substantial evidence demonstrating that the site can be adequately served by all required utilities and public services.

Additionally, the Project is not entitled to a CEQA exemption because it relies on mitigation measures to reduce potentially significant hazardous materials impacts from the Project site. Mitigation measures are not allowed under any CEQA exemption. Moreover, the City has done no analysis of the cumulative impacts of Google's multiple planned central utility plants in Moffett Park, including the plant proposed in the adjacent Google Caribbean Project. Therefore, the City lacks substantial evidence to conclude that the Project will not have significant cumulative impacts.

Finally, the Project is located within the Moffett Park Specific Plan area, and has not been analyzed in the Moffett Park Specific Plan EIR or any other prior CEQA document. The City must prepare a subsequent or supplemental EIR for the Project because there is substantial evidence demonstrating that (a) substantial changes are proposed in the Project which will require major revisions of the Moffett Park Specific Plan EIR; (b) substantial changes have occurred with respect to the circumstances under which the Project is being undertaken which will require major revisions in the Moffett Park Specific Plan EIR; and (c) new information, which was not known and could not have been known at the time the Moffett Park Specific Plan EIR was certified as complete, demonstrates that the Project is likely to have new or more severe environmental impacts than previously analyzed in the Moffett Park Specific Plan EIR.⁶

As a result of these substantial deficiencies in the City's CEQA analysis, the Project cannot be approved. The Administrator should adopt Staff's recommended Alternative 3 action, and deny all approvals sought in File No. 2019-7071 on the grounds that the Project is not exempt from CEQA. The Administrator should also remand the Project to Staff to prepare a legally adequate EIR that analyzes the

⁶ PRC § 21166(a)-(c); 14 CCR § 15162(a)(1)-(3).
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entire Project. In order to comply with CEQA, the Mechanical Facility must be fully considered and analyzed in conjunction with all reasonably foreseeable development projects in the Moffett Park area that will be connected to the Project in a single EIR.

These comments were prepared with the assistance of hazardous materials expert Matt Hagemann, P.G., C.Hg. from Soil / Water / Air Protection Enterprise ("SWAPE"), air quality expert Phyllis Fox, Ph.D., PE, and noise expert Derek Watry. Their respective technical comments and curriculum vitae are attached hereto as Exhibit A, B, and C and are fully incorporated herein.⁷

I. STATEMENT OF INTEREST

SAFER CA advocates for safe processes during construction and operation of California's utility facilities to protect the health, safety, standard of life and economic interests of its members. For this reason, SAFER CA has a strong interest in enforcing environmental laws, such as CEQA, which require the disclosure of potential environmental impacts of, and ensure safe operations and processes for, California's utility projects. Failure to adequately address the environmental impacts of water, energy, and fuel supply poses a substantial threat to the environment, worker health, surrounding communities and the local economy.

SAFER CA supports the sustainable development of utility projects in California. However, poorly planned projects can adversely impact the economic wellbeing of people who perform construction and maintenance work on the utility facilities themselves, and the surrounding communities. Plant shutdowns caused by infrastructure breakdowns and insufficiently mitigated hazardous conditions have caused prolonged work stoppages. Such nuisance conditions and catastrophic events impact local communities and the natural environment and can jeopardize future jobs by making it more difficult and more expensive for businesses to locate and people to live in the area. The participants in SAFER CA are also concerned about projects that carry serious environmental risks and public service infrastructure demands without providing countervailing employment and economic benefits to local workers and communities.

⁷ See generally Exhibit A: SWAPE Comments, Exhibit B: Fox Comments, Exhibit C: Watry Comments.
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The members represented by the participants in SAFER CA live, work, recreate and raise their families in the City of Sunnyvale. Accordingly, these people would be directly affected by the Project's adverse environmental impacts. The members of SAFER CA's participating labor organizations may also work on the Project itself. They will, therefore, be first in line to be exposed to any hazardous materials, air contaminants, and other health and safety hazards, that exist onsite.

II. LEGAL STANDARD

CEQA has two basic purposes, neither of which the City has satisfied in this case. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental impacts of a project before harm is done to the environment.⁸ The EIR is the "heart" of this requirement,⁹ and has been described as "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return."¹⁰ To fulfill this purpose, the discussion of impacts in an EIR must be detailed, complete, and "reflect a good faith effort at full disclosure."¹¹ An adequate EIR must contain facts and analysis, not just an agency's conclusions.¹²

Second, CEQA directs public agencies to avoid or reduce environmental damage when possible by requiring imposition of mitigation measures and by requiring the consideration of environmentally superior alternatives.¹³ CEQA imposes an affirmative obligation on agencies to avoid or reduce environmental harm by adopting feasible project alternatives or mitigation measures to address all potentially significant impacts identified in the agency's CEQA analysis.¹⁴ Without an adequate analysis and description of feasible mitigation measures, it would be impossible for agencies relying upon an EIR or other CEA document to meet this obligation.

⁸ Cal. Code Regs., tit. 14, § 15002, subd. (a)(1) ("CEQA Guidelines"); *Berkeley Keep Jets Over the Bay v. Bd. of Port Comm'rs.* (2001) 91 Cal.App.4th 1344, 1354 ("*Berkeley Jets*"); *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.

⁹ *No Oil, Inc. v. City of Los Angeles* (1974) 13 Cal.3d 68, 84.

¹⁰ *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795, 810.

¹¹ CEQA Guidelines, § 15151; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 721-722.

¹² *See Citizens of Goleta Valley v. Bd. of Supervisors* (1990) 52 Cal.3d 553, 568.

¹³ CEQA Guidelines, § 15002, subd. (a)(2) and (3); *Berkeley Jets*, 91 Cal.App.4th, at p. 1354; *Laurel Heights Improvement Ass'n v. Regents of the University of Cal.* (1998) 47 Cal.3d 376, 400.

¹⁴ Pub. Resources Code, §§ 21002-21002.1.

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Under CEQA, mitigation measures must be fully enforceable through permit conditions, agreements or other legally binding instruments.¹⁵ A CEQA lead agency is precluded from making the required CEQA findings to approve a project unless the record shows that all uncertainties regarding the mitigation of impacts have been resolved. For this reason, an agency may not rely on mitigation measures of uncertain efficacy or feasibility.¹⁶ This approach helps “insure the integrity of the process of decision by precluding stubborn problems or serious criticism from being swept under the rug.”¹⁷

Following preliminary review of a project to determine whether an activity is subject to CEQA, a lead agency is required to prepare an initial study to determine whether to prepare an EIR or negative declaration, identify whether a program EIR, tiering, or other appropriate process can be used for analysis of the project’s environmental effects, or determine whether a previously prepared EIR could be used with the project, among other purposes.¹⁸ CEQA requires an agency to analyze the potential environmental impacts of its proposed actions in an EIR except in certain limited circumstances.¹⁹ A negative declaration may be prepared instead of an EIR when, after preparing an initial study, a lead agency determines that a project “would not have a significant effect on the environment.”²⁰

CEQA also provides that certain in-fill development Projects are categorically exempt from CEQA.²¹ In-fill projects, however, are not exempt from CEQA, if they are inconsistent with local land use plans, or where approval of the project would result in any significant effects relating to traffic, noise, air quality, or water quality.²² In addition, no categorical exemption may be applied to any project in which there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances.²³

¹⁵ CEQA Guidelines, § 15126.4, subd. (a)(2).

¹⁶ *Kings County Farm Bureau v. County of Hanford* (1990) 221 Cal.App.3d 692, 727-28 (a groundwater purchase agreement found to be inadequate mitigation because there was no record evidence that replacement water was available).

¹⁷ *Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn.* (1986) 42 Cal.3d 929, 935.

¹⁸ CEQA Guidelines, §§ 15060, 15063, subd. (c).

¹⁹ See, e.g., Pub. Resources Code, § 21100.

²⁰ *Quail Botanical Gardens v. City of Encinitas* (1994) 29 Cal.App.4th 1597; Pub. Resources Code § 21080(c).

²¹ CEQA Guidelines § 15332.

²² CEQA Guidelines § 15332(d).

²³ CEQA Guidelines § 15300.2(c).

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Finally, where a program EIR has been prepared that could apply to a later project, CEQA requires the lead agency to conduct a two-step process to examine the later project to determine whether additional environmental review is required.²⁴ First, the agency must consider whether the project will result in environmental effects that were not examined in the program EIR.²⁵ If the agency finds the activity would have environmental effects that were not examined in the program EIR, it must then prepare an initial study to determine whether to prepare an EIR or negative declaration to address those effects.²⁶

Second, if the agency determines the project is covered by the program EIR, it must then consider whether any new or more significant environmental effects could occur due to changes in circumstances or project scope, or new information that could not have been considered in the program EIR.²⁷ More specifically, pursuant to Public Resources Code section 21166, subsequent or supplemental environmental review is required when one or more of the following events occur:

- (a) Substantial changes are proposed in the project which will require major revisions of the environmental impact report;
- (b) Substantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the environmental impact report; or
- (c) New information, which was not known and could not have been known at the time the environmental impact report was certified as complete, becomes available.²⁸

III. THE PROJECT DESCRIPTION IS INADEQUATE AND MISLEADING AND DEMONSTRATES IMPERMISSIBLE PIECEMEALING OF THE PROJECT

CEQA Guidelines section 15378 defines “project” to mean “the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the

²⁴ See CEQA Guidelines, 15168, subd. (c); S. Kostka & M. Zischke, Practice Under the California Environmental Quality Act 2d, § 10.16 (Mar. 2018).

²⁵ CEQA Guidelines, § 15168, subd. (c)(1).

²⁶ CEQA Guidelines, § 15168, subd. (c)(1).

²⁷ CEQA Guidelines, § 15168, subd. (c)(2).

²⁸ Pub. Resources Code, § 21166.

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environment.”²⁹ “The term “project” refers to the activity which is being approved and which may be subject to several discretionary approvals by governmental agencies. The term project does not mean each separate governmental approval.”³⁰ Courts have explained that “[a] complete project description of a project has to address not only the immediate environmental consequences of going forward with the project, but also all “*reasonably foreseeable* consequence[s] of the initial project.”³¹ “If a . . . [CEQA document]. . . does not adequately apprise all interested parties of the true scope of the project for intelligent weighing of the environmental consequences of the project, informed decision-making cannot occur under CEQA and the final EIR is inadequate as a matter of law.”³² The courts apply CEQA’s broad definition of “project” to cases involving exemption determinations.³³

The project description in the Project Application and Staff Report provide almost no information on the scope of the Project, nor does it describe the Project with a level of granularity on which definitive conclusions on potential environmental impacts could be made. Nonetheless, documents provided by the City demonstrate that the Project is much larger than the Applicant’s project description indicates. The City’s attempt to treat the Project as a singular approval of a Google power plant, unrelated to the other Google facilities that it will admittedly serve, constitutes impermissible piecemealing of the Project in order to avoid CEQA review.

A. The Project Description Omits Crucial Elements of the Project and Thereby Inaccurately Shrinks the Project’s Scope

In its project description letter, the Applicant describes the Project as three buildings: a heating building (housing electric/switchgear elements and heat pumps); a cooling building (housing chillers, cooling towers, and a diesel generator)³⁴; and an ancillary building housing a control room and multipurpose

²⁹ 14 Cal.Code Regs, tit. 14, §15378 (“CEQA Guidelines”).

³⁰ CEQA Guidelines, 15378 subd. (c).

³¹ *Laurel Heights Improvement Association v. Regents of University of California* (1988) 47 Cal.3d 376, emphasis added; see also *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-50.

³² *Riverwatch v. Olivenhain Municipal Water Dist.* (2009) 170 Cal.App.4th 1186, 1201.

³³ *County of Ventura v. City of Moorpark, Broad Beach Geologic Hazard Abatement District* (2018) 24 Cal.App.5th 377, 382.

³⁴ Geotechnical Report, Section 1.3, p. 2.
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space, located on a 82,285 ft² lot for housing the equipment, four thermal water storage tanks (one hot water tank and three cold water tanks).³⁵ The Applicant then briefly describes the size of the buildings, the aesthetics of the site after completion, and states that the facility “will serve as an educational amenity to visitors and Google employees.”³⁶ No reasonable understanding of the details and scope of the Project can be understood from this description. The City relied on the Applicant’s incomplete project description in its Categorical Exemption Analysis.

As explained by Dr. Fox and Mr. Watry, the brief Project description provided by the Applicant omits major components of the Project, including the following:

- Explanation of how the individual components interact to provide heating and cooling to adjacent buildings and the function of each component.
- Detailed construction schedule that identifies all equipment, their horsepower, hours of use, and engine tier;
- Description of cooling tower design, cycles of concentration, circulating water treatment method(s) and flowrate, circulating water quality, amount and quality of cooling tower blowdown, and blowdown disposal/treatment method(s);
- Diesel generator specification sheet and proposed emission controls, if any (e.g., DPF or SCR);
- Peak and total annual electricity demand in MWh/yr;
- Design of and MW output of solar panels;
- Battery composition (e.g., lithium-ion) and vendor specification sheet;
- Battery facility layout;
- Total water demand and water quality for cooling towers, irrigation, potable, and any other unidentified uses;
- Water treatment methods and residuals disposal;
- Wastewater disposal method(s) and location;

³⁵ Geotechnical Report, Sec. 1.4, p. 2; Proposed 1390 Borregas Ave Mechanical Facility: Project Description Letter, May 7, 2019; Environmental Information Form, Item 14.

³⁶ Project Description Letter.

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- Noise calculations supporting conclusion that “noise levels at the site boundaries are expected to be significantly quieter than required by code”;³⁷
- Manufacturer-provided equipment sound power levels;³⁸
- Manufacturer-provided electricity demand for all equipment;
- A P&ID diagram that identifies all connectors, valves, pumps, and other equipment that may leak vapors into the atmosphere.³⁹

Crucially, the Application also included almost no details about piping or any other utilities (location, length, depth, roadway crossings, etc.) that are necessary to facilitate the delivery of “heating and cooling services to nearby Google-controlled office buildings,” which is the stated purpose of the Project.⁴⁰ The underground pipelines that will connect the Mechanical Facility to adjacent Google buildings are basic components of the Project. They will provide a direct, physical connection between the Mechanical Facility structures and multiple other facilities owned by the Applicant, all of which will operate under the Applicant’s singular control. As such, the pipelines are part of the Project, and must be described and analyzed in the City’s CEQA document.

Neither the Staff Report, nor the Project documents provided by the Applicant, provide a clear description of the Project’s underground pipelines or associated structures. Nor do they identify or describe the “nearby Google buildings” that the Project will connect to. In fact, the Applicant seems reluctant to disclose to the City *any* potential final destination for the massive quantities of heating and cooling water and the products of the mechanical equipment housed at the Project. The omission of this basic information from the Project description renders the Project description incomplete, misleads the public as to the true scope of the Project, and resulted in a failure by the City to disclose the nature and severity of the Project’s environmental effects.⁴¹

³⁷ Noise Code Evaluation Update, May 3, 2019, pdf 6.

³⁸ Noise Code Evaluation Update, May 3, 2019, pdf 6.

³⁹ Exhibit B at 5–6.

⁴⁰ The only reference to service lines connecting the Mechanical Facility to Google office buildings is a brief acknowledgement in Google’s response to PRC comments. *But see* Stanford Energy System Innovations, http://www.urecon.com/documents/pdfs/white_papers/SESI.pdf (describing the extent of piping necessary to implement a central utility plant).

⁴¹ *Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal.3d 376.

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Fortunately, Project documents provided by the City demonstrate that the Applicant does not intend for the Project to be constructed or operated in isolation. For example, the Applicant's Geotechnical Report acknowledges that the Project will be constructed in phases. The Report explains that the Project is a central utility plant that will provide all-electric heating and cooling by sending hot and cold water via underground pipes⁴² to approximately 3.7 million square feet of future phased development on Google properties in Moffett Park.⁴³ Additionally, the Applicant's Operational Waste Management Strategy explains that, at the time the Project Application was submitted, the Applicant already anticipated that the Project would serve the first five buildings to come online before the pending Moffett Park Specific Plan amendments are adopted.⁴⁴ The Strategy further explains that, following the release of the amended Specific Plan, an additional five buildings would be supported by the Project.⁴⁵ Thus, the "reasonably foreseeable consequences" of the Project include the environmental impacts associated with the construction, operation, and physical connection of the Project's on-site facilities to the additional Google buildings that the Project is intended to serve.

Shrinking the scope of a project in order to avoid CEQA review violates CEQA's basic mandate that a "project" must be described as the "whole of the action," including not only the initial activity which is being approved, but all reasonably foreseeable components of the project. This includes phases which may be subject to multiple discretionary approvals by governmental agencies.⁴⁶ The City's proposed Categorical Exemption determination fails to describe or analyze the majority of the Project and cannot be approved. The City must prepare an EIR which describes and analyzes the entire Project.

⁴² Environmental Information Form, 10b, #9.

⁴³ Geotechnical Report, p. 1: "Based on our discussions with the project team and review of the information provided, we understand the proposed 1390 Borregas Mechanical Facility (Project) will serve the surrounding areas, including **future** office buildings." (**emphasis added**); Biological Resources Report, p. 1; Use Permit/Special Development Permit Justifications ("The all-electric mechanical facility replaces individual thermal equipment located at each **future building...**"). **Emphasis** added.

⁴⁴ Google Central Utilities Plant, Operational Waste Management Strategy, ARUP, 50% Detailed Design, May 1, 2019 (Operational Waste Management Strategy), p. 2.

⁴⁵ Google Central Utilities Plant, Operational Waste Management Strategy, ARUP, 50% Detailed Design, May 1, 2019 (Operational Waste Management Strategy), p. 2.

⁴⁶ CEQA Guidelines, 15378 subd. (c).

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B. CEQA Prohibits the Piecemealing of Projects

CEQA prohibits a project proponent from seeking approval of a large project in a piecemeal fashion in order to take advantage of environmental exemptions or lesser CEQA review for smaller projects.⁴⁷ The law mandates “that environmental considerations do not become submerged by chopping a large project into many little ones - each with a minimal potential impact on the environment - which cumulatively may have disastrous consequences.”⁴⁸ As Courts have stated: “[t]he CEQA process is intended to be a careful examination, fully open to the public, of the environmental consequences of a given project, *covering the entire project, from start to finish*.”⁴⁹

Specifically, the description of a project must describe a larger future project and analyze its effects if (1) the larger project is a reasonably foreseeable consequence of the initial project, and (2) the future project will be significant in that it will likely change the scope or nature of the initial project or its environmental effects.⁵⁰ This rule applies even if (1) the Lead Agency has not yet formally approved the larger future project, and (2) it is impossible to predict with precision the environmental effects of less-than-definite future plans, as long as these effects can be discussed at least in general terms.⁵¹ Difficulty in describing the effects of less-than-definite future plans does not excuse an agency from CEQA compliance, especially since CEQA provides mechanisms, such as Program EIRs and tiering of EIRs, to facilitate environmental analysis of larger future projects.⁵²

Furthermore, “[t]iering does not excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental impacts of the project and does not justify deferring such analysis to a later tier EIR or negative

⁴⁷ *Arviv Enterprises, Inc. v. South Valley Area Planning Com.*, 101 Cal. App. 4th 1336, 1340 (2002).

⁴⁸ *Bozung v. LAFCO*, 13 Cal.3d 263, 283-84 (1975); *City of Santee v. County of San Diego*, 214 Cal.App.3d 1438, 1452 (1989); *Citizens Assn. for Sensible Development of Bishop Area v. County of Inyo*, 172 Cal.App.3d 151, 165 (1985).

⁴⁹ *Natural Resources Defense Council v. City of Los Angeles*, 103 Cal.App.4th 268 (2002), (emphasis added).

⁵⁰ *Laurel Heights Improvement Assn. v. Regents of Univ. of California*, 47 Cal. 3d 376, 396 (1988), as modified on denial of reh'g (Jan. 26, 1989).

⁵¹ *Id.* at 398-99.

⁵² *Id.* at 399, n.8.

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declaration.”⁵³ If a program-level EIR has been released, it is nonetheless still not appropriate to piecemeal later tiers in order to avoid environmental review.

C. Expansion of the Project is a Reasonably Foreseeable Consequence of Construction and Must be Analyzed in a Single EIR

In *Laurel Heights*, the California Supreme Court grappled with a project that proposed moving a university’s research facility to a residential neighborhood.⁵⁴ The building that would serve as the research facility was three times larger than what was needed for the research facility and use of the remaining building space was to become available to the university within five years of the project’s completion.⁵⁵ It was known at the time of the trial that the university had plans to occupy more of the building and had reasonably specific plans for what it intended to do with the remaining space.⁵⁶ The court found that the future development was reasonably foreseeable and the university had to include environmental analysis of the anticipated future uses of the site.⁵⁷

Similarly here, the Project is part of the Applicant’s overall development strategy for Moffett Park, and is not being constructed in isolation. It is being constructed so as to “provide heating and cooling services to nearby Google-controlled office buildings.” Any new Applicant-owned office building will have to construct pipes underground to bring the byproducts from the Project to the office building. In its response to the City’s questions about the scope of the Project, the Applicant repeatedly avoided disclosing information about future projects in the area or indicating which future projects might be ultimately connected to the Project.

