

3.0 RESPONSE TO COMMENTS

Chapter 3 includes responses to the three (3) comment letters received (Letters included in Appendix A) on the Draft SEIR during the public review period. The following comment letters were received during the public review period for the Draft SEIR:

Letter 1: State of California Governor’s Office of Planning and Research – State Clearinghouse and Planning Unit – September 3, 2019

Letter 2: Adams Broadwell Joseph & Cardozo (on behalf of Citizens for Responsible Industry) – September 3, 2019

Letter 3: Imperial County Fire – September 18, 2019

Individual comments are bracketed and numbered in the right margin of the comment letters and the responses to the individual comment follow the letter with a corresponding response number. All non-CEQA related comments are noted as such and will be forwarded to the decision-makers.

Letter 1: State of California Governor’s Office of Planning and Research – State Clearinghouse and Planning Unit

Comment 1-1: The State Clearinghouse submitted the above-named SIR to selected state agencies for review. The review period closed on 9/2/2019, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act, <https://ceqanet.opr.ca.gov/2010111056/7>.

Response 1-1: Comment noted. The comment does not raise any significant environmental issues allegedly caused by the proposed Project or question the sufficiency of the environmental analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration.

Letter 2: Adams Broadwell Joseph & Cardozo (on behalf of Citizens for Responsible Industry)

Comment 2-1: The comment asserts that the Draft SEIR does not describe the specific kind of lithium-ion batteries the Project will use, nor the number of batteries the Project will include.

Response 2-1: The Project intends to install Lithium Nickel Manganese Cobalt Oxide (NMC) or Lithium Iron Phosphate (LFP) type lithium ion batteries from a top tier battery manufacturer. Individual battery cells are organized into battery modules and battery modules are organized into battery strings. The number of cells per battery module, and the number of battery modules per string vary by manufacturer, chemistry, and system voltage. A typical battery string rated at 110kWh typically consists of 12 to 16 modules and each module consists of 22 to 28 battery cells. The discharge duration of the system is expected to be up to 4 hours. For a 4-hour system, the total number of battery strings is anticipated to be approximately 5,750.

Comment 2-2: The comment asserts that the Draft SEIR fails to include the total amounts of the chemical components contained either in each individual battery, or the Project as a whole.

Response 2-2 The total amount of chemical components in a typical battery are shown in the MSDS sheets from Samsung and LG Chem in Appendix B of this Final SEIR document. The total number of battery cells will depend on final engineering design and discharge duration.

Comment 2-3: The comment asserts that the Draft SEIR also fails to adequately describe the layout of the batteries or the battery enclosures.

Response 2-3: CEQA requires a general description of the “main features” of the Project and does not require “all of the details or particulars.” *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. The project description in the Draft SEIR identifies Project characteristics in Section 2.6 (page 2-10). The batteries and enclosures will consist of banks of electrochemical batteries connected in series and parallel to provide the total energy storage capacity including associated electronics for monitoring and managing the batteries to ensure safety and the design life of the system

In addition to this information, the layout of the battery systems within the enclosures is further described below. Each battery module will consist of multiple lithium ion cells connected together and placed into a drawer-like housing called a module. These modules will then be stacked vertically in racks and connected in series to form battery

strings. Battery strings will be connected in parallel via combiner cabinets, which will then connect to a bi-directional inverter. Battery racks typically contain 12 to 16 modules, with racks back to back in long rows with aisles in between, looking very similar to a computer server farm or a warehouse of tall filing cabinets with all drawers openable into an aisle. Aisles are approximately 5 feet wide between the rows of battery racks. An example of a typical battery rack layout is shown below, with sets of modules connected into series strings, with another similar group back-to-back with what is shown all electrically connected the cabinet on the far left.



Figure 3-1

This is sufficient to inform the public and decision-makers concerning the scope of the Project and is therefore adequate since it describes the main features of the Project.

Comment 2-4: The comment asserts that the Draft SEIR fails to state how much wattage may be contained in a single enclosure.

Response 2-4: If the term “enclosure” is intended to mean the building then the single enclosure contains up to 125 Megawatts.

Comment 2-5: The comment asserts that the Draft SEIR fails to fully describe the decommissioning phase of the Project and explain which recycling facility would take the batteries, or even if such a facility exists or describe how the batteries will get there.

Response 2-5: CEQA requires a general description of the “main features” of the Project and does not require “all of the details or particulars.” *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. The project description in the Draft SEIR identifies the decommissioning phase of the project (Section 2.7, page 2-17). In addition, during decommissioning all batteries would be removed, tested, sorted, and either repurposed or recycled. Batteries that still have useful life could be repurposed, meaning they could be reused in other battery storage systems. Batteries at the end of their life would be recycled. Several existing recycling facilities can process lithium ion batteries. Two of these are: Lighting Resources – Environmental Services with plants in Ontario, CA and Arizona, and Global Tech Environmental with a plant in Fox Lake, WI. All the used batteries would be packaged for safe shipment and shipped by vehicle.

Comment 2-6: The comment asserts that the Draft SEIR also lacks key details regarding the ancillary equipment involved in the Project, such as the cooling and control systems, the inverters, the ventilation and the HVAC units.

Response 2-6: CEQA requires a general description of the “main features” of the Project and does not require “all of the details or particulars.” *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. The project description includes information on the project characteristics inclusive of the ancillary systems (Section 2.6, page 2-10). Although the features of ancillary equipment used in the project will depend on final design and vendor selection, all ancillary equipment, including inverters and HVAC units, will be of commercial or utility design and are already in widespread use on commercial buildings and renewable energy projects today. Example suppliers of HVAC equipment include Trane, Carrier,

Aaon and Daikan. Example suppliers of inverters include: Power Electronics, Ingeteam and SMA. Sample specification sheets for products from these suppliers are attached for informational purposes in Appendix B of this Final SEIR document.

Comment 2-7: The comment asserts that the Project description is inadequate because it does not accurately explain how the BESS will be connected to the electrical grid. The comment asserts that either the Project will only receive, store, and return solar-generated renewable energy or it will receive, store, and return energy from the wholesale power grid, which includes non-renewable energy sources such as natural gas and coal.

Response 2-7: The SDG&E Drew Switchyard is located directly west of the Project site. The Project will connect to the Drew Switchyard via the construction of a short overhead electric tie line that will connect to the existing Centinela Solar Energy (CSE) 230 kV gen-tie line which is connected to the Drew Substation. Figure 2-3 was included in the Draft SEIR indicating the location of the existing SDG&E Drew Switchyard in addition to the Project's connection to the existing CSE Facility 230 kV gen-tie line. The Project will receive and discharge electric energy at the Drew substation. Though a major use of the Project is expected to be storage of renewable energy from the many nearby solar facilities, charging energy will be wholesale energy from the CAISO grid.

Comment 2-8: The comment asserts that the Draft SEIR lacks essential information necessary to determine how much energy the Project will use and what kind of energy will charge the batteries.

Response 2-8: See also response to Comment 2-9. The Project will receive charging energy from the CAISO wholesale electric grid. For every 100 units of energy received to charge the batteries, approximately 85 units of electric energy will be returned to the CAISO wholesale electric grid. Though a major use of the Project is expected to be storage of renewable energy from the many nearby solar facilities, charging energy will be wholesale energy from the CAISO grid.

Comment 2-9: The comment asserts that the Draft SEIR fails to conduct an energy impacts analysis and that the Draft SEIR vastly underestimates the Project's GHG emissions by using the CalEED Mod to calculate GHG emissions from electricity usage at the facility and emissions from vehicle trips and does not analyze GHG impacts that would result from

the inefficiency of the Project batteries and inform how the Project affects other energy sources on the electrical grid.

Response 2-9: Operation of the Project does not create pollutant emissions when charging or discharging. The Project does not create energy. The Project does not convert energy (e.g. wind energy to electric energy or energy from combustion to electric energy). Since it does not create or convert energy it does not create GHG emissions. By providing a method to store energy created from other energy resources on the electric grid, it improves the efficient utilization of other energy resources.

The proposed Project adds energy storage capability on the site of an existing solar generation facility. The intent of the Project is to economically receive, store and return electric energy to the electric grid that will facilitate the efficient use of renewable energy.

Generation projects in Imperial County supplying energy to the CAISO grid are required to be consistent with Imperial County policies and emissions reductions strategies and will not consume energy resources in a wasteful or inefficient manner. State and local authorities regulate energy use and consumption through various means and programs. These regulations at the state level are intended to reduce energy use and greenhouse gas (GHG) emissions. These include, among others, Assembly Bill (AB) 1493–Light-duty Vehicle Standards, California Code of Regulations Title 24, Part 6–Energy Efficiency Standards, California Code of Regulations Title 24, Part 11– California Green Building Standards. The ICAPCD has adopted Rule 904, Prevention of Significant Deterioration (PSD) Program, to regulate GHG emissions for new and modified major stationary sources. Affected sources will be subject to the Best Available Control Technology (BACT), which considers technical feasibility, cost and other energy, environmental and economic impacts. Rule 904 applies to projects that will result in 75,000 or more tons per year of Carbon Dioxide equivalents (CO₂e). The proposed Project’s construction methods and operations are consistent with these goals and measures.

The commenter makes assumptive assertions that fossil-fuel derived energy generation would increase as a result of Project operation and would thus the Project would result in increased GHG emission. To specifically assess the fossil-fuel derived energy generation sources feeding into the CAISO grid in order to quantify and analyze GHG impacts is

speculative in nature and not required under CEQA. CEQA Guidelines Section 15144 and 15145: *this section limits the requirement for forecasting to that which could be reasonably expected under the circumstances and is part of the effort to provide a general "rule of reason" for EIR contents.* As part of this assumption, the commenter speculates that in addition to GHG emissions increasing due to fossil-fuel derived energy generation sources charging the Project, these sources feeding into the CAISO grid would remain and continue to contribute during Project operation. Senate Bill No. 100 [(Chapter 312) an act to amend Sections 399.11, 399.15, and 399.30 of, and to add Section 454.53 to, the Public Utilities Code, relating to energy] approved September 10, 2018 and filed with Secretary of State September 10, 2018 establishes the California Renewables Portfolio Standard Program.

...This bill revises legislative findings and declarations to state that the goal of the program is to achieve that 50% renewable resources target by December 31, 2026, and to achieve a 60% target by December 31, 2030. The bill would require that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatthours of those products sold to their retail end-use customers achieve 44% of retail sales by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030....

...This bill would state that it is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045. The bill would require that the achievement of this policy for California not increase carbon emissions elsewhere in the western grid and that the achievement not allow resource shuffling. The bill would require the PUC and the Energy Commission, in consultation with the state board, to take steps to ensure that a transition to a zero-carbon electric system for the State of California does not cause or contribute to greenhouse gas emissions increases elsewhere in the western grid. The bill would require the PUC, Energy Commission, state board, and all other state agencies to incorporate that policy into all relevant planning. The bill would require the PUC, Energy Commission, state board, and all other state agencies to ensure actions taken in furtherance of these purposes achieve specified objectives. The bill would require the PUC, Energy Commission, and state board to utilize programs authorized under existing statutes to achieve that policy and, as part of a public process, issue a joint report to the Legislature by January 1, 2021, and every 4 years thereafter, that includes specified information relating to the implementation of the policy....¹

¹ https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

As evidenced by Senate Bill No. 100, the state focus on fossil-fuel generation resources feeding into CAISO grid will continue to reduce over time; conversely, there is a state focus to increase renewable resources feeding into the CAISO grid. As such, to assume energy generation from fossil-fuel generation sources would increase through operation of the Project is not only unreasonable to speculate and calculate, but it also ignores established statewide goals.

In addition, the analysis of energy impacts is subject to the rule of reason and is to focus on energy use that is caused by the project. Judicial review of the content of EIRs typically incorporates the “rule of reason” standard to assess whether the lead agency has complied with CEQA. An EIR is to show that an agency has made an objective, good-faith effort at full disclosure (CEQA Guidelines Section 15151) and exhaustive treatment of issues is not required in an EIR. The scope of judicial review does not extend to the correctness of an EIR’s conclusion, but only to the EIR’s sufficiency as an informative document for decision makers and the public [CEQA Guidelines Section 15003(i)]. Here, the analysis cannot reasonably assume that a specific amount of fossil-fuel derived energy that would be directed towards the Project. Charging energy for the Project will be provided from the CAISO wholesale electric grid and the Project will operate depending on CAISO’s needs and market conditions.