However, the record is clear that the Applicant has quite specific plans for the nearby land they own, including at least four other projects in various stages of

⁵³ Cal.Code Regs., tit. 14, § 15152, subd. (b); *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova*, 40 Cal. 4th 412, 431, 150 P.3d 709, 720 (2007), as modified (Apr. 18, 2007).

⁵⁴ *Laurel Heights*, 47 Cal. 3d at 388.

⁵⁵ *Id.* at 393

⁵⁶ *Id.* at 395

⁵⁷ *Id.* at 399.

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planning and development within Moffett Park.⁵⁸ In particular, directly across the street from the Project, the City is preparing a Draft EIR for the Google Caribbean Campus Project (“Caribbean Project”), which will “demolish the existing 13 buildings located on the project site, existing surface parking lots, and removing of vegetation and trees on the approximately 40.5-acre site....In their place, [the Applicant] proposes to build two new 5-story office buildings totaling 1,041,890 square feet.” Notably, the Notice of Preparation for the Caribbean Project explains that Caribbean Project would also contain a central utility plant that the instant Project “includes flexibility to connect to...in [the] future.”⁵⁹

As the court in *Laurel Heights* found, “this is not the type of situation where it is unclear as to whether a parcel of land will be developed or as to whether activity will commence.”⁶⁰ The Applicant’s plans for future development are clear – the Project is intended to provide heating and cooling to other Google facilities. In fact, the Applicant has explicitly considered plans to incorporate the Project into neighboring construction projects, implicitly acknowledging that the Project serves no practical function operating in isolation.⁶¹ Thus, the Project necessarily involves the future permitting and construction of other Google facilities. By failing to analyze all of these facilities in a single EIR, the City has piecemealed the Project as the university did in *Laurel Heights*. The City must prepare an EIR for the entire Project which fully describes, analyzes and mitigates the impacts of the Mechanical Facility in conjunction with the Applicant’s related Moffett Park developments, including all related physical structures, such as Project piping, additional heating and cooling equipment, etc.

IV. THE PROJECT DOES NOT QUALIFY FOR THE INFILL EXEMPTION

The City improperly determined that the Project qualifies for the infill exemption under CEQA. CEQA is “an integral part of any public agency’s decision making process.”⁶² It was enacted to require public agencies and decision makers to

⁵⁸ See Letter from Emily L. Murray to Rebecca Moon, Esq., Re: CEQA Compliance for Google Projects in Moffett Park, April 10, 2019.

⁵⁹ PRC Comments, June 5, 2019, at PDF 6.

⁶⁰ *Laurel Heights*, 47 Cal. 3d at 395.

⁶¹ PRC Comments, June 5, 2019, at PDF 6 (Project will have capability to connect to Caribbean Project).

⁶² Pub. Resources Code § 21006.

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document and consider the environmental implications of their actions before formal decisions are made.⁶³ CEQA requires an agency to conduct adequate environmental review prior to taking any discretionary action that may significantly affect the environment unless an exemption applies.⁶⁴ Thus, exemptions must be narrowly construed and are not to be expanded beyond the scope of their plain language.⁶⁵

A. The Infill Exemption

14 CCR § 15332 provides an exemption from CEQA for “benign infill projects that are consistent with the General Plan and Zoning requirements” of a municipality and that satisfy the following criteria:⁶⁶

- (a) The project is consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.
- (b) The proposed development occurs within city limits on a project site of no more than five acres substantially surrounded by urban uses.
- (c) The project site has no value as habitat for endangered, rare or threatened species.
- (d) Approval of the project would not result in any significant effects relating to traffic, noise, air quality, or water quality.
- (e) The site can be adequately served by all required utilities and public services.

In addition to satisfying the five criteria above, a project must not fall under one of the exceptions to a categorical exemption. For the purposes of this letter, two of these exceptions are noteworthy:⁶⁷

⁶³ *Id.*, §§ 21000, 21001.

⁶⁴ *Id.*, § 21100(a); *see also* CEQA Guidelines § 15004(a).

⁶⁵ *Castaic Lake Water Agency v. City of Santa Clarita* (1995) 41 Cal.App.4th 1257.

⁶⁶ CEQA Guidelines § 15332 (under discussion section).

⁶⁷ CEQA Guidelines § 15300.2

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(b) Cumulative Impact. All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant.

(c) Significant Effect. A categorical exemption shall not be used for an activity where there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances.

Finally, the infill exemption is not available for any project that requires mitigation measures to reduce potential environmental impacts to less than significant, because a project that “may have a significant effect on the environment cannot be categorically exempt.”⁶⁸ Thus, to rely on mitigation measures during an exemption determination is to make a “premature” and “unauthorized” environmental evaluation.⁶⁹

B. Standard of Review for the Infill Exemption

The infill exemption requires a lead agency provide “substantial evidence to support [their] finding that the Project will not have a significant effect.”⁷⁰ “Substantial evidence” means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made that the project may have a significant effect on the environment is to be determined by examining the whole record before the lead agency.⁷¹ If a court locates substantial evidence in the record to support the City’s conclusion, the City’s decision will be upheld.⁷²

In contrast, the standard of review for exceptions to the infill exemption generally requires that a challenger provide a fair argument that the project *may* have a significant effect on the environment. In that instance, an agency will simply inquire whether, as a matter of law, the record contains credible evidence to support an argument that there may be a significant effect, but the agency would not weigh

⁶⁸ *Salmon Protection and Watershed Network v. County of Marin* (2004) 125 Cal.App.4th 1098, 1102.

⁶⁹ *Id.* at 1108.

⁷⁰ *Banker’s Hill, Hillcrest, Park West Community Preservation Group v. City of San Diego* (2006) 139 Cal.App.4th 249, 269.

⁷¹ CEQA Guidelines § 15384.

⁷² *Bankers Hill Hillcrest*, 139 Cal.App.4th at 269.

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the evidence or resolve any conflict.⁷³ The determination of whether a project presents “unusual circumstances” pursuant to CEQA Guidelines, § 15300.2, subd. (c) is reviewed under a 2-prong standard. First, the determination of whether a particular project presents circumstances that are unusual for projects in the exempt class is reviewed under the substantial evidence standard. Second, the agency’s finding as to whether unusual circumstances give rise to “a reasonable possibility that the activity will have a significant effect on the environment” is reviewed under the fair argument standard.⁷⁴

The record demonstrates that neither the City nor the Applicant have provided substantial evidence that the Project qualifies for the infill exemption. By contrast, there is substantial evidence demonstrating that unusual circumstances are present which preclude reliance on the infill exemption, and there is substantial evidence supporting a fair argument that the Project will result in significant, unmitigated environmental effects that require preparation of an EIR. . Finally, we show that the Project, requires the implementation of mitigation measures to prevent significant effects on the environment, and thus, the Project cannot qualify for a categorical exemption.

C. The City Lacks Substantial Evidence to Conclude that the Project Satisfies the Infill Exemption Criteria

1. The Project is not a Public Utility Building and Service Facility

A project claiming the infill exemption must be “consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations.”⁷⁵ As justification for satisfaction of this element, the Staff Report claims that the Project falls under the “Public utility building and service facilities” category within the Sunnyvale Zoning Code and claims the definition for that category applies to the Project.⁷⁶ This assumption is incorrect and unsupported on two counts.

⁷³ *Bankers Hill Hillcrest*, 139 Cal.App.4th at 263.

⁷⁴ *Berkeley Hillside Preservation v. City of Berkeley* (2015) 60 Cal.4th 1086, 1114, as modified (May 27, 2015).

⁷⁵ CEQA Guidelines § 15332(a)

⁷⁶ Letter from James T. Burroughs, Re: 1390 Borregas Avenue Central Utility Plan, Cat. 32 Exemption Letter, May 28, 2019, at 2 (hereinafter “CEQA Exemption Letter”).

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a) The Applicant is not a Public Entity

The “Public utility building and service facilities” category falls under the broader Public Facility distinction for the purposes of the Sunnyvale Zoning Code,⁷⁷ which the Sunnyvale General Plan describes as applying to “public and quasi-public services such as parks, schools, places of assembly, child-care facilities, civic facilities, and public works facilities such as solid waste, landfill, or other similar facilities to be located throughout the city.”⁷⁸ The Code explains that Sunnyvale’s “public buildings are not commercial enterprises, but are solely meant to provide the best possible services to Sunnyvale residents, businesses and visitors.”⁷⁹ They represent the “official face of a City”⁸⁰ and are subject to public accountability in their decision-making. A quasi-public service would likely refer to the services provided by “a private corporation that is backed by a government agency that has a public requirement to provide certain services,” like many of California’s private electric or water utilities.⁸¹

The Applicant is a “commercial enterprise,” and is therefore not a public or even quasi-public service provider, as defined by the Zoning Code.⁸² The stated purpose of the Project “is to provide heating and cooling services to nearby Google-controlled office buildings.”⁸³ These are public services which are commonly provided by public utilities. The Zoning Code does not authorize private commercial enterprises to provide these services, nor does the Code authorize them to take place in private buildings. The services proposed by the Project will be provided by the Applicant, to serve the Applicant’s employees in future buildings owned and controlled by the Applicant and will not be made available for general public use. Thus, the general plan and zoning designation claimed by the Applicant is not applicable to this Project, because it is reserved for City use, or use by other public or quasi-public uses. The use proposed by the Project is therefore inconsistent with the Zoning Code.

⁷⁷ Sunnyvale Code 19.29.050

⁷⁸ Sunnyvale General Plan Ch. 3, p. 3-91.

⁷⁹ Sunnyvale General Plan Ch. 4, p. 4-14.

⁸⁰ Sunnyvale General Plan Ch. 4, p. 4-14.

⁸¹ See Quasi-Public Corporation definition, available at <https://www.upcounsel.com/quasi-public-corporation>

⁸² See 10b Environmental Information Form-Responses, pdf 3 (“The 1390 Borregas Mechanical Facility...is not a public utility”).

⁸³ CEQA Exemption letter at 1.

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b) *The Project is not contemplated as a Utility Building and Service Facility in the Zoning Code or the Moffett Park Specific Plan EIR*

The Project is inconsistent with the plain language of the Sunnyvale Zoning Code which defines Public Utility Buildings and Service Facilities as “buildings or facilities above ground, such as communications equipment buildings, water pumping plants, and water storage facilities, and similar facilities.”⁸⁴ The Staff Report nevertheless contends that the Project is consistent with this definition. The City’s primary argument for the satisfaction of this element of the infill exemption is that “the proposed Mechanical Facility meets [the definition for Public Utility Buildings and Service Facilities] as an above-ground facility that is intended to provide heating and cooling services to nearby Google-controlled office buildings.”⁸⁵ The Staff Report emphasizes the “above ground facilities” portion of the definition, but glosses over the examples used in the definition to provide context for *what* above-ground facilities are included in the definition.

Contrary to the City’s contentions, the Project is also not a “communication equipment building,” nor is it a “water pumping plant” or “water storage facility,” as defined by the City’s Zoning Code and as analyzed in the Moffett Park Specific Plan. The type of water storage and pumping analyzed for environmental impacts in the City’s Moffett Park Specific Plan EIR was focused on water that could be distributed as potable or non-potable water for non-specific residential, commercial, and industrial purposes.⁸⁶ By contrast, the Project’s water storage and pumping facilities are specifically designed to send hot and cold water via underground pipes for heating and cooling services to nearby office buildings.⁸⁷ The Specific Plan EIR did not analyze or discuss this type of water storage, transmission, or use. Moreover, the other “utility building and service facility” purposes contemplated by the Specific Plan include: wastewater and sewage; electricity; natural gas; telephone services; and data transmission. None of these descriptions apply to the Project.

⁸⁴ Sunnyvale Code 19.12.170.

⁸⁵ CEQA Exemption Letter at 2.

⁸⁶ See Moffett Park Specific Plan EIR, 2003, 3.13-1–3.13-5 (covering the City’s “water distribution system” and “water demand management”).

⁸⁷ Environmental Information Form, 10b, #9.

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Thus, in order for the Applicant to qualify as a “Public utility building and service facilit[y],” a variance or amendment to the General Plan would be required. This demonstrates that the Project is inconsistent with the Sunnyvale General Plan, Zoning Code, and the Moffett Park Specific Plan. As such, the Project fails to satisfy this basic element of the Class 32 exemption and does not qualify for an infill exemption.

2. The Project is Substantially Larger than the Infill Exception Allows

The infill exemption requires a proposed project to occur “within city limits on a project site of *no more than five acres* substantially surrounded by urban uses.”⁸⁸ The City claims the Project satisfies this element because the “project site...is 1.9 acres large and is surrounded on three sides by existing light industrial/commercial-type building structures and on the fourth side by East Caribbean Drive.”⁸⁹ However, the 1.9 acres described in the Staff Report includes only the acreage of the parcel on which the three buildings and four water towers will be constructed.⁹⁰ It fails to include any underground pipelines or associated structures that will be constructed between the Project site and the other Google buildings it is designed to serve.

As we explained above, it is clear that the Project will not only include the construction of the above ground facilities and landscaping. The Project will also entail facilitating “heating and cooling services to nearby Google-controlled office buildings” through piping underneath Caspian Drive and Borregas Ave.⁹¹ The Staff Report explains that the Project will require “underground pipes through the public right-of-way” in order to provide energy to up to 3.7 million square feet of buildings (85 acres).⁹² However, the City failed to include either the pipelines or the receiving buildings in its description of the Project’s acreage. Thus, the Project’s physical structures will extend far beyond the 1.9 acres described in the Staff Report and Project Application.

⁸⁸ CEQA Guidelines § 15332(b) (emphasis added).

⁸⁹ CEQA Exemption Letter at 2.

⁹⁰ Project Description Letter.

⁹¹ PRC Comments Responses, PDF pg. 5.

⁹² Staff Report, p. 2; see also Geotechnical Report, p. 1.
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Without the underground pipes physically connecting the Project to nearby facilities, the Project would serve no practical function. Thus, the Project's underground pipes are a *necessary* part of the Project and cannot be ignored when considering its scope. The reasonably foreseeable scope of the Project is therefore up to 85 acres, which far exceeds the five-acre maximum required to qualify for the infill exemption, rendering the exemption inapplicable.

3. The Project is Inconsistent with Zoning Regulations.

To qualify for an infill exemption, a project must be consistent with “all applicable general plan policies as well as with applicable zoning designation and regulations.”⁹³ The Project fails to meet this requirement because it is facially inconsistent with City Zoning Codes designed to reduce the adverse impacts associated with the “heat island effect” of parking lot areas within the City.

The City's Parking Lot Design Standards require that a minimum of 50% of parking lot areas, including paved areas that serve parking lots, be shaded within 15 years of tree plantings.⁹⁴ The purpose of this Zoning Code requirement is to reduce the heat island effect of paving.⁹⁵ The Staff Report explains that the Project includes just 32% parking lot shading – less than the minimum required by the Zoning Code. The Applicant claims that it is impossible for the Project to comply with the Parking Lot Design Standards because (1) shared driveway access along the eastern property line limits ability to plant trees on both sides of drive aisle, and (2) trees not permitted within the utility easement along the southern property line.⁹⁶ The Staff Report acknowledges that this issue renders the Project inconsistent with this mandatory Zoning Code requirement: “The project complies with most development standards, ***with the exception of parking lot shading***.”⁹⁷ The Project is therefore admittedly inconsistent with the Zoning Code, rendering the infill exemption inapplicable.

Rather than change the Project design to increase the number of trees on the Project site's parking lots in order to comply with the Zoning Code, the Applicant has requested an exemption from Section 19.46.120(a). The Project's

⁹³ 14 CCR § 15332(a).

⁹⁴ Zoning Code, § 19.46.120(a) (Parking lot design – Shading Requirements); Staff Report, p. 4.

⁹⁵ Staff Report, p. 4.

⁹⁶ Staff Report, p. 4.

⁹⁷ Staff Report, p. 2 (emphasis added).

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inconsistency with the Zoning Code therefore remains a significant impact that requires mitigation under CEQA. The Applicant has agreed to mitigate this impact by applying a “cool pavement material” to the parking spaces and drive aisle, which reflects solar heat away from the ground and further reduces the heat island effect.⁹⁸ As discussed below, reliance on mitigation measures to reduce a project’s potentially significant effects renders the Project ineligible for any categorical exemption.⁹⁹

Finally, the Staff Report contends that the requested Zoning Code exemption is an acceptable “deviation” from the Code’s parking lot shading requirements because the mitigated impact of the heat island effect will be negligible with application of the cool pavement.¹⁰⁰ This conclusion is incorrect and unsupported because the only parking “deviations” authorized under the Zoning Code apply to *parking space* requirements, and not to parking lot *shading* requirements.¹⁰¹ Thus, there is no “deviation” authorized by the Zoning Code for the Project’s Zoning Code inconsistency from inadequate parking lot shade. This renders the Project inconsistent with applicable zoning regulations, and ineligible for the infill exemption.

D. The City Lacks Substantial Evidence to Support Its Conclusion that the Project Will Have No Significant Environmental Effects

In order to qualify for the infill exemption, the project may not “result in any significant effects relating to traffic, noise, air quality, or water quality.”¹⁰² Exemption determinations must be supported by substantial evidence in the record demonstrating that the exempt project will have no significant environmental effects. Dr. Fox and Mr. Watry explain that the impact analyses provided for the Project rely on incorrect and incomplete input data that failed to analyze the full extent of the Project’s air quality and noise impacts. As a result, the City lacks

⁹⁸ Staff Report, p. 4.

⁹⁹ *Salmon Protection and Watershed Network v. County of Marin* (2004) 125 Cal.App.4th 1098, 1102.

¹⁰⁰ Staff Report, p. 4.

¹⁰¹ Zoning Code § 19.90.030(a)(8) (“In approving a special development permit, the director, planning commission or city council may allow deviations to standards for... (8) Parking space requirements (e.g. number of spaces, percent of compact, aisle width)”).

¹⁰² CEQA Guidelines § 15332(d)

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substantial evidence to support its conclusion that the Project will have no significant environmental effects.

1. Air Emissions

The Applicant prepared an Air Quality Analysis to support the City's exemption determination. The Air Quality Analysis concludes that the Project will have no significant air quality impacts. The City adopted the conclusions of the Air Quality Analysis in its Categorical Exemption Analysis. Dr. Fox reviewed the Project Application materials and Air Quality Analysis and concludes that the "analysis significantly underestimates construction and operation emissions," primarily because "many components of Project construction and operation, such as underground pipelines connecting the Project to adjacent buildings, soil modifications to address geotechnical concerns, and emissions from Project operation, are omitted."¹⁰³

a. Construction emissions omit major portions of the Project

The calculation of emissions for the Project were estimated with the CalEEMod model using "default assumptions for a project of this type and size."¹⁰⁴ However, as Dr. Fox points out, there are no similar facilities included in the CalEEMod database, so default assumptions are not a reasonable basis for estimating construction emissions.¹⁰⁵ Additionally, while standard practice for using CalEEMod is to provide supporting construction plans, Dr. Fox explains that "the City's file only includes partial CalEEMod output and is mostly based on default assumptions rather than Project-specific assumptions."¹⁰⁶ Further, the City failed to provide any of the specific inputs that were entered into CalEEMod to generate the emissions estimate that the Air Quality Analysis relies on for its impact assessment. The missing information includes "a detailed listing of all construction equipment that would be used, their horsepower, and hours of usage." Without this information, Dr. Fox explains that "the provided model output cannot be evaluated,"¹⁰⁷ and the City cannot satisfy its burden to provide substantial evidence to support an exemption.

¹⁰³ Exhibit B at 6–7.

¹⁰⁴ Air Quality Analysis, PDF pg. 5

¹⁰⁵ Exhibit B at 9.

¹⁰⁶ Exhibit B at 9.

¹⁰⁷ Exhibit B at 9.

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The CalEEMod default assumptions are all the more insufficient because, as Dr. Fox explains, the analysis of construction emissions leaves out essential parts of the construction process, including removal of existing underground utilities, fill removal and placement off-site, trenching to lay utilities to future adjacent buildings, and the type and ‘tier’ of construction equipment.¹⁰⁸ The Air Quality Analysis also underestimates the building area of the Project’s facilities and the foundation design likely required for construction.¹⁰⁹ With this quantity of fundamental information missing from the City’s analysis of the Project’s construction emissions, the City lacks substantial evidence for the Zoning Administrator to conclude that the Project will not have significant air quality impacts.

b. Construction emissions were significantly underestimated due to an inaccurate construction schedule

Dr. Fox explains that the CalEEMod analysis completed for construction emissions is wholly inconsistent with the Project’s construction schedule, leading the analysis to significantly underestimate construction emissions.

Comparison of CalEEMod Inputs with Project Schedule

Activity	CalEEMod (days)	Schedule (days)
Demolition	20	25
Site Preparation	2	... ¹¹⁰
Grading	4	110
Building Construction	200	540
Paving	10	... ¹¹¹
Architectural Coating	10	... ¹¹²
Total	246	675

¹⁰⁸ Exhibit B at 12–14.

¹⁰⁹ Exhibit B at 14.

¹¹⁰ Included in grading.

¹¹¹ Included in building construction.

¹¹² Included in building construction.

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Air quality analyses that are this fail to incorporate accurate input numbers cannot be relied upon as substantial evidence, because they are not based on substantial evidence in the record.¹¹³

- i. *Many operational emissions were either completely omitted or significantly underestimated*

The Air Quality Analysis concludes that “there will be no emissions which impact air quality in normal operation.”¹¹⁴ However, Dr. Fox explains that the Project’s cooling towers, diesel supply and storage, wastewater treatment, and diesel generators all emit GHGs and/or criteria pollutants that were either not included or were significantly underestimated in the Project’s Air Quality Analysis.