The potential of GHG emissions from the Project’s electric use were analyzed using the California Emissions Estimator Model (CalEEMod). Electrical demand of the facility was conservatively modeled at a standard Title-24 Electricity Energy Intensity of 2.31 KWhr/square foot to determine GHG emissions. CalEEMod is a comprehensive tool for quantifying air quality impacts from land use projects located throughout California and can be used for a variety of situations where an air quality analysis is necessary or desirable such as preparing CEQA documents, conducting pre-project planning, and, verifying compliance with local air quality rules and regulations, etc. The model quantifies direct emissions from construction and operation activities (including vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use. The model was developed for the California Air Pollution Officers Association (CAPCOA) in collaboration with the California Air Districts.

Comment 2-10: The comment asserts that the Draft SEIR must be revised to include appropriate mitigation measures, such as restricting battery charging to daytime hours when solar is available, restricting charging to times when renewable generation would otherwise be curtailed, or implementing carbon offsets at other locations.

Response 2-10 Please see Response to Comment 2-9. As GHG emissions would not increase as a result of operation of the proposed Project additional mitigation restricting operations to daytime hours when solar is available is not required.

Comment 2-11: The comment asserts that the Draft SEIR failed to fully analyze the significant impact of a lithium-ion battery fire and failed to designate fire prevention and suppression measures as mitigation measures.

Response 2-11: The Draft SEIR acknowledges the potential fire risks with lithium-ion cells and further provides fire protection and prevention measures (Sections 2.6.4.1 and of the Draft SEIR and the analysis of Impact 3.5-2 in Chapter 3.5); these are both design features as well as adherence to applicable codes and regulations relevant to fire prevention and suppression. Measures would be taken to reduce the risk of potential lithium-ion battery fire at the site. This risk is addressed through the installation of a monitoring and fire suppression system that includes water and or a suppression agent (e.g. FM-200, Novatech) with smoke detectors, control panel, alarm, piping and nozzles. The fire protection system will be designed by a certified fire protection engineer and installed by a fire protection system contractor licensed in California and in accordance with all relevant building and fire codes in effect in the County at the time of building permit submission.

The fire protection plan will include a combination of prevention, suppression, and isolation methods and materials. The general approach to fire mitigation at the proposed Project site would be prevention of an incident, followed by attempts to isolate and control the incident to the immediately affected equipment, then to suppress any fire with a clean agent so as to reduce damage to uninvolved equipment. Finally, as necessary, fire mitigation could also include manually suppression using water spray or mist. The Project will comply with all applicable fire codes (including those of Imperial County), standards from UL (safety organization), and the National Fire Protection Association (UL-9540A).

During the building permit process, the Applicant will work closely with the Imperial County Fire Marshal to ensure that the design is compliant with all relevant local codes and standards.

The proposed Project will be designed and built to the latest safety standards with multiple redundant forms of protection against electrical faults and fire events at every level of the system. An automatic smoke and fire detection and alarm system coupled with water-based suppression system and/or clean-agent based suppression system will be utilized. Each cell and module will have redundant safety features including electrical fuses and overcharge protection. Every battery cell bank will be monitored for voltage, temperature, and current, and an automated control system will disconnect any battery with irregular behavior, which will be inspected before it will be returned to operation. Safety measurement points throughout each battery pack and within the system as a whole would alert the operations and maintenance organization if there is a deviation from normal operating conditions. The battery modules will include high voltage DC isolation switches for separating each battery zone into low voltage blocks safe for maintenance. A hierarchical fusing system with protection at the zone, rack, module, and individual cell level will be used, offering system safety even if the software control system is not functional. These cells are designed to clear in the proper order under over-current and/or short circuit situations, preventing uncontrolled discharge of stored energy.

Supplemental to the proposed Project fire safety features previously described and in alignment with other similar projects within Imperial County, the Project would comply with all applicable California Fire Code (2016) requirements. These requirements would apply and be implemented as part of the Project. Project compliance with these requirements would reduce impacts associated with hazard through upset/release of hazardous materials resulting from risk of fire during operation to less than significant.

Comment 2-12: The comment asserts that the Draft SEIR does not specify how the batteries will be transported, where the batteries will be manufactured, the recycling center or routes/roadways to be used.

Response 2-12: The location of battery manufacture will depend on the battery supplier selected to supply the batteries. Top tier battery suppliers have manufacturing and final assembly facilities in China, Korea, Mexico and the United States. Batteries and related components will be

transported to the site via ship, railway, and highway, in compliance with all relevant transportation regulations and safety requirements. The Project will also be subject to all local (County Ordinance), state and federal laws pertaining to the use of hazardous materials onsite during construction. The analysis under Impact 3.5-2 in Chapter 3.5 reviews all phases of the Project; construction, operation and decommissioning. Project construction activities will comply with DTSC regulations regarding the transport, use, storage, and disposal of such materials. Hazardous waste transporters must comply with the California Vehicle Code, CHP Regulations (Cal. Code Regs., tit. 13); the California State Fire Marshal Regulations (Cal. Code Regs., tit. 19); United States Department of Transportation (DOT) Hazardous Waste Transporter Requirements Fact Sheet, August 2007 2 Regulations, Title 49, Code of Federal Regulations (49 Code of Federal Regulations); and U. S. Environmental Protection Agency (U.S. EPA) Regulations, Title 40 Code of Federal Regulations. In addition, hazardous waste transporters must comply with the Health & Saf. Code and Cal. Code Regs., tit. 22 which are administered by DTSC. No acutely toxic hazardous material use is anticipated and the materials to be used do not pose a significant potential for impacts to the public and/or environment through a large release of chemicals.

Comment 2-13: The comment asserts that the Draft SEIR underestimates the risk of a lithium-ion battery fire and does not contemplate how earthquakes might increase the risk of fires, or how this increased risk might be mitigated through design or construction and suggests the Draft SEIR should be revised to consider the various foreseeable mechanisms that could start a fire at the facility.

Response 2-13: As indicated in Chapter 3.5 of the SEIR, and in response Comment 2-11 and Comment 2-12, the fire protection system will be designed by a certified fire protection engineer and installed by a fire protection system contractor licensed in California and in accordance with all relevant building and fire codes in effect in the County at the time of building permit submission. Supplemental to the proposed Project fire safety features previously described and in alignment to other similar projects within Imperial County, the following California Fire Code (2016) requirements would apply and be implemented as part of the Project. Project compliance with these requirements would reduce impacts associated with hazard through upset/release of hazardous materials resulting from risk of fire during operation to less than significant. The applicable requirements include:

608.8 Seismic protection. *The battery systems shall be seismically braced in accordance with the California Building Code.*

Comment 2-14: The comment asserts that the Draft SEIR fails to analyze the unique challenges associated with fighting a lithium-ion battery fire.

Response 2-14: Fire risk factors have been analyzed in the Draft SEIR through a review of project design features including monitoring, diagnostics and by a fire suppression system. See also response to Comment 2-11. The Draft SEIR acknowledges the potential fire risks with lithium-ion cells and further provides fire protection and prevention measures (Sections 2.6.4.1 and of the Draft SEIR and the analysis of Impact 3.5-2 in Chapter 3.5); these are both design features as well as adherence to applicable codes and regulations relevant to fire prevention and suppression. During the building permit process, the Applicant will work closely with the Imperial County Fire Marshal to ensure that the design is compliant with all local codes and standards. An automatic smoke and fire detection and alarm system coupled with water-based suppression system and/or clean-agent based suppression system will be designed.

Comment 2-15: The comment asserts that the Draft SEIR never analyzes the serious risks to human health and the environment that a lithium-ion battery fire would cause and explain the health implications of these chemicals, or how they could be released and transformed into something even more toxic in a fire.

Response 2-15: Large quantities of hazardous materials are not required as part of construction, operation, or decommissioning of the proposed Project. The Project's lithium ion batteries can be flammable, they would be enclosed, equipped with a fire safety system and would be required to meet all applicable California Fire Codes. The batteries for the Project are in an enclosed facility. An added level of protection is included in as part of Project design by housing the battery units in enclosed structures to provide containment should a fire break out. In addition, housing the battery units in an enclosure also mitigates the risk of potential spills. The Project will also be required to comply with State laws and County Ordinance restrictions which regulate, and control hazardous materials handled on-site. Workers would be trained on how to properly and safely handle the batteries with the proper personal protective equipment (PPE) based upon the material safety data sheets (MSDS) of the batteries. See also response to Comment 2-11.

Comment 2-16: The comment asserts that the Draft SEIR never explicitly finds that fire risk poses a significant impact and evades a significance finding by leaping straight to mitigation measures that are disguised as project design features and that the Draft SEIR must be revised to designate all fire prevention and suppression measures as mitigation as well as indicate exactly which fire safety standards the Project will use.

Response 2-16: The DESIR finds that fire risk is a less than significant risk and therefore no mitigation is required. The proposed Project BESS will incorporate the latest safety standards with multiple redundant forms of protection against electrical faults and fire events at every level of the system. Inherent to the BESS, each cell and module will have redundant safety features including electrical fuses and overcharge protection. Every battery cell bank will be monitored for voltage, temperature, and current, and an automated control system will disconnect any battery with irregular behavior, which will be inspected before it will be returned to operation. Safety measurement points throughout each battery pack and within the system, as a whole, would alert the operations and maintenance organization if there is a deviation from normal operating conditions. See also response to Comment 2-11.

Comment 2-17: The comment asserts that the Draft SEIR improperly defers fire prevention and suppression mitigation to an indeterminate future date and that the Draft SEIR must be revised to include both the ERP and any other fire plan developed to minimize fire risks.

Response 2-17: There is no deferral of fire prevention as part of the Project. The inherent BESS facility will be designed with safety standards and multiple redundant forms of protection against electrical faults and fire events at every level of the system as indicated in Response 16. Inherent to the BESS, each cell and module will have redundant safety features including electrical fuses and overcharge protection.

Comment 2-18: The comment asserts that the Draft SEIR fails to analyze and mitigate health impacts from pesticide and herbicide residues contained in the soil.

Response 2-18: As indicated in Chapter 3.5, the Project site was historically farmed but is now part of the existing CSE facility. The Phase I ESAs prepared for the CSE facility project found that pesticide residues on farmland in Imperial County were typically at 25 to 50 percent of regulatory action levels (Lyon, 2011). During construction, ground disturbing activities have the potential to disperse pesticide residuals. Dust generation would be addressed

through ICAPD regulations mandated to reduce dust during construction. As described in Section 3.1 of the Draft SEIR, with respect to PM10, the ICAPCD implements Regulation VIII – Fugitive Dust Rules, to control these emissions and ultimately lead the basin into compliance with air standards, consistent with the AQAP. Within Regulation VIII are Rules 800 through 806, which address construction and earthmoving activities, bulk materials, carry-out and track-out, open areas, paved and unpaved roads, and conservation management practices. Best Available Control Measures to reduce fugitive dust during construction and earthmoving activities include but are not limited to:

- Phasing of work in order to minimize disturbed surface area
- Application of water or chemical stabilizers to disturbed soils
- Construction and maintenance of wind barriers
- Use of a track-out control device or wash down system at access points to paved roads

Compliance with Regulation VIII is mandatory on all construction sites, regardless of size. Compliance for a project includes: (1) the development of a dust control plan for the construction and operational phase; and (2) notification to the air district is required 10 days prior to the commencement of any construction activity. Herbicides and pesticides may be used to control vegetation during construction. These products would be used in accordance with manufacturer prescribed and labeled instructions as authorized by the Federal Insecticide, Fungicide, and Rodenticide Act. Also, BMPs would be implemented that will include a weed control plan which will be developed and approved by the County Agricultural Commissioner prior to herbicide application. Therefore, impacts associated with hazard through upset/release of hazardous materials resulting from exposure to pesticide residue and herbicides during construction, operation and decommissioning are considered less than significant.

The Project site was cleared during the construction of the CSE facility. No Recognized Environmental Conditions (RECs) were identified at the site or on the surrounding parcels in the Phase I ESAs, therefore, impacts associated with hazard through upset/release of hazardous materials resulting from exposure to pesticide residue and herbicides during construction, operation and decommissioning are considered less than significant and Mitigation Measure HM-1 will be removed, as indicated in Chapter 2 of the Final SEIR.

Comment 2-19: The comment asserts that the Draft SEIR finds that storage of chemicals on site is a significant impact but fails to mitigate this impact.

Response 2-19: As indicated in Chapter 3.5, Hazardous materials such as diesel fuel, oil, and grease for heavy equipment will be transported, used, and potentially stored at the Project site during construction. These activities will comply with DTSC regulations regarding the transport, use, storage, and disposal of such materials. The Project will also be subject to all local (County Ordinance), state and federal laws pertaining to the use of hazardous materials onsite during construction. No acutely toxic hazardous material use is anticipated and the materials to be used during construction do not pose a significant potential for impacts to the public and/or environment through a large release of chemicals. The Project will be designed and BMPs would be implemented to minimize the potential for leaks and spills of hazardous materials during construction. These BMPs would include instructions for proper handling and disposal of materials including prohibiting hazardous materials from being drained onto the ground or into nearby drainages. All construction waste would be required to be transferred to a disposal facility authorized to accept such materials. As such, accident conditions as part of use and storage during construction, operation and decommissioning of the Project would be less than significant and no mitigation would apply. As indicated in Chapter 2 of this Final SEIR, Mitigation Measure HM-1 has been removed.

Comment 2-20: The comment asserts that the Draft SEIR fails to adequately analyze the project's air quality impacts during construction by using emissions data from "Tier 2" construction equipment and makes no significance finding about cancer risks from DPM exposure and never commits to using Tier 2 equipment.

Response 2-20: Construction of the proposed Project will utilize Tier 2 equipment. As indicated in Chapter 2 of this Final SEIR, the text has been revised to reflect this by replacing the phrase '*is expected*' with '*will be*' accordingly.

Comment 2-21: The comment asserts that the Draft SEIR identifies the Salton Sea Air Basin (SSAB) as the Geographic scope for examining cumulative impacts on air quality but uses a much smaller geographic scope instead and does not explain why this more limited geographic scope was chosen for examining cumulative impacts.

Response 2-21: The cumulative impact analysis has two goals: (1) to determine whether the overall long-term impacts of all related projects across a broader geographic area would be cumulatively significant, and (2) to determine whether the Project itself would cause a “cumulatively considerable” (and thus significant) incremental contribution to a cumulatively significant impacts. (Reference CEQA Guidelines Sections 15064(h), 15065(c), 15130(a), 15130(b), and 15355(b); *Communities for a Better Environment v. California Resources Agency* (2002) 103 Cal.App.4th 98, 120.).

A component of the cumulative analysis consists of the duration and frequency and whether the effect is a one-time event, intermittent, or long-lasting. The temporal scope refers to the duration over which an impact would occur: short-term or long-term. This limits when a project’s impacts are to be analyzed in the cumulative effects analysis compared to those that would cause impacts at the same time as the proposed Project. The County developed a list of cumulative existing and foreseeable future projects within Imperial County as indicated in Table 4-1 of the Draft SEIR and Figure 4-1. These projects include projects recently constructed existing projects, under construction, approved, but currently not built projects and projects that have submitted a development application at the time of release of the NOP.

As indicated in the Draft SEIR, in addition to the geographic scope, the temporal scope of impacts to air quality during the development of cumulative projects would occur during the short-term construction portion of the proposed Project, because short-term impacts to air quality would occur during this time period in association with the addition of construction equipment to the landscape. Impacts from similar projects identified within the SSAB that would result from limited vehicle trips for operations, maintenance, and inspection and would be substantially less than construction impacts. The very small increases in traffic volumes associated worker trips to these similar facilities are not anticipated to adversely impact air quality during the operational life of the Project.

The commenter referenced a specific project, the Heber Solar Project, as well as *multiple solar plants located in and around the City of Calipatria* while also referencing a source (<https://www.seia.org/research-resources/major-solar-projects-list>) for these projects. The projects referenced by the commenter in the website above represent operational solar sites; as such, the short-term construction related impacts to air quality have already occurred.

Cumulative impacts are defined in the CEQA Guidelines 15355 as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” In this case, the projects referenced by the commenter would not meet this definition as the proposed short-term Project construction period would not coincide with the reference projects, as the referenced projects are already built and operational, will not be built or will progress through the short-term construction phase during a different time period than the proposed Project. To further substantiate this, the following projects are operational; as such, short-term impacts resulting from construction have occurred:

- Imperial Valley Solar II (142 Acres, 20 MW)
- IV Solar Company (123 Acres, 23 MW)
- Citizens Solar (223 Acres, 30 MW)
- Sonora Solar (488 Acres, 50 MW)
- Midway Solar Farm 1 (480 Acres, 50 MW)
- Midway Solar Farm II (320 Acres, 30 MW)
- Arkansas Solar (481 Acres, 50 MW)
- (Calipat Solar Farm 1 (159 Acres, 20 MW)
- Alhambra Solar (482 Acres, 50 MW)
- Valencia Solar Project 1 (16.18 Acres, 3 MW)
- Seville Solar (1,238 Acres, 135 MW)
- Seville IV (174 Acres, 20 MW)
- Dixieland West (29 Acres, 3 MW)
- Dixeland East (21 Acres, 2 MW)
- Imperial Solar West (1,130 Acres, 250 MW)
- Campo Verde (1,443 Acres, 140 MW)
- Centinela Solar (1,645 Acres, 175 MW)
- Mount Signal Solar (1,431 Acres, 200 MW)
- Imperial Solar South (946.6 Acres, 200 MW)
- Calexico II-A (940 Acres, 100 MW)
- Calexico II-B (525 Acres, 100 MW)
- Midway Solar Farm III (162 Acres, 20 MW)
- Imperial Solar 1 LLC (Heber Solar Energy Facility) (80 Acres, 14 MW)
- Iris Cluster (Rockwood Solar) (396 Acres, 100 MW)

The following projects have obtained building permits, are under construction or are concluding construction; as such, these projects will be completed prior to construction of the proposed Project:

- Iris Cluster (Ferrell Solar) (364 Acres, 90 MW)
- Iris Cluster (Iris Solar Farm) (502 Acres, 130 MW)
- Portions of Wistaria Ranch Solar
- Valencia Solar Project 2 (17 Acres, 3 MW)
- Valencia Solar Project 3 (19 Acres, 3 MW)
- Calexico 1-A (719 Acres, 100 MW)
- Calexico 1-B (610 Acres, 100 MW)

The following projects have been approved but will not be built or have no anticipated plans for construction; as such, these projects are not anticipated to overlap with Project construction:

- Chocolate Mountain (320 Acres, 49.9 MW)
- Wilkinson (302 Acres, 30 MW)
- Midway Solar Farm IV (150 Acres, 20 MW)
- Big Rock Cluster (Laurel Solar 1) (171 Acres, 60 MW)
- Big Rock Cluster (Laurel Solar 2) (280 Acres, 70 MW)
- Big Rock Cluster (Laurel Solar 3) (587 Acres, 140 MW)
- Big Rock Cluster (Big Rock Solar) (342 Acres, 75 MW)
- Centinela Solar (422 Acres, 100 MW)
- Wistaria Ranch Solar (2,661 Acres, 250 MW)
- Iris Cluster (Lyons Solar) (138 Acres, 40 MW)

The following projects are pending entitlement but have no current plans for construction; as such, these projects are not anticipated to overlap with Project construction:

- Ormat Wister Solar (640 Acres, 40 MW)
- Nider (320 Acres, 100 MW)
- Vega SES (574 Acres, 100 MW)
- Drew Solar, LLC (762 Acres, 100 MW)

Comment 2-22: The comment asserts that the Draft SEIR fails to adequately analyze cumulative impacts from ozone, PM10 and PM 2.5 during construction and that the Draft SEIR's conclusion that there will be no overlapping construction and therefore the Project's cumulative impacts will not be considerable lacks substantial evidence and violates case law.

Response 2-22: As previously described, cumulative impacts are defined in the CEQA Guidelines 15355 as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” In this case, the projects referenced by the commenter would not meet this definition as the proposed short-term Project construction period would not coincide with the reference projects, as the referenced projects are already built and operational. See response to Comment 2-21.

Comment 2-23: The comment asserts that the Draft SEIR's reliance on ICAPCD Regulation VIII to avoid a cumulative impacts analysis is also unjustified and that the Draft SEIR asserts that compliance with a law (Regulation VIII) aimed at reducing, but not eliminating, PM 10 from construction activities renders such an analysis unnecessary.

Response 2-23: Please refer to Response 2-22.

Comment 2-A1: The comment asserts that the Draft SEIR does not contain a Material Safety Data Sheet (MSDS) for the batteries or otherwise disclose their chemical composition, a *sine qua non* for assessing the fire, explosion, health, and other risks of the battery storage facility.

Response 2-A1: See response to Comment 2-2.

Comment 2-A2: The comment asserts that the Draft SEIR does not include any information on the layout of the batteries within the facility or the fire suppression system that will be used.

Response 2-A2: See response to Comment 2-3 regarding layout. The fire suppression system will be installed in accordance with all relevant fire safety codes and requirements including: Imperial County Building and Fire Codes, National Fire Protection Association, and National Electric Code.

The Project fire suppression system will include both gas clean agent (e.g. FM200 or Novec1230) and water deluge fire suppression systems. Both of these systems will be

integrated with related building systems such as smoke detection, fire alarm, and building ventilation.

Comment 2-A3: The comment asserts that the Draft SEIR does not include any vendor specifications for the ancillary equipment required to support the batteries, including the cooling and control systems, 56 inverters, 56 transformers, and 40 rooftop heating, ventilation, and air conditioning (HVAC) units and substation equipment.

Response 2-A3: See response to Comment 2-6.

Comment 2-A4: The comment asserts that the Draft SEIR contains no information on the gross or net generation of electricity needed to operate the facility, storage capacity, storage efficiency, and expected energy output of the batteries.

Response 2-A4: The facility will be capable of receiving and discharging 125 MW at its point of interconnection (Drew Switchyard). See also the responses to Comment 2-1 and Comment 2-8.

Comment 2-A5: The comment asserts that the Draft SEIR ignores the greenhouse gas (GHG) emissions from charging the batteries.

Response 2-A5: See response to Comment 2-9.

Comment 2-A6: The comment asserts that the CalEEMod model only includes emissions from electricity usage and vehicle trips to service the facility.

Response 2-A6: See response to Comment 2-9.

Comment 2-A7: The comment asserts that the CalEEMod does not include GHG emissions from electricity usage at battery storage facilities.

Response 2-A7: See response to Comment 2-9.

Comment 2-A8: The comment asserts that the Draft SEIR contains no information on the net generation of electricity needed to operate the facility.

Response 2-A8: See response to Comment 2-8.

Comment 2-A9: The comment asserts that the Draft SEIR makes no commitment that the batteries will be charged with renewable energy.

Response 2-A9: See response to Comment 2-8. Charging energy for the Project will be provided from the CAISO wholesale electric grid which includes significant and increasing amounts of renewable energy including solar energy in Imperial County. CAISO will dispatch the Project depending on CAISO's needs and market conditions. Because charge and discharge will be largely controlled by CAISO, the Project is unable to make a specific commitment to charging with renewable energy.

Comment 2-A10: The comment asserts that the Draft SEIR fails to provide any of the information required to estimate charging emissions, including the storage capacity, storage efficiency, and expected energy output of the batteries.

Response 2-A10: See response to Comment 2-1 regarding storage capacity. See response to Comment 2-8 regarding storage efficiency. See response to Comment 2-A4 regarding expected energy output.

The Project does not create energy. It receives, stores, and discharges energy. The Project has the ability to provide this service— receive surplus grid energy (typically between daytime hours when the emission free solar energy is in abundance on the grid), store, and then discharge the stored energy when there is need (typically the evening hours when solar energy production is ramping down) – and provides a path to increase the production and use of renewable energy.

Comment 2-A11: The comment asserts that the total GHG emissions for the Project are at least 10,331 MT/yr and that the Project GHG emissions are highly significant, requiring mitigation.

Response 2-A11: See response to Comment 2-9.

Comment 2-A12: The comment asserts that the Draft SEIR contains no analysis at all of the hazards and hazardous material impacts of the battery storage facility, thus failing as an informational document under CEQA.

Response 2-A12: See response to Comment 2-19.

Comment 2-A13: The comment asserts that the Draft SEIR fails to include any analysis of fire and explosion impacts of the BESS.

Response 2-A13: See response to Comment 2-11 and response to Comment 2-A18.

Comment 2-A14: The comment asserts that the Draft SEIR fails to analyze or even discuss the risk of transporting the batteries to the site and the risks of constructing, commissioning, and decommissioning the BESS when operational safety measures discussed in the Draft SEIR would not be present.

Response 2-A14: See response to Comment 2-12.