- ii. *Operational emissions were calculated using an incorrect baseline*

The Air Quality Analysis uses an incorrect baseline to subtract from the projected operational emissions. CEQA defines the environmental setting as the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, from both a local and regional perspective.¹¹⁵ Describing the environmental setting accurately and completely for each environmental condition in the vicinity of the Project is critical to an accurate, meaningful evaluation of environmental impacts. When a project is purportedly exempt from CEQA, the proper environmental baseline is the physical environmental condition of the project site as it existed at the time the applicant filed their application for the lead agency’s permit.¹¹⁶ For this Project, the first application was submitted on January 30, 2019. At that time, the building was vacant and non-operational.¹¹⁷ Thus, the Project’s environmental baseline and baseline emissions are zero.¹¹⁸

¹¹³ *Berkeley Keep Jets Over the Bay Committee v. Board of Port Com'rs* (2001) 91 Cal.App.4th 1344, 1371, as modified on denial of reh'g (Sept. 26, 2001).

¹¹⁴ Environmental Information Form, #42.

¹¹⁵ CEQA Guidelines § 15125(a) (emphasis added); *Riverwatch v. County of San Diego* (1999) 76 Cal.App.4th 1428, 1453 (“*Riverwatch*”).

¹¹⁶ See *Bottini v. City of San Diego* (2018) 27 Cal.App.5th 281, *at 24, available at <https://www.gmsr.com/wp-content/uploads/2019/01/scw-D071670.pdf>.

¹¹⁷ Environmental Information Form, Item 10b, #8.

¹¹⁸ Exhibit B at 19.

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iii. Key operational emissions were omitted from the City's analysis

In her analysis, Dr. Fox explains the Application omitted operational emissions from the use of the cooling towers and diesel supply and storage tanks. With respect to the Project's cooling towers, she explains that, "[i]n general, cooling towers emit particulate matter (PM_{2.5}, PM₁₀), volatile organic compounds (VOCs), chlorine (added to control biological growth), and other chemicals, depending upon the chemical composition of the circulating water. When the circulating water is evaporated, for example, the total dissolved solids in the circulating water is emitted as PM₁₀."¹¹⁹ While the BAAQMD's CEQA guidelines are silent on how to evaluate the significance of this type of particulate matter emission, analysis of these emissions can be done "by estimating the emissions and using an air dispersion model to estimate ambient concentrations. The ambient concentrations are then compared to federal and state ambient air quality standards."¹²⁰ A violation of an air quality standard or the contribution to an existing violation is considered to be significant."¹²¹

However, the Air Quality Analysis includes no analysis of emissions from the cooling towers. In fact, "[t]he City's files contain no information on the type of cooling tower(s),¹²² the circulating water flow rate, the chemical composition of the cooling tower water supply or circulating water, or biocides that will be used to control bacteria,¹²³ all information necessary to estimate cooling tower emissions."¹²⁴ If the Application were to have included this information, Dr. Fox concludes that the cooling towers would emit PM₁₀ emissions ranging from 760 lb/yr or 2 lb/day to 11 ton/yr and 60 lb/day, the latter of which considered significant under the applicable Bay Area Air Quality Management District significance threshold. Dr. Fox's analysis also demonstrates that the Project has the potential to

¹¹⁹ Exhibit B at 14.

¹²⁰ See, for example, Laurelwood Data Center Initial Study and Proposed Mitigation Negative Declaration, August 28, 2019; available at: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=229584&DocumentContentId=61007> and <http://santaclaraca.gov/home/showdocument?id=64868>.

¹²¹ Exhibit B at 8–9.

¹²² There are two main types, natural draft and induced draft.

¹²³ Chardon Laboratories, What Types of Biocide Work Best?; available at: <https://www.chardonlabs.com/resources/cleaning-cooling-towers-with-biocides/>.

¹²⁴ Exhibit B at 24.

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cause toxic Legionella bacteria to be emitted as a component of the PM10 emitted by the wet cooling technology.¹²⁵

Additionally, the Air Quality Analysis completely omits emissions from diesel supply and storage. Specifically, “[t]he City’s files do not include any design information for the diesel storage] tank, required to estimate emissions, including its volume, vents, and fugitive components between the tank and the generator, which typically includes flanges and a pump that would release emissions.”¹²⁶ Further, the Air Quality Analysis omitted NOx emissions from diesel delivery and VOC releases as fuel from the generator’s spill catch basin evaporates or during hose connects and disconnects and from any tank vents and seals and connections between the tanks and the generators.¹²⁷ These omissions render the City’s analysis of operational emissions incomplete. The City’s conclusion that the Project will have less than significant operational air quality impacts is similarly unsupported.

iv. Key operational emissions were significantly underestimated

Dr. Fox explains that emissions from the diesel generators, supplying water, and for supplying energy to operate the cooling towers were underestimated. First, Dr. Fox explains that the emergency generator emissions are only for routine testing and maintenance of the generator, but do not include any analysis of if the generators supply power in an emergency. She notes that, “[a]s the purpose of these generators is to supply power during emergencies when power from SVCE is not available, it is reasonable to anticipate that emergencies will occur and that the generators will be used to supply any missing SVCE power.”¹²⁸ In fact, the BAAMQD has indicated that 100 hours of emergency operation “represents a reasonable worst-case assumption regarding the amount of time during any given year that a facility could have to operate without outside power.”¹²⁹ Had the City

¹²⁵ Exhibit B at 24–26. Legionella bacteria can cause Legionnaires' disease, a severe form of pneumonia, and Pontiac fever, an illness resembling the flu. See <https://www.mayoclinic.org/diseases-conditions/legionnaires-disease/symptoms-causes/syc-20351747> (last visited, 9/23/19).

¹²⁶ Exhibit B at 22.

¹²⁷ Exhibit B at 22–23.

¹²⁸ Exhibit B at 19.

¹²⁹ Exhibit B at 20.

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analyzed the emissions from the diesel generators, they would have found the NO_x emissions to be above the significance threshold, requiring mitigation.¹³⁰

Second, Dr. Fox explains that the “CalEEMod analysis assumed an indoor water use of 40 million gallons per year (Mgal/yr) and no outdoor water use,” however, “[t]he City’s files further disclose that 600,226 gal/yr of water will be used for landscaping.”¹³¹ The City also indicates that the source of much of the water to be used by the Project is not currently known, and thus, “it is not possible to make an accurate estimate of air quality and other impacts from supplying, treating, and disposing of the water.”¹³² Thus, the Air Quality Analysis contains no analysis of emissions related to water transport.

Finally, Dr. Fox explains that the Air Quality Analysis potentially underestimates the energy required to supply energy to the cooling towers, as they assumed the energy demand for conventional cooling towers, and the likely cooling towers for the Project will require much more energy due to the use of ambient air for cooling.¹³³

All of these deficiencies in the City’s analysis contribute to a general underestimation of the Project’s air quality impacts, and therefore cannot constitute substantial evidence for the purposes of granting an exemption from CEQA.

2. Noise

The City failed to provide substantial evidence demonstrating that impacts from noise will be less than significant. As explained by Mr. Watry, the noise report supplied by the Applicant (and adopted by the City) fails to provide any information about “the particular mechanical equipment” that will be used for the Project, nor “the basic information required to perform noise calculations.”¹³⁴ Mr. Watry notes that “[w]ithout any indication of the equipment or the sound power levels, it is not possible to independently verify that the noise calculations were done correctly.”¹³⁵ As Mr. Watry explains, “[i]t is routine to include this information in noise studies

¹³⁰ Exhibit B at 20.

¹³¹ Exhibit B at 23.

¹³² Exhibit B at 23.

¹³³ Exhibit B at 27–28.

¹³⁴ Exhibit C at 2.

¹³⁵ Exhibit C at 2.

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intended to support permit applications and/or CEQA analyses.”¹³⁶ The omission of these key facts from the Project’s noise analysis renders the analysis and its conclusions unsupported. The omission of this critical information also prevents the public from understanding the “analytic bridge” between the Project description and the City’s conclusion that the Project’s noise would be less than significant, in violation of CEQA.¹³⁷

With respect to generator noise, Mr. Watry correctly points out that the noise report implies “that the generator will, in fact, produce noise levels ‘greater than the applicable operational noise limit set forth’” in the Sunnyvale Code. However, “as written, the Noise Study contains no quantitative analysis of the Project’s actual or estimated noise levels, no discussion of existing baseline noise levels surrounding the Project site, no analysis of whether those noise levels could pose a potentially significant noise impact to local sensitive receptors, and no mitigation measures are proposed that would prohibit or prognosticate the use of an unmuffled, extremely loud generator.”¹³⁸

With respect to construction noise, Mr. Watry explains that the Applicant’s noise study “fails completely to discuss or analyze the Project’s construction noise.”¹³⁹ Without “disclosure of pertinent construction information including duration and estimated noise levels” the noise study does not provide enough information to assess the nature or severity of the Project’s construction noise impacts, and fails to constitute substantial evidence for the purposes of CEQA review.

3. The City Lacks Substantial Evidence to Support its Conclusion that the Project Site Will be Adequately Served by all Required Utilities and Public Services

The infill exemption requires that the “site can be adequately served by all required utilities and public services.”¹⁴⁰ The City claims that the Project satisfies this criterion because “[t]he Project Site is already served by all required

¹³⁶ Exhibit C at 2.

¹³⁷ *Topanga Ass’n for a Scenic Comty. v. County of Los Angeles* (1974) 11 Cal. 3d 506, 515; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal. App. 3d 692, 733.

¹³⁸ Exhibit C at 3.

¹³⁹ Exhibit C at 3.

¹⁴⁰ 14 CCR § 15332(e).
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utilities and public services and will continue to be so served after completion of the proposed Mechanical Facility.” However, neither the Applicant nor the City explains whether or how the infrastructure developed to support the site’s prior use, i.e. an office building, could support the energy/water needs of a central utility plant that necessarily requires additional utility resources, and potentially additional utility infrastructure, to enable it to serve its purpose of generating adequate heating and cooling to serve other buildings. For example, the Project will require the storage and replacement of likely millions of gallons of water to fill the water storage tanks.¹⁴¹ The City’s Categorical Exemption Analysis fails to include any discussion of existing water resources, or any analysis of whether local water purveyors have the capacity to serve the Project’s water needs.

Thus, neither the Applicant nor the City have provided enough information to demonstrate how the Mechanical Facility would be “adequately served” by the existing utilities and public services.¹⁴² The City’s conclusion that the Project will be adequately served is therefore not supported by substantial evidence.

V. THE PROJECT FALLS WITHIN THE EXCEPTIONS TO CATEGORICAL EXEMPTIONS

In its consideration of the exceptions to categorical exemptions under CEQA § 15300.2, the City states that “none of the ‘exceptions’...are relevant or applicable” to the Project. This conclusory analysis is insufficient to determine whether one of the exceptions applies. By contrast, there is substantial evidence supporting a fair argument that the Project will have significant environmental effects that have not been adequately disclosed or mitigated.

¹⁴¹ In the case of Stanford’s Central Utility Plant, the cold-water tanks held five million gallons and the hot-water tank held two million gallons.

http://www.urecon.com/documents/pdfs/white_papers/SESL.pdf

¹⁴² See Governor’s Office of Planning and Research, <http://opr.ca.gov/planning/land-use/infill-development/#targetText=Infill%20Development,not%20exclusively%20in%20urban%20areas> (describing one of the primary benefits of infill development to be to “reduce costs to build and maintain expensive infrastructure”).

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A. The Project may have Significant Effects on the Environment due to the Unusual Nature of the Project

Given the information provided by the City, there is a fair argument that the exception §15300.2(c) applies. That section states:

A categorical exemption shall not be used for an activity where there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances.

Thus, to invoke this exception, it must be shown that 1) there is a reasonable possibility that the Project will have a significant effect on the environment, and 2) that significant effect is due to unusual circumstances stemming from the Project. Unusual circumstances may be established “without evidence of an environmental effect, by showing that the project has some feature that distinguishes it from others in the exempt class, such as its size or location. In such a case, to render the exception applicable, the party need only show a reasonable possibility of a significant effect due to that unusual circumstance.”¹⁴³

With respect to the Project, as Dr. Fox and Mr. Watry explain, there is a reasonable possibility for significant air quality and noise impacts from its construction and operation, including emissions from the cooling towers, diesel generators, and construction of necessary infrastructure to implement the project.¹⁴⁴ Many of these effects are the result of unusual circumstances that do not typically apply to infill development projects. For example, Dr. Fox notes an absence of analysis with regard to the presence of a UPS battery system in the Project, which has the potential for fires or explosions if caution and mitigation is not undertaken.¹⁴⁵ Typically, “infill development project” applies to residential, commercial, industrial, public facility, and/or mixed-use projects on unused and underutilized lands within existing development patterns.¹⁴⁶ Even if the Mechanical Facility were to fall within one of these categories, the complex nature of the Project and the level of disturbance to nearby infrastructure would be unusual for an infill

¹⁴³ *Berkeley Hillside Preservation v. City of Berkeley* (2015) Maj. Op. at 21.

¹⁴⁴ See generally Exhibit B; Exhibit C at 2–3.

¹⁴⁵ Exhibit B at 30–32.

¹⁴⁶ Governor’s Office of Planning and Research, <http://opr.ca.gov/planning/land-use/infill-development/#targetText=Infill%20Development,not%20exclusively%20in%20urban%20areas>
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development project replacing only a single story office building, which is emphasized by the fact that this is “the first central utility plant in Moffett Park.”¹⁴⁷

1. There are Unusual Circumstances Due to Residual Soil Contamination Beneath the Project Site.

A 2019 Phase I Environmental Site Assessment Update (“Phase I”) prepared for the Project site identifies soil vapor concentrations above RWQCB Environmental Screening Levels for PCE and vinyl chloride, both known carcinogens according to the US EPA.¹⁴⁸ The Phase I also states that one of the three buildings will be potentially impacted by vapor intrusion (the heating building).

SWAPE explains that “[t]he presence of PCE and vinyl chloride in the subsurface pose potential inhalation health risks to construction workers.”¹⁴⁹ This environmental impact may be significant because it will exacerbate existing conditions and “PCE and vinyl chloride will...present inhalation risks to future plant workers if the membrane mitigation is inadequate.”¹⁵⁰ Further, SWAPE explains that the “contamination of the subsurface at the Project site” is an unusual circumstance for infill projects, one that is likely to result in significant environmental effects because the presence of PCE and vinyl chloride in the subsurface pose potential inhalation health risks to construction workers and others who come in close proximity to the contaminants.¹⁵¹

B. The Project May Have Significant Cumulative Impacts When Considered with Other Planned Central Utility Plants in Moffett Park

The infill exemption is inapplicable when a project has significant cumulative impacts:

¹⁴⁷ 1390 Borregas Mechanical Facility: Schematic Design, May 10, 2019, at 2.1.0-1.

¹⁴⁸ Exhibit A, SWAPE Comments, p. 1.

¹⁴⁹ Exhibit A at 2.

¹⁵⁰ Exhibit A at 2.

¹⁵¹ Exhibit A at 1.

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All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant.¹⁵²

Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.¹⁵³ The City failed to analyze the cumulative impacts of the Project in conjunction with other Moffett Park utility projects planned by the Applicant. Dr. Fox explains in her letter that the Project is one of potentially three central utility plants currently planned within one block of one another. The Caribbean Project, which is directly across Borregas avenue from the Project, has at least one on-site central utility plant, with the potential for a second one.¹⁵⁴ The projects designated as 100 and 200 Caribbean Way, for example, will be served by a dedicated 70,200 ft² central utility plant,¹⁵⁵ which is larger than the Project at 22,127 ft².¹⁵⁶ Thus, there are up to three concurrently planned central Google utility projects pending before the City. These projects may have significant cumulative impacts on air quality, public health, and other areas that require preparation of an EIR.

These are projects of exactly the same type and location, and as we have shown above, individually have the potential for significant impacts in air quality. The City includes no analysis of the cumulative impacts from the Project and similar projects nearby, and thus has provided no substantial evidence that this exception does not apply.

¹⁵² CEQA Guidelines § 15300.2(b).

¹⁵³ CEQA Guidelines § 15355.

¹⁵⁴ Vesting Tentative Map, Caribbean Campus, 100/200 West Caribbean Drive, PDF pg. 4 and 5. The CUP is north of the Parking Structure, in the upper left hand corner of the figures, at the intersection of Caribbean Drive and Mathilda Avenue.

¹⁵⁵ Letter from Peter McDonnell, Vice President, Sares Regis @ Google, to Ryan Kuchenig, City of Sunnyvale, Department of Community Development, Re: Planning Project #2107-8042 – Revised Project Description, September 12, 2018.

¹⁵⁶ Exhibit B at 27–28.

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VI. THE PROJECT'S RELIANCE ON MITIGATION MEASURES RENDERS THE INFILL EXEMPTION INAPPLICABLE

A Project may not rely on mitigation measures to qualify for a CEQA categorical exemption.¹⁵⁷ Mitigation measures are conditions on the construction and operation of a project designed to reduce environmental impacts existing at the project site at the time of an application's submission.¹⁵⁸ If a project has the potential to have a significant effect on the environment, the lead agency must prepare an EIR which incorporates feasible mitigation measures to reduce impacts to less than significant levels.¹⁵⁹ It is the possibility of a significant effect, not a determination of the actual effect, which would be the subject of a negative declaration or an EIR.¹⁶⁰

As discussed above, the Updated Phase I ESA relied upon by the City acknowledges the VOC-impacted soil, soil vapor, and/or groundwater that may be encountered during future construction. As a part of the Updated Phase I ESA, the Applicant's environmental analysis provided numerous mitigation measures to prevent and/or respond to environmental issues during construction that may cause harm to construction workers and the public.

The ESA recommends: "selected waterproofing product be a dual-purpose product that is also protective against chemical vapor intrusion"¹⁶¹; general risk management protocols; a health and safety plan; screening of excavated soil; site control in contaminated areas; utility trenches; excavation dewatering; management of unanticipated contamination of hazardous debris; and soil disposal procedures. In addition, SWAPE explains that the presence of PCE and vinyl chloride in the Project site's subsurface "warrants notification of the County of Santa Clara Department of Environmental Health (DEH) Site Cleanup Program... because rather than just mitigate one of three buildings with a barrier, as prosed to Google by their consultant, the Project site might warrant further investigation, under DEH oversight, mitigation of the other buildings, and perhaps cleanup."¹⁶²

¹⁵⁷ *Salmon Protection and Watershed Network v. County of Marin*, 125 Cal.App.4th (2004) 1098, 1107.

¹⁵⁸ See CEQA Guidelines § 15125(a).

¹⁵⁹ *Salmon Protection and Watershed Network v. County of Marin*, 125 Cal.App.4th (2004) 1098, 1107.

¹⁶⁰ *Azusa Land Reclamation Co. v. Main San Gabriel Basin Watermaster* (1997) 52 Cal. App. 4th 1165, 1199–1200.

¹⁶¹ Updated Phase I ESA, May 31, 2019, at 9.

¹⁶² Exhibit A at 2.

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SWAPE also recommends a “Phase II soil investigation which specifically identifies the location and concentration of contaminants that are likely to be disturbed during Project construction.”¹⁶³

These recommendations are clearly mitigation measures mitigation stemming from the potential for a significant environmental effect and which require mitigation to sufficiently protect construction workers, and other persons travelling to and from the Project site, from environmental impacts.

Additionally, as discussed above, the Applicant’s agreement to install “cool pavement material” to the Project’s parking lot is intended to reduce the heat island effect caused by the Project’s failure to provide adequate tree shading. This is mitigation designed to reduce a potentially significant environmental impact to less than significant levels.

The City’s reliance on mitigation measures to reduce the Project’s significant environmental effects renders the infill exemption inapplicable. Moreover, the validity and efficacy of these measures are required to be the subjects of CEQA review. An EIR must be prepared in order to fully disclose and analyze the Project’s potentially significant impacts that require mitigation, to evaluate the efficacy of any proposed mitigation, and to impose binding mitigation measures to reduce those impacts to less than significant levels.

VII. THE CITY FAILED TO ANALYZE THE PROJECT’S ENERGY IMPACTS

Appendix F of the CEQA Guidelines requires lead agencies to analyze a project’s energy impacts and to discuss mitigation measures for significant environmental impacts, including “measures to reduce the wasteful, inefficient, and unnecessary consumption of energy.”¹⁶⁴ If a project’s energy impacts are potentially significant, CEQA requires the adoption of energy conservation measures, including applicable measures set forth in Appendix F:

¹⁶³ Exhibit A at 2.