Comment 2-A15: The comment asserts that the Draft SEIR lacks substantial evidence to conclude that there will be no fire or explosion during transport, construction, commissioning, operation, and decommissioning and leaps to a general ‘fire protection plan’ which is not enforceable mitigation.

Response 2-A15: See response to Comment 2-16.

Comment 2-A16: The comment asserts that the Draft SEIR downplays the risk of fires by comparing Project battery fires to battery fires in electric vehicles and fails to acknowledge lithium-ion batteries in electric cars or explain how the Project BESS will be designed to avoid them.

Response 2-A16: See response to Comments 2-A23 and 2-A24.

Comment 2-A17: The comment asserts that the Draft SEIR fails to explain (or even acknowledge) the history of fires at similar battery storage facilities and how the proposed Project design will guard against similar fires.

Response 2-A17: See response to Comment 2-11

Comment 2-A18: The comment asserts that a traffic accident involving the BESS cannot be ruled out and that the risk of fire from battery malfunctions or traffic collisions is not zero because the technology is new and there is still much to learn.

Response 2-A18: The assertion that a traffic accident involving the BESS cannot be ruled out is speculative. An agency must use its best efforts to predict the reasonably foreseeable

environmental impacts that occur with project implementation. However, an EIR need not speculate on impacts that are not foreseeable; the distinction between foreseeable prediction and mere speculation is at play here. A vehicular impact with the BESS facility is too speculative to evaluate and CEQA does not require a “worst-case” analysis, but merely what is reasonably foreseeable. CEQA Guidelines Section 15144 and 15145 state that (Section 15144) *this section limits the requirement for forecasting to that which could be reasonably expected under the circumstances and is part of the effort to provide a general "rule of reason" for EIR contents.* Here, it is too speculative unreasonable that a vehicle would collide with the proposed BESS facility while it is traveling parallel to the proposed Project site on State Highway 98 buffered by existing vegetation, a perimeter fence, a 230kV transmission pole, inverters, substation facilities, and more than 500 feet of separating distance.

Comment 2-A19: The comment asserts that the Draft SEIR also indicates that measures will be taken "to reduce the risk of potential lithium-ion battery fires and that "reducing the risk" does not eliminate the risks, including explosions, adverse health impacts, and damage to nearby facilities and equipment.

Response 2-A19: See response to Comment 2-11.

Comment 2-A20: The comment asserts that the Draft SEIR does not include the "fire protection plan," deferring it to the future outside of CEQA review.

Comment 2-A20: See response to Comment 2-11. The Draft SEIR requires and outlines the substantive requirements of a fire protection plan to include a combination of prevention, suppression, and isolation methods and materials (Section 3.5.5, page 3.5-20). This is sufficient to inform the public and decision-makers concerning the scope of the Project.

Comment 2-A21: The comment asserts that the Draft SEIR does not contain any information on battery system layout, other than to note batteries would be placed in cabinets and installed in separate battery rooms or state how much wattage may be contained in a single enclosure.

Response 2-A21: See response to Comment 2-3.

Comment 2-A22: The comment asserts that the Draft SEIR the Draft SEIR fails to identify and analyze the numerous ways that a fire at the proposed BESS could be triggered.

Response 2-A22: As explained in response to Comments A23 and A24 the Project will employ systems to minimize and control the potential for fire.

Comment 2-A23: The comment asserts that the Draft SEIR does not mention a thermal runaway risk of the lithium-ion batteries. The Draft SEIR does not even mention this failure mode or explain how the proposed fire control measures would address it.

Response 2-A23: Thermal runaway occurs in situations where an increase in temperature changes the conditions in a way that causes a further increase in temperature, often leading to a destructive result. It is a kind of uncontrolled positive feedback. Thermal runaway occurs when a mis-operating component is not isolated from the system prior to reaching its uncontrolled positive feedback condition. To prevent the conditions that can lead to thermal runaway, the Project will have a combination of insulation resistance monitors, current sensors, cell temperature sensors, module and string overcurrent protection (fuses), battery disconnect switches, smoke sensors, warnings, alarms, and fire suppression systems that will be installed and utilized to detect potential mis-operation, isolate the effected component (e.g. open a switch) from the system, and, if needed, initiate the fire suppression system.

Comment 2-A24: The comment asserts that the Draft SEIR is silent on the design of the batteries-critical information required to evaluate hazards-thus failing as an informational document under CEQA.

Response 2-A24: In response, the battery systems will be built in an ISO 9001 compliant facility with UL 1642 certified cell design, UL 1973 certified design of stationary battery systems, and UL 9540 certified manufacturing and testing processes. UL 9540 is a newer certification establishing that the entire energy storage system (“ESS”) including batteries, PCS, and enclosures have been built and tested according to UL and industry standards. The battery manufacturer shall demonstrate that the battery cells, modules, and racks for use in the Le Conte facility are able to pass the UL 9540A testing regimen, wherein batteries are deliberately set on fire as part of the testing regimen, and the system does not allow flame to propagate to the adjacent batteries. This is currently the highest standard of testing around the world for battery projects.

Comment 2-A25: The comment asserts that the Draft SEIR does not include a risk of upset analysis, or any analysis at all, of the likelihood of a fire and its consequences.

Response 2-A25: Refer to the analysis under Impact 3.5-2 of Section 3.5.5 of the Draft SEIR. Any potential fire risk that the traditional lithium-ion cells will most likely be caused by over-charging or through short circuit due to age. This risk will be reduced through monitoring and a fire suppression system that includes water and or a suppression agent (eg FM-200, Novatech) with smoke detectors, control panel, alarm, piping and nozzles. The fire protection system will be designed by a certified fire protection engineer and installed by a fire protection system contractor licensed in California and in accordance with all relevant building and fire codes in effect in the County at the time of building permit submission. While completely avoiding damage may not be possible, adherence to these codes would be effective in minimizing the potential hazards. Therefore, impacts from fire hazards are considered less than significant.

Comment 2-A26: The comment asserts that the Emergency Response Plan is not included in the Draft SEIR, preventing review and that the details of the fire suppression system are not disclosed in the Draft SEIR, but deferred to the future, outside of CEQA review.

Response 2-A26: The Draft SEIR requires and outlines the substantive requirements of an emergency response plan to address any chemical release, fires, or injuries that might occur during construction and operation (Section 3.5.3.4, page 3.5-6). This is sufficient to inform the public and decision-makers concerning the scope of the Project.

Comment 2-A27: The comment asserts that the Draft SEIR contains no information on the layout of batteries in the storage facility and thus fails as an informational document under CEQA.

Response 2-A27: See response to Comment 2-3.

Comment 2-A28: The comment asserts that the Draft SEIR failed to support the battery chemical information with an MSDS from the battery supplier, to indicate the relative amounts of each compound present in the battery, or to confirm that no other chemicals were present.

Response 2-A28: See response to Comment 2-2.

Comment 2-A29: The comment asserts that the Draft SEIR fails to discuss the risk of accidents during battery storage, handling, and transportation to the site and thus fails as an informational document under CEQA.

Response 2-A29: See response to Comment 2-12.

Comment 2-A30: The comment asserts that the Draft SEIR did not evaluate health impacts of Project operation or include an MSDS and other characterization data on the batteries or other impacts of a BESS fire.

Response 2-A30: See response to Comment 2-2, see also response to Comment 2-11.

Comment 2-A31: The comment asserts that the Draft SEIR does not contain a map that locates sensitive receptors (e.g., residences and workers).

Response 2-A31: As indicated in the 2011 FEIR, the CSE facility site (in which the proposed Project is located) is surrounded by agricultural lands as well as land under the jurisdiction of the BLM immediately to the west. The 2011 FEIR noted that no sensitive receptors would be significantly impacted by the CSE facility (see Noise Assessment Centinela Solar Energy Project, LDN Consultants, 2011 and page 3.4-11 of the 2011 FEIR). An existing residential structure (405 Drew Road) is located approximately 1,000 feet northwest (between Drew Road and SR 98) of the proposed Project center, outside of CSE facility boundary and opposite SR 98. The residence (405 Drew Road) is located on land zoned agricultural. No new sensitive receptors have been developed in the area since the 2011 FEIR; however, additional solar development has occurred east of the CSE Facility site, opposite Brockman Road.

Additionally, as noted on page 2-15 of the Draft SEIR, when operating, the Project will be unmanned operate year-round, and available to receive or deliver energy 24 hours/day. Routine maintenance activities, including equipment testing, monitoring, and repair will occur as needed. Only authorized personnel will be permitted on-site. Facility maintenance will include the periodic maintenance of structures and BESS components. Regular maintenance performed will consist of equipment inspection and replacement and occur primarily during daylight hours. Emergency maintenance could occur at any time, as needed; however, maintenance and emergency service during daylight hours will be encouraged to maximize worker safety. There are no sensitive receptors as identified in the FEIR and no sensitive receptors have been developed since the development of the CSE facility site. The existing and proposed solar development has also shown on Figure 4-1 of the Draft SEIR. The existing CSE Control Building or Operations and Maintenance (O&M) Building, where staffing as part of the CSE facility are located have been identified on Figures 2-7 and Figure 2-8.

Comment 2-A32: The comment asserts that the Draft SEIR does not make any commitment, as in a mitigation measure, requiring the use of Tier 2 equipment.

Response 2-A32: The Project will use construction equipment that is Tier 2 compliant. See also text revisions regarding Tier 2 compliance in Chapter 2 of this Final SEIR.

Comment 2-A33: The comment asserts that the Draft SEIR did not evaluate construction health impacts. Project construction could result in significant health impacts from three sources: (1) diesel particulate matter (DPM) emitted by construction equipment; (2) HAPs released by battery accidents during battery building setup; and (3) pesticides and herbicides in disturbed soils.

Response 2-A33: An analysis of construction impacts is evaluated in Chapter 3.1, Section 3.1.7. As shown in **Error! Reference source not found.** of the Draft SEIR, none of the construction emissions would exceed the significance threshold. It should be noted that all ICAPCD standard rules and regulations are required for all construction projects within the County. Based on this, the air quality emissions would be reduced even further from those presented in **Error! Reference source not found.** of the Draft SEIR. Therefore, Project construction emissions would not exceed the ICAPCD significance threshold and impacts with regard to obstructing an air quality plan would be less than significant during Project construction.

As further described in Chapter 3.5, Section 3.5.5, the Project site was cleared during the construction of the CSE facility. No Recognized Environmental Conditions (RECs) were identified at the site or on the surrounding parcels in the Phase I ESAs. Hazardous materials such as diesel fuel, oil, and grease for heavy equipment will be transported, used, and potentially stored at the Project site during construction. These activities will comply with DTSC regulations regarding the transport, use, storage, and disposal of such materials. The Project will also be subject to all local (County Ordinance), state and federal laws pertaining to the use of hazardous materials onsite during construction. No acutely toxic hazardous material use is anticipated and the materials to be used do not pose a significant potential for impacts to the public and/or environment through a large release of chemicals. The Project will be designed and BMPs would be implemented to minimize the potential for leaks and spills of hazardous materials during construction. These BMPs would include instructions for proper handling and disposal of materials including prohibiting hazardous

materials from being drained onto the ground or into nearby drainages. All construction waste would be required to be transferred to a disposal facility authorized to accept such materials. As such, accident conditions as part of use and storage during construction, operation and decommissioning of the Project would be less than significant.

Comment 2-A34: The comment asserts that the Draft SEIR does not contain the type of information normally relied upon to determine if the OEHHA risk assessment guidance is complied with, including a detailed construction schedule and maps that locate each project construction site and identify all nearby sensitive receptors, as well as their distance from construction work and duration of exposure.

Response 2-A34: CEQA requires a general description of the “main features” of the Project and does not require “all of the details or particulars.” *Dry Creek Citizens Coalition v. County of Tulare* (1999) 70 Cal.App.4th 20, 26. A project description is adequate if it provides information sufficient to inform the public and the decision-makers of the full scope of the project. The project description in the Draft SEIR identifies the proposed construction schedule, activities, equipment and timing of each component in Chapter 2, Section 2.6.3. This is sufficient to inform the public and decision-makers concerning the scope of the Project and the manner in which Project development would occur. Please also refer to Response 2-A31.

Comment 2-A35: The comment asserts that the Draft SEIR must be modified to require pesticide and herbicide testing in advance of construction and the results used to estimate health risks to workers and to determine if contaminated soils need to be removed prior to the start of construction.

Response 2-A35: See response to Comment 2-18.

Comment 2-A36: The comment asserts that the Draft SEIR fails to discuss or evaluate the health impacts of thermal runaway or fire at the battery storage buildings.

Response 2-A36: See response to Comment 2-A23.

Comment 2-A37: The comment asserts that the Draft SEIR is silent on aquatic toxicity if an accident occurred during transport of the batteries and releases into a waterway and thus fails as an informational document under CEQA.

Response 2-A37: The commenter makes assumptive assertions that an accident could occur during transport of the batteries resulting in acute and chronic toxicity releases into a waterway is speculative. An agency must use its best efforts to predict the reasonably foreseeable environmental impacts that occur with project implementation. However, an EIR need not speculate on impacts that are not foreseeable; the distinction between foreseeable prediction and mere speculation is at play here. Acute and chronic toxicity releases into a waterway is too speculative to evaluate and CEQA does not require a “worst-case” analysis, but merely what is reasonably foreseeable. CEQA Guidelines Section 15144 and 15145 state that (Section 15144) this section limits the requirement for forecasting to that which could be reasonably expected under the circumstances and is part of the effort to provide a general “rule of reason” for EIR contents. See also response to Comment 2-12.

Letter 3: Imperial County Fire

Comment 3-1: The comment states that energy storage facilities create a special hazard for firefighter and emergency responders with possibility of water-reactive materials, electrical shock, corrosives, chemical burns, toxic fumes, flammable gases, and explosion. These hazards listed can create a negative impact on Imperial County Fire Department due to response time to the facility, equipment needed to effectively perform firefighting operations and personnel to safely perform firefighting operations for a large-scale energy storage facility.

Response 3-1: An analysis of Hazards and Hazardous Materials if provided in Chapter 3.5 of the Draft SEIR. This comment does not state a specific concern or question regarding the adequacy of the analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration.

Comment 3-2: The comment states that NFPA Standards for energy storage system includes but not limited to: NFPA: 1 Fire Code; 70 National Electrical Code; 855 Standard for the installation of Energy Storage System; 110 Standard for Emergency and Standby Power Systems; and 111 Stored Electrical Energy Emergency and Standby Power System.

Response 3-2: An analysis of Hazards and Hazardous Materials is provided in Chapter 3.5 of the Draft SEIR. Supplemental to the proposed Project fire safety features previously described and in alignment to other similar projects within Imperial County, California Fire Code requirements would apply and be implemented as part of the Project. This comment does not state a specific concern or question regarding the adequacy of the analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration.

Comment 3-3: The comment states that Imperial County Fire Department shall evaluate their apparatus and its condition for front line firefighting operation in response to potentially hazardous facility.

Response 3-3: This comment does not state a specific concern or question regarding the adequacy of the analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration.

Comment 3-4: The comment states that impacts from this project shall be evaluated by Imperial County Fire Department Fire Chief and Fire Code Official in determining any impacts of the project can or will cause a negative effect on Imperial County Fire Department and/or County of Imperial. Any impacts will be addressed between Imperial County Fire Department official, County of Imperial officials, applicants and/or developers which may include but not limited to capital purchases which may be required in providing services to this project; training; and fiscal and operational costs.

Response 3-4: This comment does not state a specific concern or question regarding the adequacy of the analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration.

Comment 3-5: The comment lists additional requirements to follow.

Response 3-5: This comment does not state a specific concern or question regarding the adequacy of the analysis in the Draft SEIR. Therefore, pursuant to CEQA Guidelines Section 15204(a), no further response to this comment is required. However, the comment is acknowledged for the record and will be forwarded to the decision-making bodies for their review and consideration. However, as a condition of Project approval, the Applicant has agreed to implement the following as indicated in the comment letter:

- An approved water supply capable of supplying the required fire flow determined by appendix B in the California Fire Code shall be installed and maintained. Private fire service mains and appurtenance shall be installed in accordance with NFPA 24.
- An approved automatic fire suppression system shall be installed on all required structures as per the California Fire Code. All fire suppression systems will be installed and maintained to the current adapted fire code and regulations.
- An approved automatic fire detection system shall be installed on all required structures as per the California Fire Code. All fire detection systems will be installed and maintained to the current adapted fire code and regulations.
- Fire department access roads and gates will be in accordance with the current adapted fire code and the facility will maintain a Knox Box for access on site.
- Compliance with all required sections of the fire code.
- Applicant shall provide product containment areas(s) for both product and water run-off in case of fire applications and retained for removal
- A Hazardous Waste Material Plan shall be submitted to Certified Unified Program Agency (CUPA) for their review and approval.
- All hazardous material and wastes shall be handled, store, and disposed as per the approved Hazardous Waste Materials Plan. All spills shall be documented and reported to Imperial County Fire Department and CUPA as required by the Hazardous Waste Material Plan.

APPENDIX A – COMMENT LETTERS



Gavin Newsom
Governor

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit



Kate Gordon
Director

September 3, 2019

David Black
Imperial County
801 Main Street
2010111056
El Centro, CA 92243

Subject: Le Conte Battery Energy Storage System Project
SCH#: 2010111056

Dear David Black

The State Clearinghouse submitted the above named SIR to selected state agencies for review. The review period closed on 9/2/2019, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act, <https://ceqanet.opr.ca.gov/2010111056/7>.

1

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

RECEIVED

SEP 09 2019

**IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES**

ADAMS BROADWELL JOSEPH & CARDOZO

A PROFESSIONAL CORPORATION

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ANDREW J. GRAF
TANYA A. GULESSERIAN
KYLE C. JONES
RACHAEL E. KOSS
NIRIT LOTAN
AARON M. MESSING
CAMILLE G. STOUGH

MARC D. JOSEPH

September 3, 2019

Via Email and Overnight Delivery

Jim Minnick
Imperial County
Planning and Development
801 Main Street
El Centro, CA 92243
Email: JimMinnick@co.imperial.ca.us

RECEIVED

SEP 04 2019

IMPERIAL COUNTY
PLANNING & DEVELOPMENT SERVICES

Re: Comments on the Draft Supplement Environmental Impact Report (SCH. No. 2010111056) for the Proposed Le Conte Energy Storage System Project (CUP No. 180018)

Dear Mr. Minnick:

On behalf of the Citizens for Responsible Industry, we submit these comments on the Draft Supplemental Environmental Impact Report ("DSEIR") for the Le Conte Battery Energy Storage Project, a proposed 125 megawatt ("MW") battery energy storage facility, located on 3-5 acres of land in southeastern Imperial County ("County") at 319 Brockman Road, Calexico, California.

The battery energy storage system ("BESS"), proposed by Le Conte Energy Storage, LLC ("Applicant"), would consist of one or two buildings 85,000 square feet in area, banks of electrochemical batteries, a substation, power conversion systems, and ancillary systems, such as fencing, security, lighting, fire protection, heating, air-conditioning, and venting (collectively "Project").¹ The buildings will contain the batteries and their enclosures. The substation, along with the transformers and inverters will be located outside, adjacent to the buildings.² The Project will be connected to the San Diego Gas and Electric ("SDG&E") owned power grid, which is

¹ DSEIR, p. ES-1.

² *Id.* at 2-11.

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September 3, 2019

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controlled by the California Independent System Operator ("CAISO").³ The Project will receive, store, and return up to 125 MW of electric energy to and from the wholesale power grid.⁴

The Project is located on rural, agriculturally zoned land in Imperial County, one mile north of the U.S.-Mexico border.⁵ The Project will be constructed entirely within the existing fence line of the Centinela Solar Energy Project site, which underwent its own environmental review process in 2011.⁶ The Centinela Project was approved by the County Board of Supervisors after certification of the Centinela EIR, Conditional Use Permit, and variance, which allowed the transmission towers to exceed the 120-ft zoning limit.⁷ The BESS, proposed in the current Project, was not included in the Centinela Project or its environmental review process, so the County prepared a DSEIR, tiering from the original Centinela EIR, to analyze the Project's environmental impacts.

The BESS proposed in the Project is an entirely different type of facility than the Centinela Solar Plant. Specifically, a BESS contains rows of electrochemical batteries, in this case lithium-ion, that consist of hazardous materials and can pose a fire danger.⁸ Moreover, while solar plants generate renewable electricity and transmit that electricity to the grid, a BESS does not generate electricity. Rather, a BESS receives energy from the grid generated by other sources, and then transmits that energy back to the grid at a later time.⁹ BESS' are thus *not* renewable energy sources, but neutral energy sources, reflecting the energy composition of the grid they are connected to.

We reviewed the DSEIR, its technical appendices, and the reference documents with the assistance from air quality and hazardous resources expert, Dr.

³ *Id.* at 2-10.

⁴ *Id.* at ES-3.

⁵ *Id.* at 2-10.

⁶ *Id.* at 2.2.

⁷ DSEIR Appendices, Initial Study/Notice of Preparation of DSEIR/Comment Letters & Mitigation and Monitoring and Reporting Program.

⁸ See Fox Comments § 4.1.1.

⁹ DSEIR, p. 2-4.

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Phyllis Fox PhD, PE, and utilities expert, Mr. David Marcus.¹⁰ The County must respond to the attached experts' comments separately.

I. STATEMENT OF INTEREST

These comments are submitted on behalf of Citizens for Responsible Industry ("Citizens"). Citizens is an unincorporated association of individuals and labor organizations with members who may be adversely affected by the potential public and worker health and safety hazards and environmental and public service impacts of the Project. The association includes Imperial County residents, Virgil Saunders and Jose Luis Miranda, and California Unions for Reliable Energy ("CURE") and its local affiliates, and the affiliates' members and their families, as well as other individuals who live, work and recreate in Imperial County. Accordingly, they would be directly affected by the Project's environmental and health and safety impacts. Individual members of CURE's affiliates may also work on the Project itself. They will, therefore, be first in line to be exposed to any hazardous materials, air contaminants or other health and safety hazards that exist onsite.

The organizational members of Citizens and their members also have an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for the members that they represent. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for industry to expand in Imperial County, and by making it less desirable for businesses to locate and people to live and recreate in the County. Continued degradation can, and has, caused construction moratoriums and other restrictions on growth that, in turn, reduces future employment opportunities.

Finally, the organizational members of Citizens are concerned with projects that can result in serious environmental harm without providing countervailing economic benefits. CEQA provides a balancing process whereby economic benefits are weighted against significant impacts to the environment. It is in this spirit that we offer these comments.

¹⁰Letter from Dr. Phyllis Fox and Mr. David Marcus to Imperial County, Re: Comments on the Draft Supplemental Environmental Impact Report for the Le Conte Battery Energy Storage System, Sep. 3, 2019, (attached as Attachment A) (hereinafter referred to as "Dr. Fox's Comments").
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II. THE DSEIR FAILS TO COMPLY WITH CEQA'S PURPOSE AND GOALS

CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an environmental impact report ("EIR") (except in certain limited circumstances).¹¹ The EIR is the very heart of CEQA.¹² "The foremost principle in interpreting CEQA is that the Legislature intended the act to be read so as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language."¹³

CEQA has two primary purposes. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental effects of a project.¹⁴ "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, the EIR 'protects not only the environment but also informed self-government.'"¹⁵ The EIR 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."¹⁶

Second, CEQA requires public agencies to avoid or reduce environmental damage when "feasible" by requiring "environmentally superior" alternatives and all feasible mitigation measures.¹⁷ The EIR serves to provide agencies and the public with information about the environmental impacts of a proposed project and to "identify ways that environmental damage can be avoided or significantly reduced."¹⁸ If the project will have a significant effect on the environment, the agency may approve the project only if it finds that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and

¹¹ See, e.g., Public Resources Code § 21100.

¹² *Dunn-Edwards v. BAAQMD* (1992) 9 Cal.App.4th 644, 652.

¹³ *Communities. for a Better Env. v. Cal. Res. Agency* (2002) 103 Cal. App.4th 98, 109 ("*CBE v. CRA*").

¹⁴ 14 Cal. Code Regs. § 15002(a)(1).

¹⁵ *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553, 564.

¹⁶ *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.

¹⁷ 14 CCR § 15002(a)(2) and (3); see also *Berkeley Jets*, 91 Cal.App.4th at 1354; *Citizens of Goleta Valley*, 52 Cal.3d at p. 564.

¹⁸ 14 Cal. Code Regs. § 15002(a)(2).