¹⁶⁴ *Ukiah Citizens for Safety First v. City of Ukiah* (2016) 248 Cal.App.4th 256, 262, citing *Tracy First v. City of Tracy* (2009) 177 Cal.App.4th 912, 930; PRC § 21100(b)(3).
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- (1) Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal [including] . . . why certain measures were incorporated in the project and why other measures were dismissed.
- (2) The potential of siting, orientation, and design to minimize energy consumption, including transportation energy, increase water conservation and reduce solid-waste.
- (3) The potential for reducing peak energy demand.
- (4) Alternate fuels (particularly renewable ones) or energy systems.
- (5) Energy conservation which could result from recycling efforts.¹⁶⁵

The purpose of the Project is to construct a power plant to generate heating and cooling services for other buildings in Moffett Park. The Project will require the use of electrical and/or natural gas energy to produce and circulate the hot and cold water required for these operations. The City's Categorical Exemption Analysis fails to describe the Project's energy use at all, and the Applicant's supporting studies fail to discuss the Project's potential increase in electrical and natural gas usage over baseline levels, whether the Project would result in wasteful, inefficient, or unnecessary energy consumption, or whether the use of alternate fuels would be feasible.¹⁶⁶ This violates CEQA's requirement that the lead agency quantify and disclose the extent of a project's energy impacts.¹⁶⁷

For example, Dr. Fox explains that a substantial amount of energy is likely to be required to operate the Project's cooling towers.¹⁶⁸ However, the City's environmental studies fail to disclose the type of cooling towers that will be used for the Project. As Dr. Fox explains, there may be a substantial variation in the amount of energy required to operate the cooling towers depending on the type of tower the Applicant constructs:

¹⁶⁵ CEQA Guidelines, Appendix F; 14 Cal. Code Regs., § 15126.4(a)(1)(C).

¹⁶⁶ The Project includes some solar panels that will be attached to a canopy structure over the ancillary building. Staff Report, p. 3. However, neither the Staff Report nor the Project's supporting studies disclose the total amount of energy that will be used for Project operations, the extent to which the solar panels will reduce that energy consumption, or whether additional alternative or renewable energy sources were analyzed.

¹⁶⁷ *California Clean Energy Committee v. City of Woodland* (2014) 225 Cal.App.4th 173, 210-211.

¹⁶⁸ Exhibit B at 28.

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Energy is required to evaporate the water in a cooling tower. An adiabatic cooling system uses ambient air for cooling. These towers operate well only when ambient temperatures are cold. *They use much more energy than conventional towers during hot seasons.* Spray cooling, as in a conventional tower, only kicks in when the ambient air temperature is too high to use cooled air.¹⁶⁹

Without this basic information about Project features, it is impossible to determine the amount of energy that will be required to support the Project, or whether the Project's energy consumption would be wasteful or require mitigation. An EIR must be prepared to fully disclose and analyze the Project's energy impacts.

VIII. THE CITY MUST PREPARE AN EIR TO ANALYZE THE POTENTIAL ENVIRONMENTAL IMPACTS THAT WERE NOT ANALYZED IN THE MOFFET PARK SPECIFIC PLAN EIR

Although the City is not relying upon the environmental analysis in the Moffett Park Specific Plant EIR to justify its approval of the Project, the City would nonetheless not be able to rely upon this analysis due to the unique nature of the Project and the lack of analysis of the Project's specific environmental impacts in the previous EIR. Where a program EIR has been prepared that can apply to a later project, CEQA requires the lead agency to conduct a two-step process to examine the later project to determine whether additional environmental review is required.¹⁷⁰ First, the agency must consider whether the project will result in environmental effects that were not examined in the program EIR.¹⁷¹ If the agency finds the activity would have environmental effects that were not examined in the program EIR, it must then prepare an initial study to determine whether to prepare an EIR or negative declaration to address those effects.¹⁷²

Second, if the agency determines the project is covered by the program EIR, it must then consider whether any new or more significant environmental effects could occur due to changes in circumstances or project scope, or new information

¹⁶⁹ Exhibit B at 28 (emphasis added).

¹⁷⁰ See CEQA Guidelines, 15168, subd. (c); S. Kostka & M. Zischke, Practice Under the California Environmental Quality Act 2d, § 10.16 (Mar. 2018).

¹⁷¹ CEQA Guidelines, § 15168, subd. (c)(1).

¹⁷² CEQA Guidelines, § 15168, subd. (c)(1).

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that could not have been considered in the program EIR.¹⁷³ More specifically, pursuant CEQA Guidelines section 15162, subsequent or supplemental environmental review is required when one or more of the following events occur:

- (1) Substantial changes are proposed in the project which will require major revisions of the previous EIR due to the involvement of new significant effects or a substantial increase in the severity of previously identified effects;
- (2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
- (3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:
 - (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
 - (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
 - (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
 - (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the

¹⁷³ CEQA Guidelines, § 15168, subd. (c)(2).
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mitigation measure or alternative.¹⁷⁴

The terms “supplement” and “subsequent” EIR are not interchangeable and this distinction implicates the public review process. “A supplement to an EIR is a document that contains additions or changes needed to make the previous EIR adequate ... In contrast ... a subsequent EIR revises the previous EIR, rather than simply supplements it.”¹⁷⁵ With subsequent review the “revised EIR must receive the same circulation and review as the original EIR.”¹⁷⁶ Here, the Project satisfies all three criteria in CEQA Guidelines § 15162(a) and the City must prepare and circulate a *subsequent* EIR for public notice and comment. By failing to do so, the County has failed to comply with CEQA.

First, the Project falls within CEQA guidelines section 15162(a)(1) and (2). It is the first of its kind in the Moffett Park Specific Plan area and is fundamentally different than the utility projects contemplated by the prior EIR.¹⁷⁷ Therefore, the environmental impact analysis completed by the City in any prior CEQA document prepared for the area is insufficient, as a substantial change would need to be made to the character of utility projects previously contemplated in the Moffett Park Specific Plan. In particular, we have provided substantial evidence that the Project has the potential for significant air quality and noise impacts related to the construction and operation of the Project, and for potentially significant hazardous materials impacts from disturbing contaminated soil beneath the Project site. These impacts would be unique within the Specific Plan because they are caused by the specific features of the Project.¹⁷⁸ Without completing additional environmental analysis, the Project cannot satisfy the requirements for disclosure and analysis under CEQA and must complete a subsequent EIR.

Next, the Project will have multiple significant effects not discussed in the Moffett Park Specific Plan EIR.¹⁷⁹ Aside from the new environmental effects due to

¹⁷⁴ CEQA Guidelines, § 15162, subd. (a)(1)-(3); see also Pub. Resources Code, § 21166.

¹⁷⁵ S. Koskte & M. Zischke, Practice Under the Environmental Quality Act 2d., § 19.4, p. 19-8 (Mar. 2018).

¹⁷⁶ S. Koskte & M. Zischke, Practice Under the Environmental Quality Act 2d., § 19.4, p. 19-8, (Mar. 2018), emphasis added; see also CEQA Guidelines, §§ 15162, 15163.

¹⁷⁷ 1390 Borregas Mechanical Facility: Schematic Design, May 10, 2019, at 2.1.0-1.

¹⁷⁸ See generally Exhibit B; Exhibit C at 2–3; see also Moffett Park Specific Plan EIR, 2003, 3.13-1–3.13-5 (covering the City’s “water distribution system” and “water demand management”).

¹⁷⁹ See CEQA Guidelines § 15162(a)(3)(A).

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the different character of a utility project we've described above, the Moffett Park Specific Plan does not account for the type of battery storage environmental effects that Dr. Fox outlines in her comments.¹⁸⁰ As Dr. Fox explains, the Project's battery storage could result in a number of significant impacts including fire, explosion, and the release of toxic chemicals, depending on the type of battery used.¹⁸¹ This is new information that was not analyzed in the Moffett Park Specific Plan EIR. Nevertheless, the City's files are silent on the type and function of the batteries and impacts that could result from them. Without information pertaining to the type of batteries used by the Project and an analysis of their impacts, the Project cannot satisfy CEQA. Because of these new issues, the Project also falls within section 15162(a)(3)(A).

Thus, the City cannot argue that the Project's environmental impacts have been covered by the Moffett Park Specific Plan EIR, and a subsequent EIR must be prepared.

IX. CONCLUSION

The Project does not qualify for a CEQA exemption: its Project Description incorrectly shrinks its scope and impermissibly piecemeals the reasonably foreseeable related construction; it is inconsistent with the Moffett Park Specific Plan and the Sunnyvale General Plan and Zoning Code; and has the potential to result in significant environmental impacts that the City has failed to disclose and mitigate, in violation of CEQA.

For the foregoing reasons, we respectfully request that the City of Sunnyvale Zoning Administrator deny the Special Development Permit and design approval for the Google Mechanical Facility, and remand the Project to Staff prepare an EIR which analyzes the entire Project, including all physical structures that will connect to the Project buildings, and all other reasonably foreseeable future development in the Project vicinity. The City must also ensure that the Project is consistent with all other applicable laws, regulations and policies.

¹⁸⁰ Exhibit B at 30–32.

¹⁸¹ Fox Comments, p. 30.
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Thank you for your consideration of these comments. Please place them in the record of proceedings for the Project.

Sincerely,

A handwritten signature in blue ink, appearing to read 'AM', with a long horizontal line extending to the left.

Aaron M. Messing
Associate

AMM:acp

4656-001acp

EXHIBIT A



Technical Consultation, Data Analysis and
Litigation Support for the Environment

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September 23, 2019

Aaron Messing
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080

Subject: Comments on the Proposed Google Mechanical Facility, Sunnyvale, California

Dear Mr. Messing:

I have reviewed project description documents submitted to the City of Sunnyvale Planning Department for a proposed mechanical facility at 1390 Borregas Avenue ("Project"). The Project would provide electric thermal energy to future development on Google properties in Moffett Park in Sunnyvale. The Project includes three one-story buildings: (1) a 11,226 sf cooling building; (2) a 9,107 sf heating building and; (3) a 1,730 sf ancillary building.

No documentation was prepared under the California Environmental Quality Act (CEQA) for the Project. Google is seeking a CEQA exemption from Sunnyvale.

This Project should not be CEQA exempt because there is a reasonable possibility that the project will have a significant effect on the environment due to unusual circumstances. The unusual circumstances stem from contamination of the subsurface at the Project site, the failure to disclose the contamination in the face of potential health risks, and failure to obtain routine regulatory oversight when such conditions are known to exist to ensure investigation of the site and proposed mitigation is adequate.

A 2019 Phase I Environmental Site Assessment Update (Phase I) prepared for the Project site¹ identifies soil vapor concentrations above RWQCB Environmental Screening Levels for PCE and vinyl chloride, both known carcinogens according to the US EPA². The Phase I states that one of the three buildings will be potentially impacted by vapor intrusion (the heating building). The Phase I proposes a membrane-like sealant to address the potential soil vapor intrusion identified in the Phase I. However, the City has not prepared an environmental impact report (EIR) to analyze the efficacy of the membrane mitigation proposed in the Phase I, or to require it as binding mitigation for the Project. The Phase I concludes that

¹Phase I Environmental Site Assessment Update, 1390-1398 Borregas Avenue, Sunnyvale, California, May 31, 2019

² ATSDR ToxFAQS, PCE <https://www.atsdr.cdc.gov/toxfags/tf.asp?id=264&tid=48> and ATSDR ToxFAQs, vinyl chloride <https://www.atsdr.cdc.gov/toxfags/tf.asp?id=281&tid=51>

the other two buildings will not be constructed at grade and so they will not be subject to vapor intrusion concerns.

The presence of PCE and vinyl chloride in the subsurface pose potential inhalation health risks to construction workers, because these contaminants are likely to be disturbed during Project construction. PCE and vinyl chloride will also present inhalation risks to future plant workers if the proposed membrane mitigation is inadequate.

The documentation of the contamination is disclosed only in the Phase I, which was prepared for and under the direction of Google, and has not been verified by the City or circulated for public comment as part of the CEQA process. The proposed mitigation for soil contamination is only recommended in the Phase I, and is not included in any binding mitigation and monitoring plan for the Project.

The Phase I recommendation needs regulatory review and must be circulated for public comment to evaluate its adequacy. The presence of PCE and vinyl chloride above RWQCB Environmental Screening Levels, as identified in the Phase I ESA, warrants preparation of a Phase II soil investigation which specifically identifies the location and concentration of contaminants that are likely to be disturbed during Project construction. Project construction activities, such as soil excavation and grading, may exacerbate these existing conditions and may result in the release of contaminants. An EIR should be prepared to fully disclose these risks, and to proposed binding mitigation measures that will ensure that residual contamination is adequately mitigate.

The presence of PCE and vinyl chloride above RWQCB Environmental Screening Levels also warrants notification and oversight by the County of Santa Clara Department of Environmental Health (DEH) Site Cleanup Program. DEH oversight activities include reviews of Phase I investigations, site assessment and remediation work plans, and monitoring and sampling operations; evaluations of potential risk; establishment of site cleanup criteria; and oversight of remediation and mitigation measures³, making them the ideal agency to ensure the Project is health-protective for construction workers and future plant workers, including those who will occupy the cooling building and the ancillary building. Agency review is critical because the Phase I lacks adequate evidence or a quantitative assessment of existing soil conditions to enable the City to conclude that existing soil contamination will be effectively mitigated. Rather than just mitigate one of the Project's three buildings with a vapor barrier, as proded to Google by their consultant, the Project site might warrant further investigation, under DEH oversight, additional mitigation for the other buildings, and perhaps regulatory cleanup.

The DEH should be engaged under a voluntary cleanup agreement, a common practice, and to follow their directed course of action. The results of the DEH-directed investigation should be included in CEQA documentation to provide for public disclosure and to ensure health-protective mitigation.

³ <https://www.sccgov.org/sites/hazmat/programs/smp/Pages/home.aspx>

Sincerely,

A handwritten signature in blue ink, appearing to read "M Hagemann", with a long horizontal flourish extending to the right.

Matt Hagemann, P.G., C.Hg.

Tel: (949) 887-9013
Email: mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

**Geologic and Hydrogeologic Characterization
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
Industrial Stormwater Compliance
CEQA Review**

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.

B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist

California Certified Hydrogeologist

Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, *Oxygenates in Water: Critical Information and Research Needs*.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.

- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Colorado.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal representatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F.** 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukunaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

EXHIBIT B

Comments
on the
Google
Central Utility Plant
1390 Borregas Avenue
Sunnyvale, CA
CEQA Exemption
14 CCR § 15332

September 24, 2019

Phyllis Fox, PhD, PE
745 White Pine Avenue
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1. INTRODUCTION

The Project will be located at 1390 to 1398 Borregas Avenue in Sunnyvale, California. The Project is a Central Utility Plant (CUP) that will provide all-electric heating and cooling by sending hot and cold water via underground pipes¹ through the public right-of-way² to approximately 3.7 million square feet of future phased development on Google properties in Moffett Park,³ characterized as “nearby office space.”⁴ The nearby buildings that will be constructed in the future are shown in Figure 1 and listed on Sunnyvale’s July 2019 Development Update⁵ and website.⁶

The Operational Waste Management Strategy indicates that the Project will serve the first five buildings to come online before the Moffett Park Specific Plan (MPSP) is released. Following the release of the MPSP, a further five buildings will be supported by this CUP development.”⁷ Some of the buildings shown in Figure 1 will be serviced by a different CUP on adjacent properties that will be built in the future.⁸ The projects designated as 100 and 200 Caribbean Way, for example, will be served by a dedicated 70,200 ft² CUP.⁹

¹ Environmental Information Form, 10b, #9.

² Report to the Zoning Administrator, Proposed Use.

³ Geotechnical Report, p. 1: “Based on our discussions with the project team and review of the information provided, we understand the proposed 1390 Borregas Mechanical Facility (Project) will serve the surrounding areas, including **future** office buildings.” (**emphasis added**); Biological Resources Report, p. 1; Use Permit/Special Development Permit Justifications (“The all-electric mechanical facility replaces individual thermal equipment located at each **future building**...”). **Emphasis added**. See also Report to the Zoning Administrator, Description of Proposed Project (“The applicant, Google, proposes to demolish the existing 26,680 square foot industrial building and redevelop the site into a mechanical facility that will provide heating and cooling to other nearby Google buildings.”)

⁴ Environmental Information Form, #7 and Biological Resources Report, p. 1.

⁵ Sunnyvale, Development Update, July 2019; available at <https://sunnyvale.ca.gov/civicax/filebank/blobdload.aspx?blobid=23793>.

⁶ Sunnyvale, Google Caribbean; available at <https://sunnyvale.ca.gov/business/projects/googlecaribbean.htm>.

⁷ Google Central Utilities Plant, Operational Waste Management Strategy, ARUP, 50% Detailed Design, May 1, 2019 (Operational Waste Management Strategy), p. 2.

⁸ See, for example, Vesting Tentative Map, June 18, 2019, Caribbean Campus, 100/200 West Caribbean Drive, pdf 4. A CUP is adjacent to the Parking Structure in the upper left-hand corner of this drawing, suggesting the grey buildings in Figure 1 may be wholly or partially supplied by an on-site CUP.

⁹ Letter from Peter McDonnell, Vice President, Sares Regis @ Google, to Ryan Kuchenig, City of Sunnyvale, Department of Community Development, Re: Planning Project #2107-8042 – Revised Project Description, September 12, 2018.

Figure 1: Future Buildings That Will Be Serviced by the Project¹⁰



The Project encompasses two buildings – a heating building (housing electric/switchgear elements and heat pumps) and a cooling building (housing chillers, cooling towers, and a diesel generator)¹¹ – located on a 82,285 ft² lot for housing the equipment, four thermal water storage tanks (one hot water tank and three cold water tanks),¹² and one ancillary building housing a control room and multipurpose space.¹³

The Project will consist of 22,127 ft² of enclosed area, the majority of which will house equipment and 1,350 ft² of occupiable space, including a control room and office space with two bathrooms.¹⁴ The building areas include an 11,284 ft² cooling building, a 9,107 ft² heating building, and 1,736 ft² ancillary building.¹⁵ The facility dimensions are in the Planning Division Application and the FAA Exhibit.¹⁶

The east side of the Heating Building will be a photovoltaic TAIC system with opaque colored glass.¹⁷ The facility will be operated remotely. The Project also will

¹⁰ Google Central Utilities Plant, Operational Waste Management Strategy, ARUP, 50% Detailed Design, May 1, 2019 (Operational Waste Management Strategy), Figure 1, p. 2.

¹¹ Geotechnical Report, Section 1.3, p. 2.

¹² Geotechnical Report, Sec. 1.4, p. 2.

¹³ Letter from Joe Van Belleghem, Senior Director of Development, Real Estate District Development, Google LLC, to City of Sunnyvale, Community Development Department, Re: Proposed 1390 Borregas Ave Mechanical Facility, May 7, 2019; Environmental Information Form, Item 14.

¹⁴ ARUP, 1390 Borregas Mechanical Facility – Transportation Memo; Traffic Memo, p. 2; Operational Waste Management Strategy, p. 3.

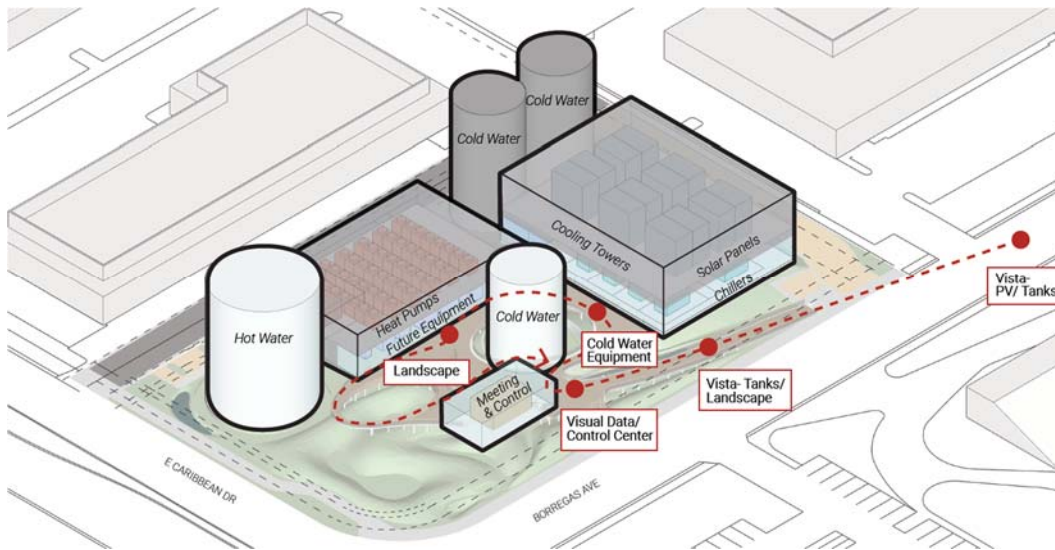
¹⁵ Planning Division Application, Code Summary, pdf 1.

¹⁶ Kier & Wright, FAA Exhibit, Proposed Borregas Mechanical Facility, March 18, 2019.

¹⁷ Planning Division Application, East Elevation, pdf 5.

include a publicly accessible walkway from which visitors can observe the equipment from the exterior of the building.¹⁸ There will be no full-time employees. On-site maintenance will occur once a month.¹⁹ The facility layout is shown in Figure 2. Google has applied for a categorical exemption from CEQA under 14 CCR § 15332.

Figure 2: Facility Layout²⁰



The Project will include the following equipment and facilities:

¹⁸ Planning Division Application and Biological Resources Report, p. 1.

¹⁹ Traffic Memo, p. 2.

²⁰ Report to Zoning Administrator, Attachment 7, Design Intent, Narrative Presentation, July 1, 2019, pdf 9.