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that any unavoidable significant effects on the environment are “acceptable due to overriding concerns.”¹⁹

While the courts review an EIR using an “abuse of discretion” standard, “the reviewing court is not to ‘uncritically rely on every study or analysis presented by a project proponent in support of its position. *A clearly inadequate or unsupported study is entitled to no judicial deference.*”²⁰ As the courts have explained, “a prejudicial abuse of discretion occurs “if the failure to include relevant information precludes informed decision making and informed public participation, thereby thwarting the statutory goals of the EIR process.”²¹

The DSEIR for this Project fails to comply with CEQA’s basic requirement to act as an informational document. It lacks details in key areas, which the public and decision-makers rely upon to assess the Project’s significant environmental impacts. The DSEIR fails to (1) provide an accurate project description (2) accurately disclose and analyze the Project’s significant impacts, (3) accurately disclose and analyze the Project’s considerable cumulative impacts; and (4) incorporate all feasible mitigation measures to mitigate those impacts. Because of these flaws, the DSEIR is insufficient as a matter of law and lacks substantial evidence to properly identify and mitigate the Project’s significant impacts, thus violating CEQA.

III. THE DSEIR IS INTERNALLY INCONSISTENT AND FAILS TO INCLUDE A COMPLETE PROJECT DESCRIPTION

The DSEIR does not meet CEQA requirements because it fails to include a complete and accurate project description, rendering the entire impact analysis unreliable. An accurate and complete project description is necessary to perform an evaluation of the potential environmental effects of a proposed project.²² Without a

¹⁹ PRC § 21081; 14 CCR § 15092(b)(2)(A) & (B).

²⁰ *Berkeley Jets*, 91 Cal. App. 4th 1344, 1355 (emphasis added), quoting, *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 391 409, fn. 12.

²¹ *Berkeley Jets*, 91 Cal.App.4th at 1355; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 722; *Galante Vineyards v. Monterey Peninsula Water Management Dist.* (1997) 60 Cal.App.4th 1109, 1117; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 946.

²² See, e.g., *Laurel Heights Improvement Association v. Regents of the University of California* (1988) 47 Cal.3d 376.

complete project description, the environmental analysis will be impermissibly narrow, thus minimizing the project's impacts and undercutting public review.²³ The courts have repeatedly held that "an accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient [CEQA document]."²⁴ "Only through an accurate view of the project may affected outsiders and public decision makers balance the proposal's benefit against its environmental costs."²⁵

CEQA Guidelines §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 environment."²⁶ "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."²⁷ Courts have explained that for a project description to be complete, it must address not only the immediate environmental consequences of going forward with the project, but also all "*reasonably foreseeable* consequence[s] of the initial project."²⁸

a. The DSEIR Fails to Describe the Batteries, Battery Lay-Out, and Battery Enclosures

The DSEIR includes only brief and general information about the batteries that the Project will use, impeding a comprehensive environmental impact analysis. The main component of a BESS are the batteries, but the DSEIR does not describe the specific kind of lithium-ion batteries the Project will use, nor the number of batteries the Project will include.²⁹ Indeed, the DSEIR states only that the Project will use "traditional" lithium-ion batteries.³⁰ But as stated by Tesla, a prominent lithium-ion battery manufacturer, the term "lithium-ion batteries" actually contains "a broad set of storage technologies," all of which have unique chemical components,

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²³ See *ibid.*

²⁴ *County of Inyo v. County of Los Angeles* (1977) 71 Cal.App.3d 185, 193.

²⁵ *Id.* at 192-193.

²⁶ 14 CCR § 15378.

²⁷ *Id.* at § 15378(c).

²⁸ *Laurel Heights*, 47 Cal.3d at p. 396 (emphasis added); see also *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449-50.

²⁹ See DSEIR, p. 2-10.

³⁰ DSEIR, p. 2-1.

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as well as "different properties and associated risks."³¹ Without a description of the specific kind of lithium-ion batteries used, an accurate analysis of the Project's environmental impacts is impossible.

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Additionally, while § 2.6.3.9 of the DSEIR lists some of the chemical components of the batteries, the DSEIR fails to include the total amounts of the chemical components contained either in each individual battery, or the Project as a whole.³² The DSEIR also fails to explain any of the properties of these chemical components, including whether they are hazardous to human health, stating only "[t]he [Centinela Solar Energy] project Environmental Protection Plan will be updated to incorporate any hazardous material associated with the Project."³³ A later update to the Environmental Protection Plan does not allow the public or the agency decision-makers to fully analyze the health and environmental impacts. Moreover, this information is normally included in a Material Safety Data Sheet (MSDS) for the batteries, which is missing from the DSEIR. Since the batteries contain chemicals that are "sufficient to raise serious concerns about health and safety[.]"³⁴ the DSEIR must be revised to fully explain what those potentially significant health and safety issues are.

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The DSEIR also fails to adequately describe the layout of the batteries or the battery enclosures. The DSEIR fails to state how close the batteries will be placed either to each other or the building walls. In addition, the DSEIR fails to state how much wattage may be contained in a single enclosure. All of these and other design details impact the fire risk associated with the Project.³⁵ As explained in Dr. Fox's comments, "the layout of battery facilities can prevent adequate firefighting access."³⁶ But since the DSEIR does not contain any information on the battery system layout, it is impossible to determine the fire and explosion risk associated with the Project. The DSEIR must be revised to include this information so the

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³¹ Letter from Sarah Van Cleve, Manager, US Energy Policy, Tesla, Inc., to Arizona Corporation Commission, Re: Tesla Response to Commissioner Kennedy's August 2nd Letter Regarding Lithium-Ion Battery Safety/Docket No. E-01345A-19-0076, August 19, 2019; available at <https://clocket.irnages.azcc.gov/E000002454.pdf>.

³² DSEIR, p. 2-15.

³³ *Ibid.*

³⁴ Fox Comments, p. 2

³⁵ *Id.* at 17.

³⁶ *Id.* at 16.

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agency decision-makers and the public have a clear picture of the Project and its associated risks.]

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b. The DSEIR Fails to Accurately Describe the Project's Decommissioning Phase

The DSEIR fails to adequately describe the full scope of the Project being approved, and thus fails to disclose the full range and severity of the Project's environmental impacts. A complete project description must include details as to the "later phases of the project, and any secondary, support, or off-site features necessary for its implementation."³⁷ The requirements of CEQA cannot be avoided by chopping the project into many small parts or by excluding reasonably foreseeable future activities that may become part of the project.³⁸ The DSEIR must supply enough information so that the decisionmakers and the public can understand the full scope of the Project.³⁹ The DSEIR must then analyze the whole project in a single environmental review document and may not piecemeal or split a project into pieces for purposes of analysis.

Here, the DSEIR fails to fully describe the decommissioning phase of the Project. For instance, the DSEIR claims that at the end of the Project's lifetime, "[t]he batteries are also recyclable and will be recycled at a facility approved by the battery supplier...."⁴⁰ But the DSEIR fails to explain which recycling facility would take the batteries, or even if such a facility exists. In addition, removing the batteries from the BESS during decommissioning and transporting the batteries to a recycling facility pose risks to the public and the environment as accidents during transport could result in chemical fires or explosions, and the extent of this risk is dependent on the method (rail, road, etc.), length, and route of this transport. The DSEIR fails to identify whether a recycling facility exists that will take the Project batteries and fails to describe how the batteries will get there. This failure makes it impossible for the County to accurately gauge the environmental impacts from decommissioning the Project.

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³⁷ CEQA Guidelines, Appendix G, Environmental Checklist Form § 8.

³⁸ Pub. Resources Code § 21159.27 (prohibiting piecemealing); see also *Rio Vista Farm Bureau Center v. County of Solano* (1992) 5 Cal.App.4th 351, 370.

³⁹ *Dry Creek Citizens Coalition v. County of Tulare* (1990) 70 Cal.App.4th 20, 26.

⁴⁰ DSEIR, p. 3.5-17.

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c. The DSEIR Fails to Describe the Ancillary Equipment Needed to Operate the Project

The DSEIR also lacks key details regarding the ancillary equipment involved in the Project, such as the cooling and control systems, the inverters, the ventilation and the HVAC units.⁴¹ Although much of this equipment requires electricity and thus causes GHG and criteria pollutant emissions, the equipment was not described in sufficient detail to allow the public or agency decision-makers to calculate these impacts. The DSEIR must be revised to include vendor specifications for the equipment used in the Project, or at the very least provide estimates for the electricity requirements for this equipment.

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d. The DSEIR’s Description of How the Project will Receive and Return Energy from the Grid is Vague and Inconsistent

The Project description is inadequate because it does not accurately explain how the BESS will be connected to the electrical grid. The DSEIR states that the Project will “[r]eceive solar-generated electricity during times of excess generation or times of low energy demand and store that power for release when the customer deems it to be more valuable thus increasing the effectiveness of Imperial County renewable energy projects....”⁴² But the DSEIR also states that the Project will “allow for efficient storage of energy available on the wholesale power grid, including renewable energy....”⁴³ These two statements are contradictory. Either the Project will only receive, store, and return solar-generated renewable energy or it will receive, store, and return energy from the wholesale power grid, which includes non-renewable energy sources such as natural gas and coal. This contradictory and incomplete description of how the Project receives and returns energy to the grid renders a conclusion about the Project’s energy impacts impossible, as discussed in more detail below.

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In addition, the DSEIR lacks essential information necessary to determine how much energy the Project will use. As stated in the Dr. Fox’s comments:

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⁴¹ See DSEIR, p. 2-10.

⁴² *Id.* at 2-6.

⁴³ *Id.* at 2-10.

The environmental impacts of the Project from pollutant emissions during operation depends on how many megawatt hours (MWh) of generation are required to charge the Project batteries, which grid sources are the marginal sources⁴⁴ of supply during the hours when Project charging or discharging is occurring, and the emission rates of those grid sources. The number of MWh of charging energy required will in turn depend on the expected Project generation and the Project efficiency (the percentage of charging energy which can be recovered as generation during discharge).⁴⁵

None of this information required for an analysis of the Project's impacts is included in the DSEIR: the DSEIR does not include the efficiency of the Project batteries, the generation required to charge the batteries, or the expected generation of the Project. Likewise, the DSEIR does not include any specific information about what kind of energy will charge the batteries, besides making vague assertions that *some* of it will come from renewable sources.⁴⁶ The DSEIR must be revised to include this information so the public and agency decision-makers can be fully informed of the Project's energy and greenhouse gas ("GHG") impacts.

IV. THE DSEIR LACKS SUBSTANTIAL EVIDENCE FOR ITS CONCLUSIONS ON SIGNIFICANT IMPACTS AND FAILS TO INCORPORATE ALL FEASIBLE MITIGATION MEASURES TO REDUCE IMPACTS TO LESS THAN SIGNIFICANT

An EIR must fully disclose all potentially significant impacts of a Project and implement all feasible mitigation to reduce those impacts to less than significant levels. The lead agency's significance determination with regard to each impact must be supported by accurate scientific and factual data.⁴⁷ An agency cannot conclude that an impact is less than significant unless it produces rigorous analysis and concrete substantial evidence justifying the finding.⁴⁸

⁴⁴ The marginal source of supply in a given hour is the source whose output would be increased if demand increases in that hour from the previous hour, or whose output would be decreased in that hour if demand decreases in that hour from the previous hour.

⁴⁵ Fox/Marcus Comments, p. 5.

⁴⁶ DSEIR, p. 2-10; p. 2-4.

⁴⁷ 14 CCR § 15064(b).

⁴⁸ *Kings Cty. Farm Bur. v. Hanford* (1990) 221 Cal.App.3d 692, 732.
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Moreover, the failure to provide information required by CEQA is a failure to proceed in the manner required by CEQA.⁴⁹ Challenges to an agency's failure to proceed in the manner required by CEQA, such as the failure to address a subject required to be covered in an EIR or to disclose information about a project's environmental effects or alternatives, are subject to a less deferential standard than challenges to an agency's factual conclusions.⁵⁰ In reviewing challenges to an agency's approval of an EIR based on a lack of substantial evidence, the court will 'determine de novo whether the agency has employed the correct procedures, scrupulously enforcing all legislatively mandated CEQA requirements....'⁵¹

Even when the substantial evidence standard is applicable to agency decisions to certify an EIR and approve a project, reviewing courts will not 'uncritically rely on every study or analysis presented by a project proponent in support of its position. A clearly inadequate or unsupported study is entitled to no judicial deference.'⁵²

Here, the DSEIR fails to adequately analyze and mitigate the Project's energy and GHG impacts, fails to adequately analyze and mitigate significant impacts from fires, explosions, and accidental release of hazardous materials, and fails to identify and analyze health impacts during the Project's construction, operation, and decommissioning phases.

a. The DSEIR Fails to Identify, Analyze, and Mitigate the Project's Energy Impacts and Greenhouse Gas Emissions

CEQA requires agencies to analyze a project's energy impacts when "the project's energy use reveals that the project may result in significant environmental effects due to the wasteful, inefficient, or unnecessary consumption use [sic] of energy...."⁵³ The CEQA Guidelines also state that the analysis of a project's energy impacts "should include the project's energy use for all project phases and components," and that relevant considerations include "the project's size, location, orientation, equipment use and any renewable energy features that could be

⁴⁹ *Sierra Club v. State Bd. Of Forestry* (1994) 7 Cal.4th 1215, 1236.

⁵⁰ *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 435.

⁵¹ *Ibid.*

⁵² *Berkeley Jets*, 91 Cal.App.4th at 1355.

⁵³ 14 CCR § 15126.2(b).

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incorporated into the project.”⁵⁴ Further guidance for considering energy impacts is included in Appendix F of the Guidelines, which states that the energy analysis may include “[t]he effects of the project on peak and base period demands for electricity and other forms of energy,” as well as the “the effects of the project on energy resources.”⁵⁵ The CEQA Guidelines also state that the energy analysis “may be included in related analyses,” such as the GHG impact analysis.⁵⁶

In addition to analyzing energy impacts, CEQA requires agencies to analyze GHG impacts. The CEQA Guidelines state that lead agencies “shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gases resulting from a project.”⁵⁷ “The agency’s analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes.”⁵⁸ The Guidelines also state that the lead agency “may use a model or methodology to estimate greenhouse gas emissions resulting from a project ... The lead agency must support its selection of a model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology used.”⁵⁹

Here, the DSEIR fails entirely to conduct an energy impacts analysis. Because of this, the DSEIR vastly underestimates the Project’s GHG emissions. Because a BESS draws energy from the grid, stores it, and then discharges energy back to the grid later, it has a profound impact on “peak and base period demands for electricity....”⁶⁰ Yet, the DSEIR omits entirely any discussion of the Project’s energy impacts. Instead, the DSEIR concludes without any evidence that the Project will “[a]ssist the State in achieving ... greenhouse gas (GHG) emissions reduction objectives by constructing a BESS....”⁶¹ This assertion is baseless. Recent evidence shows that energy storage has actually increased energy use in the United States due to “energy arbitrage,” the practice of storing energy when cheapest and discharging energy when most expensive, without regard to the

⁵⁴ *Ibid.*

⁵⁵ CEQA Guidelines, Appendix F: Energy Conservation, Section C(3); Section C(5).

⁵⁶ 14 CCR § 15126.2(b).

⁵⁷ *Id.* at § 15064.4(a).

⁵⁸ *Ibid.*

⁵⁹ *Id.* at § 15064.4(c).

⁶⁰ CEQA Guidelines, Appendix F: Energy Conservation, Section C(3).

⁶¹ DSEIR, p. 2-4.

electricity source that charges the battery.⁶² As discussed below, it is likely that the Project will also operate in this manner.

The DSEIR suggests that the Project will merely move energy around, stating the Project will “receive, store and return up to 125 MW of electric energy to the electric grid.”⁶³ But this statement obscures the fact that the Project will also *use* energy. Batteries are imperfect instruments: energy is lost every time a battery is charged and discharged. This means that if a battery absorbs 1 MWh of electricity, it will discharge less than 1 MWh back to the grid. The ratio of how much the battery stores versus discharges is referred to as the energy efficiency of the batteries. As stated above, this number is not included in the DSEIR and thus an accurate analysis of the Project’s energy impacts is impossible. That said, Dr. Fox and Mr. Marcus were able to calculate the average efficiency of batteries on the CAISO grid based on recent CAISO data as roughly 80% efficient.⁶⁴ So, if a battery on the CAISO grid absorbs 1 MWh of energy, it will on average discharge only 0.8 MWh back to the grid.

If the Project batteries have an efficiency of 80% like the average battery connected to the CAISO grid, every 1 MWh that a customer receives from the Project requires 1.25 MWh of electrical generation due to efficiency losses. Sources connected to the CAISO grid will have to increase electricity generation to compensate for this 20% loss. If fossil-fuel derived energy generation increases to compensate for this loss, the Project will result in increased GHG emissions.

The DSEIR fails to analyze this issue. Instead, the DSEIR uses the CalEEMod to calculate GHG emissions from electricity usage at the facility and emissions from vehicle trips.⁶⁵ The CalEEMod is not specific to BESS facilities and only includes emissions from electricity use and vehicle trips to service a typical “General Light Industry” facility of a specified size.⁶⁶ It excludes the significant electrical demand to operate inverters, transformers, cooling and controls systems and HVAC equipment, as well as the energy required to charge the batteries, as

⁶² Eric S. Hittinger and Ines M.L. Azevedo, *Bulk Energy Storage Increase United States Electricity System Emissions*, J. OF ENV. SCI. TECH. (2015) available at <https://doi.org/10.1021/es505027p>.

⁶³ DSEIR, p. 2-4.

⁶⁴ Fox/Marcus Comments, p. 7.

⁶⁵ DSEIR, Appendix B, Section 4.2 and Appendix A to Appendix B, CalEEMod Emission Calculations; See also Fox Comment, p. 4.

⁶⁶ *Ibid.*

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discussed above. The Guidelines require that any model used to estimate GHG emissions must be supported by substantial evidence and that the lead agency explain any limitations of the model used. The DSEIR fails to meet this mandate. The CalEEMod does not include any data on emissions from energy storage systems and is thus an inadequate model to calculate the Project's GHG emissions.

Rather than performing a comprehensive GHG impact analysis, the DSEIR states (without any evidence) that the Project will make “renewable energy projects more efficient by capturing and transmitting energy that might otherwise go unused.”⁶⁷ But this is unlikely to be true. As explained in Dr. Fox's comments, a BESS usually charges when electricity is cheapest (i.e., when demand for electricity is low) and discharges when electricity is most expensive (i.e., when demand for electricity is high).⁶⁸ The Project will likely also operate this way, because the DSEIR states that “[c]harging energy will be provided from the electric grid which will include solar energy currently produced by projects interconnected at the Drew and IV substations.”⁶⁹ This statement suggests that the batteries will be charged using whatever energy is available on the CAISO grid, which includes non-renewable sources like natural gas and coal.⁷⁰ Thus, there is no evidence that the Project will charge using only emissions-free, renewable energy. In fact, the likelihood that the Project will use renewable energy to charge is quite low because the Project can only use renewable energy to charge when there is “extra” renewable energy on the grid—i.e. when renewable energy would be otherwise “curtailed,” or cut-off. However, Mr. Marcus determined, based on data from CAISO, that renewable energy is rarely curtailed on the CAISO grid.⁷¹ Thus, most of the time, the Project will use fossil-fuel derived energy to charge the batteries, which will increase GHG emissions.

As explained in Dr. Fox's comments, an accurate analysis of the Project's potentially significant impacts requires much more information than was disclosed

⁶⁷ DSEIR, p. 2-4.

⁶⁸ Fox/Marcus Comments, p. 5.

⁶⁹ DSEIR, p. 2-4.

⁷⁰ CAISO participates in the Western Energy Imbalance Market, so marginal sources of generation outside the CAISO are also available from a wide swath of the Western U.S. grid, which includes coal-powered generators. The Western Energy Imbalance Market is a real-time, wholesale energy trading market that enables participants anywhere in the West to buy and sell energy when needed. See <https://www.westerneim.com/pages/default.aspx>.

⁷¹ Fox/Marcus Comment, p. 8.

in the DSEIR. Not only must the DSEIR describe the energy efficiency of the batteries, but it must also include the energy sources used to charge the batteries and the energy source the BESS displaces when it discharges the batteries. Absent such information, it is impossible to determine whether the roundtrip energy loss of the batteries is offset by emissions reductions during battery discharge.

Despite the DSEIR's omission of essential information, data available to the public about existing batteries currently connected to the CAISO grid suggest that the Project will increase GHG emissions rather than decrease them as claimed. Dr. Fox and Mr. Marcus compiled data from CAISO on existing batteries to estimate energy and GHG impacts of the Project. They found that "[t]he net increase in energy generation, after taking account of hours when the Project would be discharging, will be 25.5 GWh per year."⁷² As explained above, very little of this energy is likely to be from renewable sources. Therefore, the Project will likely be charged with energy derived from natural gas, which is the primary marginal source of energy on the CAISO grid.⁷³

Using emissions data from a modern natural-gas fired generation plant on the SDG&E system, Dr. Fox and Mr. Marcus calculated that the Project will produce 10,331 metric tons ("MT") of CO₂e per year, far more than the DSEIR estimated and greatly in exceedance of the CAPCOA GHG significance threshold of 900 MT/yr.⁷⁴ This number only represents the emissions generated by the extra energy it takes to compensate for the batteries' roundtrip energy loss. Thus, 10,331 MT/yr of CO₂e are attributable directly to the Project's operation, but the majority of these emissions, 94% (9,752 MT/yr) were completely excluded from the DSEIR's GHG impact analysis.

Moreover, 9,742 MT/yr of GHG emissions is an underestimate because the DSEIR's CalEEMod calculation excluded emissions from the ancillary cooling and control systems, inverters, transformers, and HVAC units, using an energy intensity based on "General Light Industry" instead.⁷⁵ However, as explained in Dr. Fox's comment, "[a] BESS is not 'General Light Industry'" and requires significantly

⁷² Fox/Marcus Comment, p. 7.

⁷³ *Ibid.*

⁷⁴ *Id.* at 8.

⁷⁵ DSEIR, Appendix B, Section 4.2, p. 4-2 and Appendix A or Appendix B, pdf 35; Fox Comments, p. 4.

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more electricity to operate than the typical light industry operation.⁷⁶ Thus, the model the DSEIR uses to calculate GHG emissions is not supported by substantial evidence and violates CEQA.

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The DSEIR must be revised to fully analyze the GHG impacts that would result from the inefficiency of the Project batteries and from how the Project affects other energy sources on the electrical grid. In addition, given that the Project's GHG impacts are significant, the DSEIR must be revised to include appropriate mitigation measures, such as restricting battery charging to daytime hours when solar is available, restricting charging to times when renewable generation would otherwise be curtailed, or implementing carbon offsets at other locations.

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b. The DSEIR Fails to Adequately Disclose, Analyze, and Mitigate Significant Impacts from Hazardous Materials Contained in the Project Batteries

Appendix G of the CEQA Guidelines states that lead agencies should consider whether the project would "create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous waste" or "[c]reate a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment."⁷⁷ Here, the DSEIR failed to fully analyze the significant impact of a lithium-ion battery fire and failed to designate fire prevention and suppression measures as mitigation measures.

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c. The DSEIR Fails to Analyze All of the Upset and Accident Conditions that Could Expose the Public to Hazardous Chemicals Released from the Batteries

The DSEIR claims that "[t]he Project will not exposure [sic] the public to hazardous materials and wastes."⁷⁸ The DSEIR does not provide substantial evidence for this conclusion. In fact, the Project could expose the public, including workers, to hazardous materials during transport of the batteries, during

⁷⁶ Fox/Marcus Comments, p. 4.

⁷⁷ CEQA Guidelines, Appendix G, Evaluation of Environmental Impacts, Section IX(a)-(b), Hazards and Hazardous Materials.

⁷⁸ DSEIR, p. 3.5-12.

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construction or decommissioning of the Project, or during operation of the Project in the event of a fire.

1. *The Batteries Could Release Hazardous Materials During Transport or Construction*

The batteries could expose the public to hazardous materials if an accident occurs during transport from the manufacturing facility to the Project site and from the Project site to the unidentified recycling center referenced in the DSEIR. The DSEIR only mentions this possibility in passing, stating “[t]he batteries will be transported/shipped in compliance with all applicable federal, state and local regulations addressing hazardous materials transport.”⁷⁹ But regulations do not prevent accidents and do not mandate particular haul routes, which minimize passage through dense urban areas, or by schools, hospitals, or other sensitive receptors. Likewise, neither regulations nor the DSEIR specify how the batteries will be transported, i.e. by truck, car, plane, etc. In addition, because the DSEIR fails to disclose where the batteries will be manufactured and fails to identify the recycling center, the public does not know the number of miles the batteries will be transported. All of these factors influence the degree of risk posed by the batteries during transportation. As stated in Dr. Fox’s comments:

The batteries will likely be shipped from warehouses in unknown location(s) and transported to the site from these undisclosed locations by undisclosed means (rail, truck, ship?), over undisclosed routes and roadways. These routes could include sensitive desert habitat that would be irreversibly damaged in the event of a transportation accident. Further, an explosion triggered by a fire during handling and transportation could result in injuries and deaths of workers and motorists and could irreversibly damage the immediately adjacent CSE facility, as well as other nearby solar facilities.⁸⁰

As shown in Dr. Fox’s comment, there are clearly many kinds of significant impacts that could result from an accident during transport of the batteries. By failing to identify the manufacturing facility, recycling center, and the haul routes, the true risk of exposure to hazardous materials cannot be analyzed as required by CEQA.