Table 1: Project Facilities²¹

Chillers	9,000 SF
Boiler	6,000 SF
Cooling Towers	8,000 SF
Generators	2,400 SF
Battery Storage	6,000 SF
Switchgear	3,600 SF
Offices / Control Room (with 2 bathrooms)	900 SF
Water Treatment	12,600 SF
Substation	12,600 SF
 Total (inc. circulation etc.)	 61,100 SF

I reviewed the files provided by the City of Sunnyvale in response to data requests²² and released by the City in support of the September 25, 2019 hearing.²³ In my opinion, the information in the City's files is not adequate to make the determinations required under 14 CCR § 15332 because key information required to evaluate impacts is missing from the record. Further, in my opinion, the proposed facility has the potential to result in significant air quality impacts. The daily NO_x emissions from the diesel generator, for example, are significant, requiring the installation of pollution controls. Further, particulate PM₁₀ and PM_{2.5} emissions from construction are controlled using a standard suite of mitigation measures.

My resume is included in Exhibit 1 to these Comments. I have over 40 years of experience in the field of environmental engineering, including air emissions and air pollution control; greenhouse gas (GHG) emission inventory and control; water quality and water supply investigations; hazardous waste investigations; hazard investigations; risk of upset modeling; environmental permitting; nuisance investigations (odor, noise); environmental impact reports (EIRs), including CEQA/NEPA documentation; risk assessments; and litigation support. I have MS and PhD degrees in environmental engineering from the University of California at Berkeley. I am a licensed professional engineer in California.

²¹ Operational Waste Management Strategy, p. 2.

²² City of Sunnyvale, Response to Public Records Act Request from Adams Broadwell Joseph & Cardozo, July 8, 2019 and Sept. 6, 2019.

²³ City of Sunnyvale, Agenda for September 25, 2019 Legislative Public Meeting, File # 19-0988, Report to the Zoning Administrator, Attachments 1-7; available at <https://sunnyvaleca.legistar.com/LegislationDetail.aspx?ID=4144523&GUID=990035CC-3612-4BE4-AF9A-ED85AA9E7530&Options=&Search=>.

I have prepared comments, responses to comments, and sections of EIRs for both proponents and opponents of projects on air quality, water supply, water quality, hazardous waste, public health, risk assessment, worker health and safety, odor, risk of upset, noise, land use, and other areas for well over 500 CEQA documents. This work includes EIRs, Initial Studies, Negative Declarations (NDs), and Mitigated Negative Declarations (MNDs). My work has been cited in two published CEQA opinions: (1) *Berkeley Keep Jets Over the Bay Committee, City of San Leandro, and City of Alameda et al. v. Board of Port Commissioners* (2001) 111 Cal. Rptr. 2d 598 and *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal. 4th 310 and has supported the record in many other CEQA cases.

2. THE PROJECT DESCRIPTION IS INCOMPLETE

A complete and accurate project description is essential to estimate the environmental impacts of a Project. Emissions, required to estimate air quality and public health impacts, for example, depend upon equipment specifications. There are no specifications for any of the equipment in the Project, preventing an accurate estimate of emissions.

The Project description evaluated in these comments was pieced together from brief descriptions in information in the City's files, cited in these comments. The information produced by the City in response to our PRAs is not adequate for anyone to evaluate the environmental impacts of this Project. Key information required to estimate air quality, public health, noise and other environmental impacts of the Project is missing from the record, including:

- A project description that explains how the individual components interact to provide heating and cooling to adjacent buildings and the function of each component;
- Detailed construction schedule that identifies all equipment, their horsepower, hours of use, and engine tier;
- Cooling tower design, cycles of concentration, circulating water treatment method(s) and flowrate, circulating water quality, amount and quality of cooling tower blowdown, and blowdown disposal/treatment method(s);
- Diesel generator specification sheet and proposed emission controls, if any (e.g., DPF or SCR);
- Peak and total annual electricity demand in MWh/yr;
- Design of and MW output of solar panels;

- Details of piping and any other utilities (location, length, depth, roadway crossings, etc.) connecting the Project to future adjacent buildings;
- Battery composition (e.g., lithium-ion) and vendor specification sheet;
- Battery facility layout;
- Total water demand and water quality for cooling towers, irrigation, potable, and any other unidentified uses;
- Water treatment methods and residuals disposal;
- Wastewater disposal method(s) and location;
- Noise calculations supporting conclusion that “noise levels at the site boundaries are expected to be significantly quieter than required by code”;²⁴
- Manufacturer-provided equipment sound power levels;²⁵
- Manufacturer-provided electricity demand for all equipment;
- A P&ID diagram that identifies all connectors, valves, pumps, and other equipment that may leak vapors into the atmosphere.

Thus, the files before the City of Sunnyvale cannot support the necessary findings of no significant air quality and other impacts.

3. AIR QUALITY IMPACTS

The Air Quality Analysis (AQA)²⁶ calculated criteria pollutant emissions from the Project within the Bay Area Air Quality Management District (BAAQMD), as summarized in Table 2.²⁷ This table suggests that construction emissions are very small and operational emissions are negative for most pollutants. This is simply not believable or supported in the record for a project of this magnitude. As discussed below, many components of Project construction and operation, such as underground pipelines connecting the Project to adjacent buildings, soil modifications to address geotechnical concerns, and emissions from Project operation, are omitted. Thus, I reviewed the emissions calculations to verify that they are consistent with the Project described in the City’s files. They are not.

²⁴ Noise Code Evaluation Update, May 3, 2019, pdf 6.

²⁵ Noise Code Evaluation Update, May 3, 2019, pdf 6.

²⁶ Letter Report from James A. Reyff, Illingworth & Rodkin, Inc. to Andy Springer, Google, Inc. Re: 1390 Borregas District CUP Development in Sunnyvale, CA – Air Quality Analysis, May 29, 2019 (Air Quality Analysis).

²⁷ Air Quality Analysis, Table 2.

Table 2: Annual and Average Construction and Operational Emissions²⁸

Scenario	ROG	NOx	PM ₁₀	PM _{2.5}	CO ₂ e
2019-20 Project Construction (tons)	0.38 tons	1.95 tons	0.11 tons	0.10 tons	236MT
2019-20 Project Construction (lbs./day) ¹	9.1 lbs.	15.9 lbs.	0.9 lbs.	0.8 lbs.	--
BAAQMD Thresholds (pounds/day)	54 lbs.	54 lbs.	82 lbs. ²	54 lbs. ²	NA
2021 Project Operational Emissions (tons/year)	0.16 tons	0.24 tons	0.02 tons	0.01 tons	108 MT
Existing Operational Emissions (tons/year)	0.16 tons	0.20 tons	0.16 tons	0.05 tons	223 MT
Net Project Operational Emissions (tons/year)	0.00 tons	0.04 tons	-0.14 tons	-0.04 tons	-115 MT
BAAQMD Thresholds (tons /year)	10 tons	10 tons	15 tons	10 tons	660 MT ⁴
Exceed Threshold?	No	No	No	No	No
Net Project Operational Emissions (lbs/day) ³	0 lbs.	<1 lbs.	<1 lbs.	<1 lbs.	--
BAAQMD Thresholds (pounds/day)	54 lbs.	54 lbs.	82 lbs.	54 lbs.	NA
Exceed Threshold?	No	No	No	No	No
Stationary Sources (emergency generator engine) of GHG Emissions (metric tons)	--	--	--	--	24 MT
BAAQMD Thresholds (metric tons /year)	NA	NA	NA	NA	6,600 MT ⁴
Exceed Threshold?					No

¹ Assumes 246 construction workdays
² Applies to only exhaust portion.
³ Assumes 365-day operation.
⁴ BAAQMD 2020 threshold adjusted for 2030 (40% lower)

The Air Quality Analysis used the California Emissions Estimator Model (CalEEMod), Version 2016.3.2, to estimate emissions from construction and operation of the Project “assuming full build-out of the project.”²⁹ This analysis significantly underestimates construction and operational emissions for the reasons discussed below. The Project may have significant construction and operational air quality impacts when these errors and omissions are corrected.

3.1. Air Quality Impacts of Filterable PM_{2.5} and PM₁₀ Were Not Evaluated

The Air Quality Analysis used the BAAQMD’s CEQA significance thresholds to evaluate the air quality impacts of Project construction and operation.³⁰ Particulate matter, PM_{2.5} and PM₁₀, is emitted in two forms: as a gas and as a solid. The BAAQMD significance thresholds for PM_{2.5} and PM₁₀ only apply to the gaseous or exhaust portion of particulate matter emissions.³¹

The major source of construction PM_{2.5} and PM₁₀ is particulate matter from fugitive dust generated during demolition, grading and other construction activities.

²⁸ Air Quality Analysis, Table 2.

²⁹ Air Quality Analysis, p. 5.

³⁰ Air Quality Analysis, pp. 3-4.

³¹ Air Quality Analysis, Table 1 and BAAQMD, California Environmental Quality Act Air Quality Guidelines, Table 2-1 and Appendix D, Section 4, May 2017; available at http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

The major source of operational PM_{2.5} and PM₁₀ emissions is the cooling tower. Cooling towers also emit PM_{2.5} and PM₁₀ in the particulate form. Thus, the Air Quality Analysis fails to analyze all Project air quality impacts.

The BAAQMD CEQA significance thresholds for construction PM_{2.5} and PM₁₀ relied on in the Air Quality Analysis assume that the solid fraction is not significant if construction “Best Management Practices” (BMPs) are implemented.³² The BAAQMD’s recommended BMPs for construction, for example, are “basic construction mitigation.”³³ BAAQMD considers fugitive dust emissions to be significant without these mitigation measures. The air quality analysis’s reliance on these significance thresholds thus has tacitly assumed, without disclosing this fact, that the solid fraction of PM_{2.5} and PM₁₀ is not significant if construction BMPs are implemented. The Report to the Zoning Administrator, Attachment 4, admits to relying on these “best management practices to address air quality during the course of construction, such as dust control measures.” Similarly, Attachment 5 specifically requires BAAQMD’s “Basic Construction Mitigation Measures Recommended for All Proposed Projects.”³⁴ The Air Quality Analysis fails to disclose that this assumes that mitigation measures are implemented.³⁵ A project that requires mitigation does not qualify for a Class 32 Categorical Exemption.³⁶

The BAAQMD’s CEQA guidelines are silent on how to evaluate the significance of the particulate fraction of PM_{2.5} and PM₁₀ during Project operation. The BAAQMD’s operational screening criteria³⁷ are not relevant because they do not include a use similar to the Project. The air quality impacts of the solid fraction of PM_{2.5} and PM₁₀ must be separately evaluated to demonstrate that they have no significant air quality impacts. This is typically done by estimating the emissions and using an air dispersion model to estimate ambient concentrations. The ambient concentrations are

³² Ibid.

³³ BAAQMD, May 2017, Section 8-2: “Basic Construction Mitigation Measures Recommended for All Proposed Projects.”

³⁴ Report to Zoning Administrator, Attachment 5, Section DC-4.

³⁵ Air Quality Analysis, Table 2.

³⁶

https://webcache.googleusercontent.com/search?q=cache:gdfA0nq37wEJ:https://planning.lacity.org/Forms_Procedures/7828.pdf+&cd=3&hl=en&ct=clnk&gl=us.

³⁷ BAAQMD, May 2017, Table 3-1.

compared to federal and state ambient air quality standards.³⁸ A violation of an air quality standard or the contribution to an existing violation is considered to be significant.

The City's files do not contain any analysis of the air quality impacts of the particulate fraction of PM2.5 or PM10. Further, as discussed below, the City's files do not estimate most of the particulate fraction of PM2.5 and PM10 emissions from Project construction and operation.

3.2. Construction Emissions Are Underestimated and Significant

Construction emissions were estimated with the CalEEMod model using "default assumptions for a project of this type and size."³⁹ However, there are no similar facilities included in the CalEEMod database, so default assumptions are not a reasonable basis for estimating construction emissions. Default assumptions underestimate emissions for many reasons, discussed below. They, for example, do not consider adverse geological conditions that must be corrected before building construction can start or the complex network of underground piping required to connect the CUP to adjacent buildings that are not part of the Project. Further, construction emissions cannot be accurately estimated with the available information in the City's files.

Standard practice when using CalEEMod is to provide supporting construction plans, including a detailed construction schedule that identifies all equipment that will be required to build the Project, including phasing descriptions, detailed construction equipment activity use (e.g., horsepower and hours of use for each piece of equipment), and employee, delivery, water truck, and other truck use data, including distance traveled.⁴⁰ The City's file only includes partial CalEEMod output and is mostly based on default assumptions rather than Project-specific assumptions. It is standard practice when reporting CalEEMod results to include both model inputs and outputs. Inputs include, for example, a detailed listing of all construction equipment that would be used, their horsepower, and hours of usage. In sum, the construction emissions are

³⁸ See, for example, Laurelwood Data Center Initial Study and Proposed Mitigation Negative Declaration, August 28, 2019; available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=229584&DocumentContentId=61007> and <http://santaclaraca.gov/home/showdocument?id=64868>.

³⁹ Air Quality Analysis, pdf 5.

⁴⁰ See, e.g., Kings County Planning Commission, Henrietta Solar Project, Table 4, Construction Equipment Assumptions (listing phase, equipment, number, hours per day, horsepower, and load factor) pdf 62-64; <https://www.countyofkings.com/home/showdocument?id=6946>.

unsupported and not specific to this Project. The provided model output cannot be evaluated without this information.

3.2.1. The CalEEMod Model Is Not Valid for the Project

Further, CalEEMod is not a reasonable choice for a project of the type evaluated here.

First, CalEEMod is in many ways a “black box,” where the actual emission calculations and coding are not available to the user or reviewer. The user must reverse engineer the calculations to figure out what was assumed.

Second, CalEEMod does not include the correct emission calculation methodologies for many of the most significant construction activities. For example, CalEEMod lacks the ability to calculate fugitive dust emissions from wind erosion. Thus, the construction emissions reported in the Air Quality Report and summarized in Table 2 are incomplete and underestimated.

Third, CalEEMod uses an inappropriate unpaved road emission factor in calculating fugitive dust emissions from onsite hauling, grading, and other activities. These are the most significant sources of PM10 and PM2.5 emissions during construction activities. CalEEMod uses the AP-42 emission factor for unpaved public roads when calculating construction fugitive dust emissions.⁴¹ As specified in the AP-42 emission factor for unpaved roads, there are two emission calculation equations: one for industrial roads, and another for public roads. The unpaved public road emission factor is limited to vehicles weighing between 1.5 and 3.0 tons.⁴² Haul trucks and other construction equipment weigh far more. The industrial unpaved emission factor in AP-42, which is designed for vehicles weighing from 2 to 290 tons, is the appropriate equation to use in calculating haul truck trips and construction equipment operating in unpaved areas. Using inappropriate unpaved road emission factors results in substantial underpredictions of fugitive PM10 and PM2.5 emissions.

Fourth, CalEEMod does not include any fugitive PM2.5 or PM10 emissions from unpaved on-site haul roads.

Fifth, CalEEMod estimates operational emissions using “default assumptions for a project of this type and size.”⁴³ However, there are no similar facilities included in the

⁴¹ CAPCOA, CalEEMod User’s Guide, Appendix A: Calculation Details for CalEEMod, October 2017, p. 30); available at http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf.

⁴² EPA, AP-42, Section 13.2.2 – Unpaved Roads, November 2006, Table 13.2.2-3; available at <http://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf>.

⁴³ Air Quality Analysis, pdf 5.

CalEEMod database, so default assumptions are not a reasonable basis for estimating operational emissions.

3.2.2. The CalEEMod Analysis Is Inconsistent with the Construction Schedule

The Project will be located on a 1.9-acre parcel currently occupied by an empty 26,880 ft² light-industrial, one-story concrete tilt-up building with associated paved parking areas and utilities.⁴⁴ The Project will demolish this building⁴⁵ and replace it with Project facilities. The construction schedule indicates the following activities:

Table 3: Project Construction Schedule⁴⁶

Activity Name	Duration	Start	Finish
1390 Borregas Mechanical Facility			
Design, Entitlement, Permitting (Calendar Days) - 15 Months	439	03-Nov-18	15-Jan-20
Construction (Calendar Days) - 21 Months	623	16-Jan-20	29-Sep-21
Testing & Commissioning (Calendar Days) - 6 Months	183	30-Sep-21	31-Mar-22
Project Schedule			
Design, Entitlement, Permitting - Summary	298	05-Nov-18	15-Jan-20
Early Work & Demolition - Summary	25	16-Jan-20	24-Feb-20
Mobilization, Site Readiness - Summary	110	25-Feb-20	31-Jul-20
Foundations & Superstructure - Summary	120	02-Jul-20	28-Dec-20
Rough-In - Summary	80	09-Dec-20	06-Apr-21
Install Exterior - Summary	173	05-Jan-21	15-Sep-21
Equipment and Piping Installation, Hook-Up and Initial Start-Up - Summary	167	28-Jan-21	29-Sep-21
Testing, Commissioning, Punch and Turnover - Summary	123	30-Sep-21	31-Mar-22
Substantial Completion	0		31-Mar-22*

There are discrepancies between this construction schedule and the assumptions used in the CalEEMod analysis. All of the discrepancies underestimate emissions. They are as follows:

⁴⁴ Geotechnical Report, Item 1.2 and Transportation Memo, p. 1. The 9/25/19 Report to the Zoning Administrator states the existing building is 26,680 ft².

⁴⁵ Environmental Information Form, Item 10b, #8.

⁴⁶ Project Schedule.

Table 4: Comparison of CalEEMod Inputs with Project Schedule

Activity	CalEEMod (days)	Schedule (days)
Demolition	20	25
Site Preparation	2	--- ⁴⁷
Grading	4	110
Building Construction	200	540
Paving	10	--- ⁴⁸
Architectural Coating	10	--- ⁴⁹
Total	246	675

Thus, on its face, the air quality analysis has significantly underestimated construction emissions. The record is so thin that I am unable to correct all of the errors and omissions in the air quality impact analysis. However, some can be located and are discussed below.

3.2.3. Removal of Existing Underground Utilities

The prior site uses likely required underground utilities, including for water supply, sewage, and utilities. These would have to be removed before the new facility is built. The Report to the Zoning Administrator requires: "All existing utility lines (public or private) and/or their appurtenances not serving the project and/or have conflicts with the project, shall be capped, abandoned, removed, relocated and/or disposed of..."⁵⁰ The CalEEMod analysis does not include emissions from removing existing underground utilities, and the files before the City do not include the information required to make these calculations.

3.2.4. Fill Removal and Placement Emissions Were Omitted

The geotechnical report recommends that about 5 feet of existing fill should be removed within the limits of any structural improvements that may be sensitive to settlement and recompacted⁵¹ "[t]o reduce the risk of settlement..."⁵² The CalEEMod analysis did not include these emissions. For example, the CalEEMod analysis assumed

⁴⁷ Included in grading.

⁴⁸ Included in building construction.

⁴⁹ Included in building construction.

⁵⁰ Report to the Zoning Administrator, Attachment 4, Section EP-10. See also EP-14.

⁵¹ Geotechnical Report, pp. 18-19.

⁵² Geotechnical Report, pp. 6-7.

zero emissions of all pollutants from off-site hauling.⁵³ In fact, the CalEEMod analysis assumed zero hauling trips for demolition, site preparation, and grading.⁵⁴ This is clearly wrong. The removal of existing buildings, 5 feet of existing non-engineered fill, the addition of 5 feet of engineered fill, and dealing with shallow groundwater is a significant source of emissions not acknowledged or included in the Air Quality Analysis and construction emission calculations.

The volume of soil that would have to be excavated and replaced is 8,647 yd³.⁵⁵ As an average truck can hold 18 yd³ of soil, 480 one-way, on-site truck trips would be required to remove the soil and 480 trips to replace it with engineered fill.⁵⁶ As grading is estimated to last for 8 days,⁵⁷ 94 truck trips per day would be required to remove soil. Additional on-site truck trips are likely required to move material removed from one on-site area to another. The CalEEMod analysis assumed zero hauling trips,⁵⁸ thus significantly underestimating emissions.

3.2.5. Trenching Emissions to Lay Utilities to Future Adjacent Buildings Were Omitted

The Project will be located on Borregas Avenue at East Caribbean Drive. It will serve the first five buildings to come online before the Moffett Park Specific Plan amendments are released.⁵⁹ Following the release of this plan, a further five buildings will be connected to the Project.⁶⁰ Figure 1. The Report to the Zoning Administrator describes the Project: “The applicant, Google, proposes to demolish the existing 26,680 square foot industrial building and redevelop the site into a mechanical facility that will provide heating and cooling to other nearby Google buildings.” The Air Quality Analysis did not include the emissions from constructing the connecting facilities, including utility trenches and underground piping.

⁵³ Air Quality Analysis, pdf 18, Mitigated Construction Off-Site, Hauling emissions = 0.

⁵⁴ Air Quality Analysis, pdf 15.

⁵⁵ Volume of soil removed and replaced: $2(5 \text{ ft} \times 23,370 \text{ ft}^2)(0.037 \text{ yd}^3/\text{ft}^3) = 8,647 \text{ yd}^3$. See Air Quality Analysis, p. 5.

⁵⁶ Number of truck trips to remove soil during grading = $13,455 \text{ yd}^3 / 16 \text{ yd}^3/\text{truck} = 841 \text{ trips}$.

⁵⁷ Air Quality Analysis, pdf 15.

⁵⁸ Air Quality Analysis, pdf 15, Trips and VMT: “Hauling Trip Number = 0”.

⁵⁹ Operational Waste Management Strategy, p. 2.

⁶⁰ Operational Waste Management Strategy, p. 2.

These emissions could be substantial because “Borregas Avenue is very congested with existing utilities.”⁶¹ The City also notes that “Installation of hot and cold water lines across Borregas and Caspian are likely to be required to be deeper than the deepest existing utilities. Tunneling of these lines, inside of a casing, such that the carrier pipes can be replaced in the future is likely to be required.”⁶² These conditions were not considered in the CalEEMod analysis, which did not include any underground utilities or tunneling.

Further, the City’s files do not include the information required to estimate these emissions; for example, length and depth of underground pipelines and utility corridors, roads and other surface facilities that will require special construction methods (like jack-and-bore) beneath roadways. These emissions cannot be estimated with the information available in the City’s files.

Further, trench(es) will be required to connect the Project to SVCE service in public rights-of-way and utility easements. The CalEEMod analysis does not include emissions from this trenching.

3.2.6. Foundation Design Is Inconsistent with CalEEMod Analysis

The Geotechnical Report indicates that seismically induced settlement is possible at the site and recommends two options for foundations – a shallow foundation system and a deep foundation system such as auger-cast piles.⁶³ These construction methods will require more equipment and release more emissions than assumed in the default assumptions used in the CalEEMod analysis. The CalEEMod analysis, for example, does not include emissions from any augers. These emissions cannot be estimated with the information available in the City’s files.

3.2.7. Building Area Is Underestimated

The CalEEMod analysis assumed a “non-residential indoor” area of 35,055 ft² ⁶⁴ and elsewhere, a “general light industry” floor surface area of 26,880 ft².⁶⁵ The City’s files disclose a total facility area of 61,100 ft², or roughly twice as high as modeled (Table

⁶¹ City of Sunnyvale, Planning PRC Comments, Project 2017-8042, Plan Submittal 4, October 12, 2019, Item 10(b), pdf 5.

⁶² PRC Comments and Applicant Responses, pdf 7, item 18.

⁶³ Geotechnical Report, p. 12.

⁶⁴ Air Quality Analysis, pdf 14.

⁶⁵ Air Quality Analysis, pdf 36.

1). Thus, emissions from constructing the Project's facilities are underestimated by about a factor of two due to just this one factor.

3.2.8. Basis of Construction Equipment Emissions Not Disclosed

The emissions from construction equipment depend on the number of each type of equipment (graders, scrapers, haul trucks, etc.) and the "tier" of the equipment. The construction fleet includes Tier 0 to 4 equipment where the lowest emissions occur from the highest tier. The CalEEMod output in the Air Quality Analysis does not include the tier of the construction equipment assumed in the analysis. This information is virtually always included in CalEEMod files that support construction air quality analyses. There is no way to back-calculate the tier from the partial CalEEMod output files. If the construction emissions assume engine tiers higher than Tier 2 (the default), this constitutes mitigation, which is not allowed under the subject categorical exemption.

3.2.9. Emissions from Off-Road Truck Travel Within the Site Are Omitted

The CalEEMod model does not include fugitive dust from off-road vehicle travel,⁶⁶ which must be separately calculated. This includes fugitive dust from on-site haul trucks. Haul truck activities will generate fugitive PM_{2.5} and PM₁₀ emissions when traveling on unpaved roads and other unpaved areas within the Project site during site preparation and grading. The construction site will include unpaved roads to haul off and replace fill and demolition debris, but the CalEEMod analysis fails to identify them, provide a supported estimate of their length, or calculate emissions from them.

3.2.10. Fugitive Dust Emissions from Wind Erosion Were Omitted and Are Significant

Windblown dust can be a significant source of fugitive PM₁₀ and PM_{2.5} emissions. CalEEMod does not estimate "fugitive dust generated by wind over land and storage piles"⁶⁷ because of the number of input parameters required – such as soil type, moisture content, wind speed, and so forth. The CalEEMod Technical Paper states that this limitation "could result in underestimated fugitive dust emissions if high

⁶⁶ CalEEMod User's Guide, p. 2 ("Fugitive dust [emissions] from ... off-road vehicle travel, are not quantified in CalEEMod...").

⁶⁷ CalEEMod User's Guide, p. 55; available at <http://www.caleemod.com/>.

winds and loose soil are substantial characteristics for a given land use/construction scenario.”⁶⁸

In addition, the CalEEMod User’s Guide reminds the reviewer in two more instances that wind erosion emissions from disturbed soil and storage piles are not calculated by the model: “Fugitive dust from windblown sources such as storage piles is not quantified in CalEEMod, which is consistent with approaches taken in other comprehensive models.”⁶⁹

The CalEEMod analysis in the Air Quality Analysis does not estimate PM_{2.5} and PM₁₀ emissions of windblown dust from the areas that would be graded or otherwise disturbed and thus has underestimated fugitive PM₁₀ and PM_{2.5} emissions. The maximum daily emissions can be very high in the Project area.

Frequent hot, dry, high-wind events in the Bay Area, of up to 40–50 mph, typically occur in spring and fall and are known as Diablo winds. They can cause substantial emissions of fugitive dust particulate matter, particularly from disturbed surfaces. Further, winds blow at night. Thus, unless the construction contractor is required to water throughout the night to maintain soil moisture, wind erosion would occur in the period when the water from the last watering event in the evening has evaporated and before the first watering event in the morning. This is of particular concern during the hot summer months, when temperatures can exceed 100 F. The Air Quality Report does not include any mitigation measures for fugitive dust, even though it relied on significance thresholds that assume mitigation measures.

As high winds can reach 30 to 50 mph, even up to hurricane speeds,⁷⁰ they can raise significant amounts of dust, even when conventional tracking and other such controls are used, often prompting alerts from air pollution control districts. The Air Quality Report did not include any wind data – not even a wind rose, which is commonly found in air quality analyses. If high winds occurred during grading, cut and fill, or soil movement, or from bare graded soil surfaces during non-working hours, even if periodically wetted, significant amounts of fugitive dust would be released. These emissions could result in public health impacts due to violations of state and federal ambient air quality standards for PM₁₀ and PM_{2.5}. PM₁₀ and PM_{2.5} emissions

⁶⁸ CalEEMod, Technical Paper, Methodology Reasoning and Policy Development of the California Emission Estimator Model, July 2011, p. 4.

⁶⁹ CalEEMod, User’s Guide, *op. cit.*, p. 3.

⁷⁰ Daphne Thompson, The Diablo Winds of California; available at <https://blog.wdtinc.com/the-devil-winds-of-california>.

from these events were not included in the emissions in Table 2, and no air dispersion modeling was conducted to evaluate their impact on local ambient air quality.

Wind erosion emissions are typically calculated using methods in AP-42,⁷¹ which require detailed information on site topography, wind profiles, and dispersion modeling. The Air Quality Report does not include any calculations of wind erosion emissions or their resulting ambient air quality impacts. Further, none of the information required to estimate wind erosion emissions is included or cited in the Air Quality Report or elsewhere in the City's files.

However, in another case in which adequate data were available, I used the AP-42 "Industrial Wind Erosion" guidance with a 2-minute wind speed of 30 mph to estimate wind erosion PM10 emissions from a similar construction site (4 acres disturbed compared to 2.5 acres for the Project). This analysis indicated emissions of 60 lb/day of PM10 and 30 lb/day of PM2.5. Adjusting these emissions for acres graded, a rough estimate of wind erosion emissions from grading the Project site would be 38 lb/day of PM10 and 19 lb/day of PM2.5.⁷²

As the BAAQMD does not have significance thresholds for fugitive PM2.5 and PM10, based on the assumption that these emissions will be mitigated with a standard suite of mitigation measures, the significance of these emissions must be determined using air quality dispersion modeling or significance thresholds from other similarly situated air pollution control districts.

The adjacent Sacramento Metropolitan Air Quality Management District (SMAQMD) has a zero-significance threshold for all PM10 and PM2.5 (from both fugitive dust and exhaust).⁷³ Under this standard, both PM10 and PM2.5 emissions from construction of the Project are significant.

Under the SMAQMD guidance, "if all feasible BACT/BMPs are applied" then the PM10 construction significance threshold is 80 lb/day and 14.6 ton/yr and the PM2.5 threshold is 82 lb/day and 15 ton/yr.⁷⁴ As no mitigation is allowed for a Class 32 Categorical Exemption, the standard is zero for fugitive dust. Thus, under the

⁷¹ U.S. EPA, AP-42, Section 13.2.5, Industrial Wind Erosion; available at <https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0205.pdf>.

⁷² Wind erosion fugitive dust particulate matter emissions from the Project site: PM10 = (60 lb/day)(2.5/4) = **38 lb/day**; PM2.5 = (30 lb/day)(2.5/4) = **19 lb/day**.

⁷³ SMAQMD Thresholds of Significance Table; available at <http://www.airquality.org/LandUse/Transportation/Documents/CH2ThresholdsTable5-2015.pdf>.

⁷⁴ *Ibid.*

SMAQMD guidelines, PM_{2.5} and PM₁₀ emissions from Project construction are significant.

3.3. Operational Emissions Are Underestimated and Potentially Significant

Operational emissions also were estimated with the CalEEMod model using “default assumptions for a project of this type and size.”⁷⁵ However, there are no similar facilities included in the CalEEMod database, so default assumptions are not a reasonable basis for estimating operational emissions. Building energy use, for example, uses the California Commercial End Use Survey database to develop intensity values (electricity and natural gas usage per square foot per year) for non-residential buildings.⁷⁶ This database does not include a similar use. Further, the information in the City’s files is inadequate to estimate emissions for the specific uses in this Project.

The supporting files incorrectly assert that “there will be no emissions which impact air quality in normal operation.”⁷⁷ This is incorrect. The cooling towers, diesel supply and storage, wastewater treatment, and diesel generators all emit GHGs and/or criteria pollutants that were either not included or were significantly underestimated in the Air Quality Analysis for the reasons discussed below.

3.3.1. Incorrect Baseline

The operational emissions in Table 2 subtract baseline emissions from existing operations at the site from projected increases in emissions. However, the baseline for this Project is zero because the site was vacant at the time environmental analysis of the Project began.⁷⁸ The BAAQMD’s CEQA guidelines, which the Air Quality Analysis relies on, only allow the subtraction of baseline emissions when the subject use is operational at the time that the Notice of Preparation (NOP) was circulated or in the absence of an NOP, when environmental analysis begins.⁷⁹

⁷⁵ Air Quality Analysis, pdf 5.

⁷⁶ CAPCOA, California Emissions Estimator Model, Appendix A: Calculation Details for CalEEMod, October 2017, Section 7.1, p. 37; available at http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6.

⁷⁷ Environmental Information Form, #42.

⁷⁸ Environmental Information Form, Item 10b, #8.

⁷⁹ Bay Area Air Quality Management District (BAAQMD), California Environmental Quality Act Air Quality Guidelines, May 2017, p. 4-2, pdf 36, Step 2: Emission Quantification; available at http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

There is no evidence in the record that the site was occupied and emitting at the assumed level when environmental review began. The record suggests environmental review began around March 2018. The Air Quality Analysis is dated May 29, 2019. The supporting CalEEMod run is dated May 27, 2019. The Environmental Information Form is dated January 30, 2019. The Noise Report is dated May 3, 2019. The Biological Resources Report is dated May 2, 2019 and the reconnaissance-level site survey was conducted on January 11, 2019.⁸⁰ The FAA No-Hazard Determination is dated April 26, 2019. The historical records search results were reported on March 25, 2018.⁸¹ The Operational Waste Management Strategy was reported on May 1, 2019. Thus, the baseline is zero.

3.3.2. Diesel Generator Emissions Underestimated

The Project includes a 1,000 kilowatt (kW) diesel generator that would operate up to 50 hr/yr for routine testing and maintenance.⁸² Elsewhere, the City's files indicate the diesel generator will operate once per month in "short-duration" testing and once per year in "long-duration" testing, plus emergency operation.⁸³ The Sunnyvale files do not include the vendor specification sheet for this generator, which would include emission factors and disclose whether any pollution control equipment would be used, such as selective catalytic reduction (SCR). The Air Quality Analysis used CalEEMod default assumptions for a 1,250 hp generator (932 kW)⁸⁴ to estimate emissions from the Project generator.⁸⁵ The CalEEMod analysis assumed a load factor of 0.73.⁸⁶ The resulting emissions, reported in the CalEEMod output in the Air Quality Analysis,⁸⁷ are underestimated for two reasons.

The emergency generator emissions are only for routine testing and maintenance of the generator. Based on my review of emission calculations in the Air Quality Analysis, the generator emissions exclude any actual use of the generators to supply power in an emergency. As the purpose of these generators is to supply power during emergencies when power from SVCE is not available, it is reasonable to anticipate that

⁸⁰ Biological Resources Report, pdf 7.

⁸¹ CHRIS Letter from Jessika Akmenkalns to Johnson Chang, Re: Record Search Results for the Proposed Project Located at 1390, March 26, 2018.

⁸² Air Quality Analysis, p. 6.

⁸³ Environmental Information Form, Item 10b, #40, 41, 42.

⁸⁴ $(1250 \text{ hp})(0.7457 \text{ kW/hp}) = 932 \text{ kW}$.

⁸⁵ Air Quality Analysis, pdf 34.

⁸⁶ Air Quality Analysis, pdf 34.

⁸⁷ Air Quality Analysis, pdf 35.

emergencies will occur and that the generator will be used to supply any missing SVCE power. The emissions from replacing SVCE power would be in addition to emissions from routine testing. Routine testing and maintenance were assumed to be conducted at a load of 73%. Emergency operation would occur at full load, when emissions in g/hp-hr are higher.

Further, the BAAQMD recently published a new policy, *Calculating Potential to Emit for Emergency Backup Power Generators*,⁸⁸ that applies to this generator. This policy, used to determine the applicability of District permitting regulations, such as New Source Review and Title V Major Facility Review, requires that emissions from emergency operation be calculated based on 100 hours per generator per year. The District states that 100 hours represents a **reasonable worst-case assumption** regarding the amount of time during any given year that a facility could have to operate without outside power, which would necessitate emergency operation of a facility's backup generators:

Emergency backup power generators are used to provide power in emergency situations where a facility loses its external power supply from the power grid. By its very nature, such emergency operation is unplanned and infrequent, and when it does occur it is impossible to predict how long it will last. Although it is foreseeable that an emergency backup power generator may have to operate to respond to emergency conditions at some point during its useful life, it is not possible to predict with any specificity exactly how frequently such operations will occur, or for what duration. 100 hours is a reasonable worst-case assumption of the longest a facility may need to operate on backup power in any given year in the event of a major power outage.

The same reasoning applies to the emergency use of the standby generator for purposes of CEQA review. Yet, the City's files exclude these emissions from its analysis. The Air Quality Analysis estimated 0.2293 ton/yr of NO_x from the diesel generator.⁸⁹ Assuming a Cummins Diesel Generator Set QST30 Series Engine,⁹⁰ the NO_x emission factor for full prime operation is 4.00 g/hp-hr. Assuming 100 hours of

⁸⁸ Pamela Leong, BAAQMD, *Calculating Potential to Emit for Emergency Backup Power Generators*, June 3, 2019; available at [http://www.baaqmd.gov/~media/files/engineering/policy_and_procedures/banking-and-offsets/calculating-pte-for-emergency-generators-06032019-pdf.pdf?la=en](http://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/banking-and-offsets/calculating-pte-for-emergency-generators-06032019-pdf.pdf?la=en).

⁸⁹ Air Quality Analysis, pdf 35.

⁹⁰ City of Santa Clara, Initial Study with Proposed Mitigated Negative Declaration, 1150 Walsh Avenue SV1 Data Center, Appendix A, Air Quality and GHG Emissions Assessment, pdf 66; available at <http://santaclaraca.gov/Home/Components/BusinessDirectory/BusinessDirectory/295/3649>.

operation, the NOx emissions would be 283 lb/day⁹¹ and 0.6 ton/yr.⁹² The unmitigated NOx emissions exceed the BAAQMD's daily significance threshold of 54 lb/day and are significant, requiring mitigation. NOx emissions from diesel generators are commonly controlled using SCR. Thus, the significant daily NOx emissions from the diesel generator disqualifies the Project for a categorical exemption from CEQA under 14 CCR § 15332 because mitigation is required to reduce NOx emissions from the diesel generator.

3.3.3. Emissions from Electricity Generation Omitted

The Air Quality Analysis states that electricity will be supplied by Silicon Valley Clean Energy (SVCE) and that it will be 100% carbon free.⁹³ Thus, the air quality analysis includes no emissions from supplying electricity to the Project. However, the files I reviewed do not contain a will serve letter documenting that SVCE can deliver 100% renewables to the Project without increasing GHG emissions elsewhere. SVCE works in partnership with PG&E, buying clean electricity directly from the source and PG&E delivers the electricity over existing power lines.⁹⁴ If SVCE buys Google's electricity from new renewable resources then it is fair for Google to claim they are 100% renewably supplied. However, if SVCE is just taking existing renewable resources that would serve other customers without a requirement for renewables, then Google can still claim they are using 100% renewables, but the other customers without a renewable requirement would use zero percent renewables, which would nevertheless increase emissions. The record fails to include a requirement that 100% renewable electricity be used for the Project without causing increases in emissions elsewhere on the grid. If the Project's 100% renewable use causes increases in nonrenewable electricity elsewhere on the grid, these increases must be included in the Project's emissions. The record before the City is silent on this issue.

Alternatively, wildfire policies could impact SVCE's ability to supply power to customers if curtailments on the PG&E system interrupt SVCE's electricity supplies, as SVCE relies on PG&E to deliver its electricity. A Public Safety Power Shutoff (PSPS) could indirectly limit renewable electricity supplies to the Project. A PSPS essentially de-energizes power lines in order to prevent the lines from causing wildfires. The PSPSs are generally limited to high fire-risk zones and are only implemented under

⁹¹ Daily NOx emissions for diesel generator = (4.00 g/hp-hr)(24 hr/day)(1000 kW)(1.34 hp/kW)/454 g/lb = **283 lb/day**.

⁹² Annual NOx emissions for diesel generator = [(4.00 g/hp-hr)(100 hr/yr)(1000 kW)(1.34 hp/kW)/454 g/lb]/2000 lb/ton = **0.59 ton/yr**.

⁹³ Air Quality Analysis, pdf 5.

⁹⁴ Silicon Valley Clean Energy, How It Works; available at <https://www.svcleanenergy.org/>.

special conditions. While the SVCE's service territory is not in a high-risk zone, a line de-energization in one of PG&E's high-risk zones to reduce the risk of lines causing a wildfire could reduce the electricity supplied to SVCE through PG&E lines. Electricity supplies to SVCE through PG&E could also be reduced if transmission lines were de-energized to avoid damage from a wildfire. Thus, emissions must include supplying 100% of the Project's energy from nonrenewable sources. The CalEEMod run indicates the Project would use 6.02 e+6 kWh/yr.⁹⁵ The energy demand by the Project is the default for "general light industry" and a small parking lot.⁹⁶ The Project is not "general light industry." It includes equipment, such as the chillers, switchgears, and pumps that use large amounts of energy. The City's files contain no equipment specifications for any of the electrical equipment. Thus, the CalEEMod default cannot be confirmed.

Thus, GHG and criteria pollutant emissions to supply the Project from local generation could be significant and must be included in the Project's emission inventory in Table 2.

3.3.4. Emissions from Diesel Supply and Storage Tank Omitted

The Project includes belly tanks to store diesel for use in the generator.⁹⁷ The files I reviewed are silent on this emission source and do not include any of the information required to estimate diesel supply and storage tank emissions. The City's files do not include any design information for this tank, required to estimate emissions, including its volume, vents, and fugitive components between the tank and the generator, which typically includes flanges and a pump that would release emissions.

There are nearby canals⁹⁸ and San Francisco Bay is close. Thus, measures to minimize potential leaks should be incorporated in the fuel system design. The designs of the tanks and fuel delivery system are not disclosed. The tanks should be double walled to minimize the potential for an accidental fuel release and to allow monitoring for the presence of liquids, indicative of a leak. There should be an automatic alert system to notify staff of leaks. Warning signs should be present at the fuel unloading area to minimize potential refueling accidents occurring due to tanker trucks departing prior to disconnecting the transfer hose. An emergency shut-off valve should be present in the event of a pump hose break while fueling the tank. Tanker truck loading

⁹⁵ Air Quality Analysis, pdf 30, Section 5.3 Energy by Land Use - Electricity: 6.01941e+6 + 840 kWh/yr = **6.02 e+6 kWh/yr.**

⁹⁶ Air Quality Analysis, pdf 30.

⁹⁷ Environmental Information Form, #48.

⁹⁸ See Report to the Zoning Administrator, Attachment 7, pdf 5,

and unloading procedures should be posted at the unloading area. The City's file is silent on these important design features to protect against leaks.

The diesel fuel would be delivered by tanker truck, which emits NO_x and other criteria pollutants. Fueling would likely occur within a spill catch basin located under the generator. Spills and drips would collect in this basin and release VOCs when the fuel evaporates. VOC emissions would also occur during hose connects and disconnects and from any tank vents and seals and connections between the tanks and the generators. Further, diesel is not stable and deteriorates with age. If the fuel is not consumed within about a year, it must be replaced with fresh fuel.⁹⁹ Based on my experience, these emissions can be substantial, especially on hot summer days such as those that occur in the Project area. In the summer, it can be over 80 degrees Fahrenheit in Sunnyvale.

3.3.5. Emissions from Supplying Water

The Air Quality Analysis states that "the project would consume relatively large amounts of water that would be provided to other land uses for heating and cooling purposes. The source of the water ... has not been established yet."¹⁰⁰ Elsewhere, the City's files indicate that the Project will use water in the cooling towers and for landscaping.¹⁰¹

The CalEEMod analysis assumed an indoor water use of 40 million gallons per year (Mgal/yr) and no outdoor water use.¹⁰² The analysis failed to disclose what the indoor water would be used for. Given the Project design, the only plausible use for this quantity of water is evaporation in the cooling towers.

The City's files are ambiguous as to the source of the water, variously stating it has not been determined yet,¹⁰³ and elsewhere asserting the main source is the San Francisco Public Utilities Commission (SFPUC) via the Santa Clara Valley Water District, which gets its supply from the Hetch Hetchy reservoir in the headwaters of the

⁹⁹ BP, Long term Storage of Diesel, February 10, 2006; available at https://www.bp.com/content/dam/bp-country/en_au/media/fuel-news/long-term-storage-diesel.pdf.

¹⁰⁰ Air Quality Analysis, pdf 5 and 32, Section 7.2 Water by Land Use.

¹⁰¹ See City of Sunnyvale, Landscape Water Budget Calculations.

¹⁰² Air Quality Analysis, pdf 11, 32 and Section 7.2.

¹⁰³ Air Quality Analysis, pdf 5 and 32, Section 7.2 Water by Land Use.

Mokelumne River.^{104,105} Further, discussions in a public meeting suggest ocean water is also being considered.¹⁰⁶ Given the uncertainty in the water supply for the cooling tower, a potential source of emissions, it is not possible to make an accurate estimate of air quality and other impacts from supplying, treating, and disposing of the water.

The use of high purity imported water from snow melt and rain in the Sierra Nevada, water that would otherwise serve as drinking water, for an industrial use, is not a reasonable beneficial use for this potable water, given California's well-known water shortage problem. The use of drinking water in the cooling tower is a significant cumulative water supply impact that should not be allowed. Mitigation should be imposed to require the use of recycled water in the cooling towers.

The City's files further disclose that 600,226 gal/yr of water will be used for landscaping.¹⁰⁷ The landscaping water supply is apparently recycled water¹⁰⁸ but the source and quality of the recycled water is not disclosed. It most likely is recycled water supplied by Valley Water.¹⁰⁹

The CalEEMod analysis only estimated GHG and other emissions from supplying the non-irrigation water and no emissions from supplying recycled irrigation water and the operation of the cooling towers. Thus, all air quality impacts are underestimated.

3.3.6. Emissions from Cooling Towers

The Project includes 8,000 square feet of cooling towers. There are many types of cooling towers.¹¹⁰ The City's files do not disclose the type of cooling towers, preventing an accurate estimate of emissions and other impacts. However, Figure 2 suggests adiabatic cooling towers.

A cooling tower is a device that uses a combination of heat and mass transfer to cool water. The water to be cooled is distributed in the tower by spray nozzles, splash bars, or film fill to expose a very large water surface to atmospheric air. Air is moved

¹⁰⁴ Phase I, pdf 20.

¹⁰⁵ City of San Francisco – Water Quality Data for Year 2019; available at <https://sfwater.org/index.aspx?page=634>.

¹⁰⁶ Public Meeting, August 13, 2019, Exhibit 2.

¹⁰⁷ City of Sunnyvale, Landscaping Water Budget Calculations.

¹⁰⁸ 1390 Borregas Planning Resubmission, pdf 43, Drawing No. L3.07. See also: AQA, pdf 5.

¹⁰⁹ Valley Water: <https://www.valleywater.org/where-your-water-comes-from>.

¹¹⁰ See, e.g., <https://deltacooling.com/resources/faqs/what-is-a-cooling-tower> and <https://www.chardonlabs.com/resources/what-are-adiabatic-cooling-towers/>.

using fans, natural draft, or the induction effect from water sprays. A portion of the water is evaporated because the moisture content of the air is less than saturated at the temperature of the water. As energy is required to evaporate the water, the water is cooled.¹¹¹

An adiabatic cooling system uses ambient air for a portion of the cooling. These towers operate well only when ambient temperatures are cold. They use much more energy than conventional towers during hot seasons. Spray cooling, as in a conventional tower, only kicks in when the ambient air temperature is too high to use cooled air.¹¹²

Thus, cooling towers are heat exchangers that dissipate heat to the atmosphere by evaporating water that is circulated through the tower.¹¹³ Some of the water circulating through the tower is entrained in the air stream and carried out of the tower as drift droplets.

Chemicals in the circulating water, such as chlorine, metals, and total dissolved solids (TDS) will be emitted from the tower with the drift droplets during wet cooling. The emissions from a cooling tower depend on its drift rate, circulating water flow rate, and chemical composition of the circulating water. The City's files do not contain any of this information. In general, cooling towers emit particulate matter (PM2.5, PM10), volatile organic compounds (VOCs), chlorine (added to control biological growth), and other chemicals, depending upon the chemical composition of the circulating water. When the circulating water is evaporated, for example, the total dissolved solids in the circulating water is emitted as PM10.

The City's files contain no information on the type of cooling tower(s),¹¹⁴ the circulating water flow rate, the chemical composition of the cooling tower water supply or circulating water, or biocides that will be used to control bacteria;¹¹⁵ all information

¹¹¹ D. G. Kröger, *Air-Cooled Heat Exchangers and Cooling Towers*, 1998; p. 1.1.1; available at <http://eolss.net/Sample-Chapters/C08/E3-10-03-06.pdf>.

¹¹² See, e.g., *Adiabatic Cooler v. Cooling Tower*; available at <https://www.icscoolenergy.com/adiabaticcoolervcoolingtower/> and Adam Meyer, *Adiabatic Cooling: Best of Both Worlds*, DCD, December 5, 2019; available at <https://www.datacenterdynamics.com/opinions/adiabatic-cooling-best-of-both-worlds/>.

¹¹³ Chem-Aqua, Inc., *Cooling Tower Basic Operation*. See video at https://www.youtube.com/watch?v=pXaK8_F8dn0. See also Wikipedia, *Cooling Tower*; available at https://en.wikipedia.org/wiki/Cooling_tower.

¹¹⁴ There are two main types—natural draft and induced draft.

¹¹⁵ Chardon Laboratories, *What Types of Biocide Work Best?*; available at <https://www.chardonlabs.com/resources/cleaning-cooling-towers-with-biocides/>.

necessary to estimate cooling tower emissions. In fact, the City's files incorrectly assert that "there will be no emissions which impact air quality in normal operation."¹¹⁶ This is incorrect. Cooling towers are a major source of PM10 emissions and potentially, other chemicals, depending upon the source of the cooling water, which also is not disclosed in the City's files.

Cooling tower PM10 emissions are normally calculated using AP-42, which is the EPA emission estimating bible. The EPA procedure involves multiplying the circulating water flow rate by an emission factor in pounds per 1,000 gallons.¹¹⁷ The EPA procedure assumes that the water evaporates, leaving behind finely dispersed salts with particle sizes less than 10 microns (i.e., PM10).¹¹⁸

The EPA emission factor for PM10 emissions from an induced draft cooling tower is 0.019 pounds per 1,000 gallons of circulating water, which corresponds to an effective cooling tower recirculating water TDS content of about 11,500 ppm.¹¹⁹ The CalEEMod inputs assumed an indoor water use of 40 Mgal/yr,¹²⁰ but failed to disclose the use. The most likely use for this much water is evaporation in the cooling tower. Using the EPA emission factor and 40 Mgal/yr, PM10 emissions¹²¹ from the cooling towers would be 760 lb/yr or 2 lb/day.

The files I reviewed suggest that sea water is being considered for cooling water. The August 13, 2019 Neighborhood Meeting¹²² discussed sea water as a supply for the cooling towers. If seawater were used, emissions would be significantly higher as sea water contains much higher TDS concentrations than fresh water. The TDS of sea water

¹¹⁶ Environmental Information Form, #42.

¹¹⁷ U.S. EPA, AP-42, Fifth Edition, Volume 1, Chapter 13, Miscellaneous Sources, Chapter 13.4, Wet Cooling Towers, Table 13.4-1; available at <https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s04.pdf>.

¹¹⁸ See also SCAQMD, Guidelines for Calculating Emissions from Cooling Towers; available at <http://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/guidecalcemiscooltowerdec13.pdf>.

¹¹⁹ AP-42, Table 13.4-1 and p. 13.4-4.

¹²⁰ Air Quality Analysis, pdf 32, Section 7.2.

¹²¹ Studies have demonstrated that 100% of the particulate matter is PM10 or smaller. See G. Israelson, N. Stich, and T. Weast, Comparison of Cooling Tower Mineral Mass Emissions by Isokinetic EPA Method 13A and Heated Cascade Impactor Tests, Cooling Tower Institute Paper No. TP91-12, 1991 and Thomas E. Weast and Nicholas M. Stich, Reduction of Cooling Tower PM10 Emissions Due to Drift Eliminator Modifications at a Chemical Refining Plant, Cooling Tower Institute Paper No TP92-10, 1992.

¹²² Exhibit 2.

is about 35,000 mg/L.¹²³ Assuming the TDS of the circulating water is 1,000 mg/L (and the record is silent on the composition of the cooling tower water supply, number of cycles of concentration, TDS of the circulating water, etc.), the PM10 emissions would be 35 (35,000/1,000 = 35) times higher, resulting in 60 lb/day¹²⁴ and 11 ton/yr of PM10. As the daily and annual cooling tower emissions if sea water is used exceed the BAAQMD daily and annual operational significant thresholds,¹²⁵ PM10 emissions from the cooling tower are potentially significant.

Finally, wet cooling can result in significant public health impacts in the surrounding community. While the nearest resident is 3,000 feet away, the Project site is bordered by East Caribbean Drive to the north, Borregas Avenue to the west, and commercial properties to the south and east.¹²⁶ Motorists and workers in adjacent properties would be exposed to cooling tower emissions. The Project includes walkways throughout the facility where employees and members of the public will be present. Plume touchdown on these roads and walkways could result in significant public health impacts.

For example, the Cooling Technology Institute (“CTI”) advises that permitting agencies should assume that any cooling tower system harbors the Legionella bacteria, including from adiabatic cooling towers.¹²⁷ Confirmed cases of Legionellosis from cooling towers are on the rise.¹²⁸ The Legionella bacteria will be emitted as a component of the PM10 emitted by the wet cooling towers. Legionella bacteria emitted in cooling tower drift are hazardous substances and need to be addressed in the permit application. The most straightforward solution to the difficult problem of Legionella bacteria in cooling tower drift is to utilize 100% dry cooling technology.

3.3.7. Cooling Tower Blowdown

The cooling towers generate a blowdown stream that must be treated and discharged. The files I reviewed are silent on cooling tower blowdown. The files do not

¹²³ Texas Water Development Board, Seawater FAQs; available at <http://www.twdb.texas.gov/innovativewater/desal/faqseawater.asp>. See also <https://www.google.com/search?q=tds+of+seawater&oeq=TDS+of+sea&aqs=chrome.0.0j69i57j0l4.3015j0j7&sourceid=chrome&ie=UTF-8>.

¹²⁴ Cooling tower PM10 emissions, assuming the use of sea water: (35,000/1,000)(2 lb/day) = **70 lb/day** and (35,000/1,000)(0.4 ton/yr) = **14 ton/yr**.

¹²⁵ Air Quality Analysis, Table 1, pdf 4 and BAAQMD, May 2017, Table 2-1.

¹²⁶ Geotechnical Report, p. 1.

¹²⁷ Chardon Laboratories, What Are Adiabatic Cooling Towers?; available at <https://www.chardonlabs.com/resources/what-are-adiabatic-cooling-towers/>.

¹²⁸ Adam Green and Robert J. Cunningham, The Rest of the Story: You Have Treated Your Cooling Tower – What Can Go Wrong?, *CTI Journal*, v. 40, no. 2, pp. 62-68, 2019.

disclose the amount of blowdown and how and where it will be treated and disposed. The treatment of the blowdown prior to disposal is a mitigation measure that is not allowed under the 14 CCR § 15332 categorical exemption.

3.3.8. Emissions from Supplying Energy to Operate Cooling Towers

The CalEEMod model used to estimate emissions from constructing and operating the facility assumed the energy demand for conventional cooling towers. However, if adiabatic cooling towers will be used, as Figure 2 suggests, the energy demand and resulting emissions will be much higher than assumed.

Energy is required to evaporate the water in a cooling tower.¹²⁹ An adiabatic cooling system uses ambient air for cooling. These towers operate well only when ambient temperatures are cold. They use much more energy than conventional towers during hot seasons. Spray cooling, as in a conventional tower, only kicks in when the ambient air temperature is too high to use cooled air.¹³⁰ The CalEEMod model used to estimate emissions does not include cooling tower water or energy demand.

3.4. Air Quality Impacts Were Not Evaluated

In addition to the BAAQMD significance thresholds listed in Table 2, a project's potential to result in significant air quality impacts and adverse impacts to residents, workers, and sensitive receptors, such as the disadvantaged and low-income communities in the surrounding area, depends on compliance with ambient air quality standards (AAQS). The AAQS are health protective and must be evaluated to confirm that the Project will not result in significant air quality and public health impacts. Generally, this is done by modeling emissions to determine if a project would exceed any air quality standard or contribute substantially to an existing or projected air quality violation.¹³¹ A responsive analysis is not in the City's files.

3.5. Cumulative Impacts Were Not Evaluated and Are Potentially Significant

A Project cannot qualify for a Class 32 exemption from CEQA when the cumulative impacts of successive projects of the same type in the same place over time are significant. The Project consists of a central facility to provide utilities to a series of

¹²⁹ D. G. Kröger, Air-Cooled Heat Exchangers and Cooling Towers, 1998; p. 1.1.1; available at <http://eolss.net/Sample-Chapters/C08/E3-10-03-06.pdf>.

¹³⁰ See, e.g., Adiabatic Cooler v. Cooling Tower; available at <https://www.icscoolenergy.com/adiabaticcoolercoolingtower/>.

¹³¹ Laurelwood IS/MND, pdf 56; available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=229584&DocumentContentId=61007>.

future buildings in the same general area. Figure 1. These future projects should have been evaluated cumulatively.

First, some of the nearby projects include on-site dedicated central utility plants (CUPs) to supply their utilities. The Caribbean project has at least one on-site CUP, with the potential for a second one.¹³² The projects designated as 100 and 200 Caribbean Way, for example, will be served by a dedicated 70,200 ft² CUP,¹³³ which is larger than the Project at 22,127 ft². Elsewhere, the City's files identify another potential CUP on the northeast corner of the 100 Caribbean site.¹³⁴ Thus, there is at least one large nearby CUP, of the same type as the Project, within a few blocks, of the Project that will be built in the future.

Second, there are nearby projects that will be directly connected to the Project that would be supplied by the Project. Figure 1. These nearby projects are part of the Project because the Project would not exist but for the adjacent projects for which it is supplying heating and cooling.

Third, other approved and pending projects that will not be serviced by the Project are nearby.¹³⁵ The construction of these projects plus the construction of all projects supplied by the Project will likely overlap in time.

Thus, cumulative impacts of the Project and other nearby projects (1) with dedicated CUPs, (2) without dedicated CUPs that will be supplied by the Project, and (3) any other nearby project whose construction overlaps with the Project should be evaluated for cumulative impacts. The files I reviewed do not include any cumulative impact analysis of the Project.

¹³² Vesting Tentative Map, Caribbean Campus, 100/200 West Caribbean Drive, pdf 4 and 5. The CUP is north of the Parking Structure, in the upper left hand corner of the figures, at the intersection of Caribbean Drive and Mathilda Avenue.

¹³³ Letter from Peter McDonnell, Vice President, Sares Regis @ Google, to Ryan Kuchenig, City of Sunnyvale, Department of Community Development, Re: Planning Project #2107-8042 – Revised Project Description, September 12, 2018.

¹³⁴ 100 & 200 Caribbean Planning Division Application, Environmental Information Form, December 20, 2018, pdf 41, "The project will be served by cooling towers, natural gas boilers and diesel emergency generators located in an on-site dedicated central utility plant (CUP). This CUP will be located on the North West portion of the site, adjacent to the parking structure on-site. The prevailing winds are primarily from the Northwest, as such moving most fumes and vapors over the site, as opposed to toward the property line."

¹³⁵ Letter from Andrew Crabtree, Director of Community Development, City of Santa Clara, to Ryan Kuchenig, City of Sunnyvale, Community Development Department, Re: Notice of Preparation of a Draft EIR for the Google Caribbean Campus Project, May 30, 2019; available at <http://santaclaraca.gov/home/showdocument?id=64270>.

3.6. Battery Fire and Explosion Impacts Are Potentially Significant

The facility will include batteries in the Heating Building, shown on documents in the City's files.^{136,137} These documents identify the batteries as "UPS batteries," but fail to disclose the function of the batteries. A UPS system generally consists of batteries, an inverter and switches that facilitate the uninterrupted transfer of electrical power from a substation to the facility in the event of a service interruption.

The batteries could result in a number of significant impacts including fire, explosion, and the release of toxic chemicals, depending on the type of battery. The City's files are silent on the type and function of the batteries and impacts that could result from them.

Hazards associated with battery systems are normally analyzed by identifying all feasible failure modes, identifying the consequences of each failure mode (e.g., fire, explosion, specific chemicals and the rates at which they could be released) and resulting impacts in surrounding areas and the consequences (e.g., chronic, acute, and cancer impacts). The City's files contain no information on the batteries and no analysis at all of the hazards and hazardous material impacts of the battery storage facility.

Batteries contain flammable materials that can ignite and cause fires and explosions, resulting in irreversible damage in the surrounding area, including to on-site and nearby buildings, workers, pedestrians within the facility, motorists on adjacent roadways, and responding firefighters. The batteries contain hazardous chemicals that would be released in fires. Fires also could occur during battery transportation to the site, construction of the battery storage area, and Project commissioning and decommissioning; as well as during operation.

If lithium-ion batteries are used, for example, fires resulting in the release of toxic gases may result. The electrolytes used in lithium-ion batteries are flammable in the presence of oxygen. While the batteries are sealed from external sources of oxygen, some cathodes can release oxygen within the cell under high temperatures.^{138,139} These batteries are susceptible to thermal runaway, which is a chain reaction leading to self-

¹³⁶ 1390 Borregas Mechanical Facility, Planning Division Application, pdf 67, 71.

¹³⁷ Operational Waste Management Strategy, p. 2.

¹³⁸ Brian Eckhouse and Mark Chediak, Explosions Threatening Lithium-Ion's Edge in a Battery Race, Bloomberg, April 24, 2019; available at <https://www.bloomberg.com/news/articles/2019-04-23/explosions-are-threatening-lithium-ion-s-edge-in-a-battery-race>.

¹³⁹ Thomas F. Armistead, Fire at Arizona Energy Storage Battery Bank Draws Scrutiny, *Engineering News-Record*, July 7/8, 2019, p. 18. Exhibit 3.

heating and release of stored energy.¹⁴⁰ As described in a recent refereed journal article:¹⁴¹

An irreversible thermal event in a lithium-ion battery can be initiated in several ways, by spontaneous internal or external short-circuit, overcharging, external heating or fire, mechanical abuse etc. This may result in a thermal runaway caused by the exothermal reactions in the battery^{6,7,8,9,10}, eventually resulting in a fire and/or explosion. The consequences of such an event in a large Li-ion battery pack can be severe due to the risk for failure propagation^{11,12,13}. The electrolyte in a lithium-ion battery is flammable and generally contains lithium hexafluorophosphate (LiPF₆) or other Li-salts containing fluorine. In the event of overheating the electrolyte will evaporate and eventually be vented out from the battery cells. The gases may or may not be ignited immediately. In case the emitted gas is not immediately ignited the risk for a gas explosion at a later stage may be imminent. Li-ion batteries release a various number of toxic substances^{14,15,16} as well as e.g. CO (an asphyxiant gas) and CO₂ (induces anoxia) during heating and fire. At elevated temperature the fluorine content of the electrolyte and, to some extent, other parts of the battery such as the polyvinylidene fluoride (PVdF) binder in the electrodes, may form gases such as hydrogen fluoride HF, phosphorus pentafluoride (PF₅) and phosphoryl fluoride (POF₃). Compounds containing fluorine can also be present as e.g. flame retardants in electrolyte and/or separator¹⁷, in additives and in the electrode materials, e.g. fluorophosphates^{18,19}, adding additional sources of fluorine.

Many fires have been reported at battery storage facilities. The Arizona Corporation Commission (ACC) recently reviewed the 2019 APS McMicken Energy Storage Facility and 2012 APS Elden Substation near miss and concluded that “utility scale lithium ion batteries using the chemistries in those types of lithium ion batteries are not prudent and create unacceptable risks, particularly those with chemistries that include compounds that can release hydrogen fluoride in the event of a fire and/or

¹⁴⁰ Todd M. Bandhauer, Srinivas Garimella, and Thomas F. Fuller, A Critical Review of Thermal Issues in Lithium-Ion Batteries, *The Journal of the Electrochemical Society*, v. 158 R-21-R25, January 2011; available at https://wiki.aalto.fi/download/attachments/91692283/a_critical_review_of_thermal_issues_in_li-ion_batteries.pdf?version=1&modificationDate=1398443780029&api=v2.

¹⁴¹ Fredrik Larsson et al., Toxic Fluoride Gas Emissions from Lithium-ion Battery Fires, *Scientific Reports*, v. 7, 2017; available at <https://www.nature.com/articles/s41598-017-09784-z>.

explosion.”¹⁴² Thus, it is critically important that the City determine the type of batteries that will be used by the Project and evaluate their impacts.

¹⁴² Sandra D. Kennedy, Commissioner, Re: In the Matter of the Commission’s Inquiry of Arizona Public Service Battery Incident at the McMicken Energy Storage Facility Pursuant to Arizona Administrative Code R14-2-101, Docket No. E-01345A-19-076, August 2, 2019, p. 2; available at <https://docket.images.azcc.gov/E000002248.pdf>.

Attachment 1

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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-present; #57886), 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-present
Qualified Environmental Professional (QEP), Institute of Professional Environmental Practice (QEP #02-010007), 2001-present

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)

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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 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 & liquefaction plants; conventional and thermally enhanced oil production; oil and gas production, including hydraulic fracking and acid stimulation treatments; 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; 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; desalination plants; selective catalytic reduction (SCR) systems; selective noncatalytic reduction (SNCR) systems; halogen acid furnaces; contaminated

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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

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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 NO_x, SO₂, PM, PM_{2.5}, 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 NO_x, 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

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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.
- 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, SO2 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

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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 NO_x, 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 NO_x 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 NO_x 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 NO_x emissions, BACT analyses (water injection, SCR, ultra low NO_x 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 NO_x burners (5 ppm NO_x 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, 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*

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Plains Energy, and Kansas City Power & Light. Case settled March 27, 2007, providing offsets for over 6 million ton/yr of CO₂ and lower NO_x and SO₂ 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 NO_x BACT limit from 0.07 lb/MMBtu to 0.06

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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 NO_x, SO₂, 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, Intervenor, 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 NO_x 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.

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- 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 SO₂ 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

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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 NO_x, SO₂, 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, NO_x, SO₂, Hg, Be), single source, enforceability, and errors and omissions. Assist counsel draft exceptions. Cabinet Secretary issued Order April 11, 2006 denying Hearing Officer's report, except as to NO_x 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 ft² 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 Semptra 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 CO₂ and NH₃, 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 NH₃ and CO₂, 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

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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.

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- 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 NO_x, SO_x, 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 SCONO_x, 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

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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.

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- 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.

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- 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 advise 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

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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.

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- 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, FONSI, 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/REMEDATION/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

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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 April 2016, prepared supplemental comments on Valero Benicia Crude by Rail Project, focused on on-site impacts and impacts at the unloading terminal, in response to request for a stay to appeal Planning Commission decision.
- 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.

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- 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.
- In March 2015, prepared "Comments on Proposed Title V Air Permit, Yuhuang Chemical Inc. Methanol Plant, St. James, Louisiana".
- 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.
- 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.
- 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.

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- 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 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 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,

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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.

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- 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 NO_x, 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 NO_x 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 NO_x 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 NO_x 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 NO_x 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).

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- 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 Cir. July 19, 2013).
- Identified errors in N₂O 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

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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.

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- 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.

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- 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;

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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

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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 streams. 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.

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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 outgassing 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.

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- 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.

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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.

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(Partial)

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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, Dry Precipitator Efficiency Improvements, 2/12/09
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McIlvaine Hot Topic Hour, Carbon Management Strategies and Technologies, 6/24/10
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Interest Rates, PDH P204, 3/9/12

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Attachment 2

Google invites you to a Neighborhood Meeting

Come learn about our proposed Mechanical Facility Project in Moffett Park

August 13th, 2019 | 2:00 pm @ Google - 1380 Borregas Ave, Sunnyvale



Project Location Map



Artist Rendering of Planned Project for 1390 Borregas Avenue
(Illustrative rendering conceptual only, subject to change)

Planning Application #2019-7071

Project Location: 1390 Borregas Avenue

Project Description: Google LLC proposes to replace the existing single building (26,880 sf) with a mechanical facility consisting of three smaller buildings (totaling 22,063 sf) and five water tanks. The mechanical facility will provide water to new surrounding buildings for heating and cooling purposes, while providing energy savings. A raised boardwalk connects the proposed structures and offers an opportunity to learn about sustainable technology. Through the interplay of built and natural environments, the design highlights the ecology of the south bay and the community of Sunnyvale.

If you are interested in learning more about this proposal and seeing the conceptual plans, we invite you to join us for this informational session. City of Sunnyvale Planning Division staff will be in attendance. For questions, please contact Rachel Colton at Google LLC (650) 390-4227 or rachelgrossman@google.com

Attachment 3

POWER GRID

Fire at Arizona Energy Storage Battery Bank Draws Scrutiny

Questions are still awaiting answers as Arizona Public Service Co. investigates the cause of an explosion

April 19 in a 2-MW/2-MWh grid-connected energy-storage battery facility in Surprise, Ariz. The incident sent eight firefighters and a police officer to the hospital with non-life-threatening injuries, but APS has revealed few of its investigation's findings despite promising in a June 5 statement that "periodic updates will be posted to report on the process and progress being made."

The explosion of the lithium-ion (Li-ion) battery bank drew new attention to the flammable battery technology, which has caused spontaneous fires in Boeing airliners and Samsung smart phones in recent years.

"Although we don't know what happened at APS, it's very likely it's all the same challenge," says George W. Crabtree, director of Argonne National Laboratory's Joint Center for Energy Storage Research. "If you get the temperature of the Li-ion battery above 150° C, a reaction takes place between the cathode and the electrolyte that doesn't require any oxygen from the air to proceed, and that reaction releases heat. The heat that's released heats up the battery further; that makes the reaction go faster, and it's what they call a 'thermal runaway.' That has been the major safety problem with Li-ion batteries. It's very well known."

The April 19 incident occurred at the APS McMicken Energy Storage Facility, one of two identical battery banks, each about the size of a shipping container, recently built to help store solar energy to better meet power demand after sunset. The battery systems consist of 27

racks of 14 modules each, for a total of 378 modules of lithium-ion batteries. Construction began on the facilities in

It is still early days for establishing a general incident timeline for this technology according to Ben Kaun, energy storage project manager at the Electric Power Research Institute in Palo Alto, Calif. "We have had discussions with a lot of industry participants about the potential value of developing an incident database, so that we can understand ... the kinds of

consequences that occur when different types of failures happen," he told ENR.

"What we're learning over time is that it's not necessarily always a battery problem," Kaun says. "It's not necessarily that the failures are occurring within the battery. There are other systems that make up an energy storage system, which can result in failures, and those failures can result in further failures of the battery."

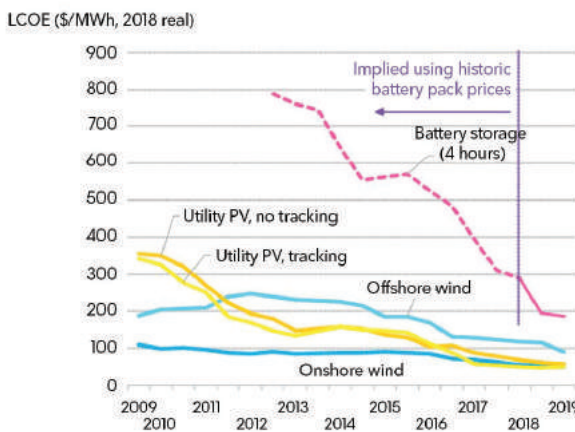
Despite the recorded incidents of bursting into flames, Li-ion batteries now make up 98% to 99% of all new battery-type energy storage systems,

and "there's been rapid adoption in the last couple of years in particular," says Kaun. Potentially competing technologies "are either not in the right cost point now or are at earlier technology-readiness levels, still in the R&D phase where one might speculate that they could one day take market share from Li-ion," he says.

A safer technology may be so-called flow batteries, which "operate with liquid anodes and cathodes instead of solid anodes and cathodes that you have in most batteries," Crabtree says. "The advantage of that for the grid is that if you make the tank 10 times bigger, put 10 times more liquid in it, you store 10 times more energy; it scales perfectly linearly. That is not true of Li-ion." A recent BloombergNEF report indicates the levelized cost of electricity from batteries has fallen faster than the cost of solar panels. "That could easily happen to flow batteries as they get into high production mode," he says. ■

By Thomas F. Armistead

GLOBAL BENCHMARKS - PV, WIND AND BATTERIES



SOURCE: BLOOMBERGNEF. NOTE: THE GLOBAL BENCHMARK IS A COUNTRY WEIGHTED-AVERAGE USING THE LATEST ANNUAL CAPACITY ADDITIONS. THE STORAGE LCOE IS REFLECTED OF A UTILITY-SCALE LI-ION BATTERY STORAGE SYSTEM RUNNING AT A DAILY CYCLE AND INCLUDES CHARGING COSTS ASSUMED TO BE 60% OF WHOLE SALE BASE POWER PRICE IN EACH COUNTRY.

2016 and they came online in 2017.

With more than 1,700 MW of renewable-energy capacity already online, APS continues to invest heavily in solar energy development, including the energy-storage batteries required for round-the-clock load serving. In February 2019, the utility announced plans to add 850 MW of battery storage and at least 100 MW of new solar generation to its system by 2025.

The installation base of grid-connected energy storage was negligible before 2000 and utility industry experience with it has been thin, but there have been only three catastrophic failures at major facilities in the U.S.: one in Hawaii and two in the APS system in Arizona. In 2012, a 1.5-MW APS battery facility near Flagstaff, Ariz., caught fire. The utility took lessons from the investigation of that incident and has continued with advancements in battery design and safety standards to expand its stationary storage for renewable energy resources.

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EXHIBIT 3



WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
NEW YORK

23 September 2019

Aaron Messing, Esq.
Adams Broadwell Joseph & Cardozo
601 Gateway Blvd, Suite 1000
South San Francisco, California 94080

Subject: Google – 1390 Borregas Mechanical Facility
Comments on Noise Code Evaluation Update

Dear Mr. Messing,

Wilson Ihrig has reviewed the noise evaluation prepared by Arup North America Ltd presented in their reported titled *Google – 1390 Borregas Mechanical Facility, Noise Code Evaluation* (Rev 2; May 3, 2019, “Noise Study”). We have also reviewed a supplemental letter prepared on May 9, 2019 in which Arup responds to comments by the City of Sunnyvale Project Review Committee (PRC). The comments request information about the noise levels with and without proposed barriers. The supplemental letter includes a diagram that shows the requested information and indicates that the “Noise Study has been revised and resubmitted to address the PRC Comment . . .”, but this new diagram is also included in the Revision 2 version of the Noise Study that we have reviewed. Therefore, although the dates of the two documents are incongruous, we believe the Noise Study we have reviewed was, in fact, issued after the May 9, 2019 response letter and is the most recent version.

This review is predicated on the assumption that the Noise Study is intended to support the application for necessary permits from the City of Sunnyvale. However, we note that there are several indications in the Noise Study itself that indicate this is not the case. The front cover contains the statements:

“This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.”

The footer of each page contains the following:

CPRA CONFIDENTIAL TREATMENT REQUEST NOT FOR PUBLIC RELEASE – CPRA
EXEMPT

CONFIDENTIAL AND PROPRIETARY BUSINESS / SITING INFORMATION PRE-
DECISIONAL DRAFT – FOR REVIEW ONLY

These statements seem to imply that the Noise Study is not intended for the purported purpose, but for the sake of this review, it is assumed to be.

We have also reviewed the *CEQA Class 32 Categorical Exemption Analysis* (Attachment 4, 2019-7071). This document summarizes the findings of the Noise Study with respect to operational noise levels. It is consistent with the Noise Study, does not contain any additional information regarding noise levels, and, therefore, does not change our assessment of the Noise Study.

Wilson Ihrig has practiced exclusively in the field of acoustics since 1966. During our 53 years of operation, we have prepared hundreds of noise studies for Environmental Impact Reports and Statements. We have one of the largest technical laboratories in the acoustical consulting industry. We also utilize industry-standard acoustical programs such as Environmental Noise Model (ENM), Traffic Noise Model (TNM), SoundPLAN, and CADNA. In short, we are well qualified to prepare environmental noise studies and review studies prepared by others.

Our comments on the Noise Study follow.

1. Noise Study fails to provide details necessary to substantiate findings

Our primary criticism of the Noise Study is that it contains no technical information whatsoever to substantiate the estimated noise levels. This is unusual for a noise report that is purportedly prepared and submitted to satisfy the City of Sunnyvale Planning Department and/or the California Environmental Quality Act (CEQA). The report alludes to data that could and should have been presented:

“Noise levels at the property line are determined by the manufacturer-provided equipment sound power levels . . .” [Noise Study at p. 5]

The Conclusions section states:

“This calculation can be updated if equipment is reselected or added . . .” [Noise Study at p. 6]

Both of these statements imply:

- i. That particular mechanical equipment (make and model) are known, but these are not revealed in the report.

- ii. That the manufacturer provides the basic information required to perform noise calculations, but this information is also not provided in the report.

Without any indication of the equipment or the sound power levels, it is not possible to independently verify that the noise calculations were done correctly. It is routine to include this information in noise studies intended to support permit applications and/or CEQA analyses.

2. Noise Study fails to provide information about generator noise

The Noise Study asserts that the City of Sunnyvale municipal code does not enable the City to enforce any sort of noise limit on the backup generator. However, this assessment fails to address CEQA's requirement for a substantive analysis of potentially significant noise impacts resulting from Project operation, even in the absence of local regulations establishing an enforceable noise limit. By invoking Code Section 19.42.030(b), the Noise Study is implying that the generator will, in fact, produce noise levels "greater than the applicable operational noise limit set forth in subsection (a)", albeit on a temporary, occasional, or infrequent basis and only during the daytime hours. Nonetheless, to the extent that the Noise Report is intended to provide substantial evidence of compliance with CEQA, some basic information about the backup generator noise level must be provided. As written, the Noise Study contains no quantitative analysis of the generator's actual or estimated noise levels, no discussion of existing baseline noise levels surrounding the Project site, no analysis of whether those noise levels could pose a potentially significant noise impact to local sensitive receptors, and no mitigation measures or restrictions that would prohibit or prognosticate the use of an unmuffled, extremely loud generator. Thus, the Noise Report fails to provide the basic information necessary for the public or the City to determine whether the generator will result in significant noise impacts.

3. Noise Study fails to provide information about construction noise

The Noise Study fails completely to discuss or analyze the Project's construction noise. Had it done so, it would have likely reached a similar conclusion as it did for the generator noise: the noise decibel levels are not limited by the City of Sunnyvale municipal code. However, in keeping with our comments on the backup generator noise, CEQA requires an analysis of the Project's construction noise impacts, including the disclosure of pertinent construction information including duration and estimated noise levels, so that the public and the City can assess whether the noise levels that will be generated during Project construction will result in significant individual and cumulative noise impacts in the vicinity of the Project site.

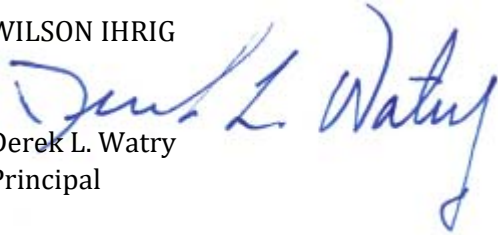
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Please contact me if you have any questions about these review comments.

Very truly yours,

WILSON IHRIG

Derek L. Watry
Principal





DEREK L. WATRY

Principal

Since joining Wilson Ihrig in 1992, Derek has gained experienced in many areas of practice including environmental, construction, forensic, architectural, and industrial. For all of these, he has conducted extensive field measurements, established acceptability criteria, and calculated future noise and vibration levels. In the many of these areas, he has prepared CEQA and NEPA noise technical studies and EIR/EIS sections. Derek has a thorough understanding of the technical, public relations, and political aspects of environmental noise and vibration compliance work. He has helped resolve complex community noise issues, and he has also served as an expert witness in numerous legal matters.

Education

- M.S. Mechanical Engineering, University of California, Berkeley
- B.S. Mechanical Engineering, University of California, San Diego
- M.B.A. Saint Mary's College of California

Project Experience

12th Street Reconstruction, Oakland, CA

Responsible for construction noise control plan from pile driving after City received complaints from nearby neighbors. Attendance required at community meetings.

525 Golden Gate Avenue Demolition, San Francisco, CA

Noise and vibration monitoring and consultation during demolition of a multi-story office building next to Federal, State, and Municipal Court buildings for the SFDPPW.

911 Emergency Communications Center, San Francisco, CA

Technical assistance on issues relating to the demolition and construction work including vibration monitoring, developing specification and reviewing/recommending appropriate methods and equipment for demolition of Old Emergency Center for the SFDPPW.

Central Contra Costa Sanitary District, Grayson Creek Sewer, Pleasant Hill, CA

Evaluation of vibration levels due to construction of new sewer line in hard soil.

City of Atascadero, Review of Walmart EIR Noise Analysis, Atascadero, CA

Review and Critique of EIR Noise Analysis for the Del Rio Road Commercial Area Specific Plan.

City of Fremont, Ongoing Environmental Services On-Call Contract, Fremont, CA

Work tasks primarily focus on noise insulation and vibration control design compliance for new residential projects and peer review other consultant's projects.

City of Fremont, Patterson Ranch EIR, Fremont, CA

Conducted noise and vibration portion of the EIR.

City of King City, Silva Ranch Annexation EIR, King City, CA

Conducted the noise portion of the EIR and assessed the suitability of the project areas for the intended development. Work included a reconnaissance of existing noise sources and receptors in and around the project areas, and long-term noise measurements at key locations.



Conoco Phillips Community Study and Expert Witness, Rodeo, CA

Investigated low frequency noise from exhaust stacks and provided expert witness services representing Conoco Phillips. Evaluated effectiveness of noise controls implemented by the refinery.

Golden Gate Park Concourse Underground Garage, San Francisco, CA

Noise and vibration testing during underground garage construction to monitor for residences and an old sandstone statue during pile driving for the City of San Francisco.

Laguna Honda Hospital, Clarendon Hall Demolition, San Francisco, CA

Project manager for performed vibration monitoring during demolition of an older wing of the Laguna Honda Hospital.

Loch Lomond Marina EIR, San Rafael, CA

Examined traffic noise impacts on existing residences for the City of San Rafael. Provided the project with acoustical analyses and reports to satisfy the requirements of Title 24.

Mare Island Dredge and Material Disposal, Vallejo, CA

EIR/EIS analysis of noise from planned dredged material off-loading operations for the City of Vallejo.

Napa Creek Vibration Monitoring Review, CA

Initially brought in to peer review construction vibration services provided by another firm, but eventually was tapped for its expertise to develop a vibration monitoring plan for construction activities near historic buildings and long-term construction vibration monitoring.

San Francisco DPW, Environmental Services On-Call, CA

Noise and vibration monitoring for such tasks as: Northshore Main Improvement project, and design noise mitigation for SOMA West Skate Park.

San Francisco PUC, Islais Creek Clean Water Program, San Francisco, CA

Community noise and vibration monitoring during construction, including several stages of pile driving. Coordination of noise and ground vibration measurements during pile driving and other construction activity to determine compliance with noise ordinance. Coordination with Department of Public Works to provide a vibration seminar for inspectors and interaction with Construction Management team and nearby businesses to resolve noise and vibration issues.

San Francisco PUC, Richmond Transport Tunnel Clean Water Program, San Francisco, CA

Environmental compliance monitoring of vibration during soft tunnel mining and boring, cut-and-cover trenching for sewer lines, hard rock tunnel blasting and site remediation. Work involved long-term monitoring of general construction activity, special investigations of groundborne vibration from pumps and bus generated ground vibration, and interaction with the public (homeowners).

Santa Clara VTA, Capitol Expressway Light Rail (CELR) Bus Rapid Transit (BRT) Update EIS, CA

Reviewed previous BRT analysis and provide memo to support EIS.

***Shell Oil Refinery, Martinez, CA***

Identified source of community noise complaints from tonal noise due to refinery equipment and operations. Developed noise control recommendations. Conducted round-the-clock noise measurements at nearby residence and near to the property line of the refinery and correlated results. Conducted an exhaustive noise survey of the noisier pieces of equipment throughout the refinery to identify and characterize the dominant noise sources that were located anywhere from a quarter to three-quarters of a mile away. Provided a list of actions to mitigate noise from the noisiest pieces of refinery equipment. Assisted the refinery in the selection of long-term noise monitoring equipment to be situated on the refinery grounds so that a record of the current noise environment will be documented, and future noise complaints can be addressed more efficiently.

Tyco Electronics Corporation, Annual Noise Compliance Study, Menlo Park, CA

Conducted annual noise compliance monitoring. Provided letter critiquing the regulatory requirements and recommending improvements.

University of California, San Francisco Mission Bay Campus Vibration Study, CA

Conducted measurements and analysis of ground vibration across site due to heavy traffic on Third Street. Analysis included assessment of pavement surface condition and propensity of local soil structure.