⁷⁹ *Id.* at 3.5-17.

⁸⁰ Fox Comments, p. 26.
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In addition, a fire could occur during construction or decommissioning, before or after the safety measures incorporated in the Project design are functioning. As discussed further below and in Dr. Fox's Comments,⁸¹ a fire would release multiple toxic chemicals that would impact worker health and the environment. The DSEIR does not consider this possibility and must be revised to incorporate mitigation measures for all phases of the Project.

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2. The Batteries Could Release Hazardous Materials in the Event of a Fire

The DSEIR states that “[t]he batteries used for the Project would not release any hazardous material to the surrounding environment during operation.”⁸² However, hazardous materials would be released to the surrounding environment in the event of a fire. And lithium-ion battery fires are a well-documented problem.⁸³ As explained in Dr. Fox's comment:

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Lithium-ion batteries are ... very sensitive to mechanical damage and electrical surges. This type of damage can result in internal battery short circuits which lead to internal battery heating, battery explosions, and fires. The loss of a single battery can rapidly cascade to surrounding batteries, resulting in a large fire.⁸⁴

The DSEIR underestimates the risk of a lithium-ion battery fire, stating “any potential fire risk that the traditional lithium-ion cells have will most likely be

⁸¹ *Id.* at 33.

⁸² DSEIR, at p. 3.5-17.

⁸³ See Ligzi Kong et al., *Li-Ion Battery Fires Hazards and Safety Strategies*, ENERGIES (2018), doi:10.3390/en11092191, stating “There have been numerous incidents of Li-ion batteries catching fire and exploding. For example, the United States (U.S.) Federal Aviation Administration (FAA) reported 206 air/airport Li-ion battery fire/explosion incidents from March 1991 to January 2018 [2]. In May 2011, a Chevrolet Volt caught fire three weeks after a crash test [3]. In 2013, several Tesla Model S sedans caught fire after they were damaged by road debris. Although Tesla strengthened the battery shield on its new and existing cars, in August 2016, a Tesla electric car caught fire in France during a promotional tour. In 2016, 92 Samsung Note 7 smartphones caught fire and caused a mass product recall [4]. Other Li-ion battery-powered devices have also been mentioned in fire-type incidents, such as notebook computers [4,5], hoverboards [4], and electronic cigarettes [6,7]. The corresponding causes for the Li-ion battery incidents vary. Short circuits, mechanical abuse, battery overcharging, and design and manufacturing flaws can all result in a battery fire/explosion.”

⁸⁴ Fox Comments, p. 19.

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caused by over-charging or through short circuit due to age.”⁸⁵ However, fires can result from any number of factors, in addition to overcharging and age, including “manufacturing defects, battery aging, thermal runaway, malfunction of the cooling system, and charging a severely discharged cell—which can result in internal cell breakdown and damage to neighboring cells.”⁸⁶ In addition, “Li-ion batteries are sensitive to abusive conditions such as high temperatures, crashing, overcharge, over-discharge, and short circuit.”⁸⁷ Thermal runaway, which the DSEIR never mentions, is the most common cause of lithium-ion battery fires.⁸⁸ Moreover, the Project is located in a seismically active region.⁸⁹ The DSEIR does not contemplate how earthquakes might increase the risk of fires, or how this increased risk might be mitigated through design or construction. The DSEIR must be revised to consider the various foreseeable mechanisms that could start a fire at the facility, so the agency-decision makers can fully analyze the risk of fire and make a significance finding if appropriate.

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Failing to analyze the various events that could trigger fires at the Project site is not the DSEIR’s only flaw. The DSEIR also fails to analyze the unique challenges associated with fighting a lithium-ion battery fire. As explained by Dr. Fox, lithium-ion battery fires burn hotter, are more difficult to extinguish, and can reignite days after being put out.⁹⁰ Indeed, based on experiences with previous fires at energy storage facilities, flames can grow to 75 feet in length. Lithium-ion battery fires also pose “a serious risk of a large-scale explosion.”⁹¹ As Dr. Fox explains, an explosion at the Project based on the amount of energy stored on site would be equivalent to an explosion of 108 tons of trinitrotoluene (“TNT”).⁹² In this context, conventional methods for controlling fires are largely insufficient.⁹³ The use of water to extinguish lithium-ion battery fires, for example, could cause “the formation of additional toxic gases and increase the production of hydrogen fluoride,”⁹⁴ a toxic gas described in more detail below. In addition, when water *is* an

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⁸⁵ DSEIR, p. 3.5-20.

⁸⁶ Fox Comments, p. 17.

⁸⁷ *Id.* at 18.

⁸⁸ *Ibid.*

⁸⁹ DSEIR, p. 3.4-3.

⁹⁰ Fox Comment, p. 15.

⁹¹ *Id.* at 26.

⁹² *Ibid.*

⁹³ *Id.* at 34.

⁹⁴ *Id.* at 26.

appropriate extinguishing agent, lithium-ion battery fires require much more of it than expected.⁹⁵ Because the DSEIR does not identify the unique challenges associated with fighting lithium-ion battery fires, the agency decision-makers cannot determine whether a lithium-ion battery fire constitutes a significant impact in need of mitigation.

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d. The DSEIR Fails to Analyze the Significant Impacts on Health and the Environment from the Foreseeable Release of Battery Chemicals

The DSEIR never analyzes the serious risks to human health and the environment that a lithium-ion battery fire would cause. Indeed, the DSEIR claims that “[t]he analysis [in the DSEIR] reviews the types and amounts of materials to be used for the Project as well as the use, transport, and disposal of those materials onsite.”⁹⁶ But this claim does not bear scrutiny. The DSEIR only lists *some* of the chemicals contained in the batteries and does not describe the “amounts of materials to be used” in the batteries as claimed.

Moreover, the DSEIR fails to explain the health implications of these chemicals, or how they could be released and transformed into something even more toxic in a fire. This omission is significant, because the DSEIR states that the batteries will contain cobalt oxide; manganese dioxide; nickel oxide; carbon; electrolyte; polyvinylidene fluoride; aluminum foil; copper foil; aluminum and inert materials.⁹⁷ As explained in Dr. Fox’s comments, this specific chemistry includes “compounds that can release hydrogen fluoride.”⁹⁸ Hydrogen fluoride is an extremely toxic gas. The Center for Disease Control states that “[b]reathing in hydrogen fluoride at high levels or in combination with skin contact can cause death from an irregular heartbeat or from fluid buildup in the lungs.”⁹⁹ Just last April, a fire at a BESS in Surprise, Arizona, caused the hospitalization of four firefighters for chemical and chemical inhalation burns.¹⁰⁰ In her comments, Dr. Fox lists the various health impacts associated with burning batteries, stating:

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⁹⁵ *Id.* at 22.

⁹⁶ DSEIR, p. 3.5-15.

⁹⁷ *Id.* at p. 2-15.

⁹⁸ Fox Comments, p. 24.

⁹⁹ Center for Disease Control and Prevention, *Facts About Hydrogen Fluoride*, <https://emergency.cdc.gov/agent/hydrofluoricacid/basics/facts.asp> (last visited Aug. 30, 2019).

¹⁰⁰ Fox Comments, p. 24.
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batteries may rupture when exposed to extreme heat/fire, leaking corrosive materials, and/or emit toxic fumes. Burning batteries may emit acrid smoke, irritating fumes, and toxic fumes of fluoride, resulting in acute and chronic health effects in responding firefighters (and any nearby workers and residents). Acute health hazards include chemical inhalation burns and damage to lungs, eyes, and skin. Cobalt, present in the Project's batteries, is a suspected human carcinogen.¹⁰¹

These kinds of health impacts that are known to occur during a lithium-ion battery fire must be fully analyzed in the DSEIR, but they are not. The DSEIR never once mentions hydrogen fluoride, or the possibility that the batteries will release this toxic chemical in the event of a fire. Likewise, the DSEIR never mentions the health implications of cobalt, a possible human carcinogen contained in the battery chemistry. Indeed, Dr. Fox identified numerous toxic chemicals that could be released in the event of a lithium-ion battery, which were never discussed in the DSEIR.¹⁰²

In the event of a fire or explosion, these chemicals would not only pose a serious threat to construction workers, solar plant workers, agricultural workers on adjacent lots, and passing motorists, these chemicals could also enter the environment. The Project site is approximately 700 feet from the Wormwood Canal,¹⁰³ which is "a small portion of the complex water delivery system in the Imperial Valley that irrigates some of the most productive agricultural land in the United States."¹⁰⁴ As noted in Dr. Fox's comments, accidental releases of battery chemicals into waterways "could result in acute and chronic toxicity."¹⁰⁵ The DSEIR's failure to analyze these serious impacts to public health and the environment is unacceptable and violates the law.

The DSEIR must be revised to conduct a full hazards analysis on the possibility of a battery fire, including identification of the chemicals that would be

¹⁰¹ *Ibid.*

¹⁰² *Id.* at 33.

¹⁰³ See Google Earth, <https://earth.google.com/web/@32.6782208,-115.67181851,-4.22950109a,550.40299481d,35y,50.14794315h,59.99927276t,0r>.

¹⁰⁴ See Draft Cultural Resource Inventory for the Vega SES LLC Solar Project at p. 18, available at http://www.icpds.com/CMS/Media/Appendix-E1_Cultural-Resource-Inventory.pdf.

¹⁰⁵ Fox Comments, p. 35.

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released into the environment if such a reasonably foreseeable event were to occur, who might be exposed, and the health implications associated with that exposure. Mitigation must be identified for the significant impacts.

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e. The DSEIR Fails to Properly Characterize Fire Prevention and Suppression Measures as Mitigation Measures

In *Lotus v. Department of Transportation*, an EIR approved by CalTrans contained several measures “[t]o help minimize potential stress on the redwood trees” during construction of a highway.¹⁰⁶ Although those measures were clearly separate mitigation, the project proponents did not designate them as mitigation and the EIR concluded that because of the planned implementation of those measures, no significant impacts were expected.¹⁰⁷ However, the Appellate Court found that because the EIR had “compress[ed] the analysis of impacts and mitigation measures into a single issue, the EIR disregard[ed] the requirements of CEQA.”¹⁰⁸ The Court continued, stating “[a]bsent a determination regarding the significance of the impacts... it is impossible to determine whether mitigation measures are required or to evaluate whether other more effective measures than those proposed should be considered.”¹⁰⁹ *Lotus* emphasized that an EIR must make a finding “for each identified significant effect” and include an explanation and rationale for each such finding.¹¹⁰

Like the CEQA document in *Lotus*, the DSEIR “compress[es] the analysis of impacts and mitigation measures into a single issue....”¹¹¹ Various sections of the DSEIR include measures to prevent and suppress lithium-ion battery fires. For example, both the project description and the DSEIR’s analysis on hazards state that the Project will meet “the latest standards from UL and National Fire Protection Association” and that the applicant will conduct a “destructive test for battery racks that determines that a fire at one location will not propagate to any neighboring batteries.”¹¹² The DSEIR also states that the Project will have an Emergency Response Plan and “include redundant safety features including

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¹⁰⁶ *Lotus v. Department of Transportation* (2014) 223 Cal.App.4th 645, 650.

¹⁰⁷ *Id.*, at 651.

¹⁰⁸ *Id.*, at 656.

¹⁰⁹ *Ibid.*

¹¹⁰ *Id.* at 654

¹¹¹ *Id.* at 650.

¹¹² DSEIR, p. 3.5-6.
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electrical fuses and overcharge protection.”¹¹³ But none of these measures are included as mitigation measures. Indeed, like in *Lotus*, it is unclear whether the lead agency believes that the risk of a lithium-ion battery fire is significant absent mitigation or not. For instance, the DSEIR concludes that:

The impacts associated with the reasonably foreseeable upset and accident conditions involving an accidental release of hazardous materials into the environment during operation are considered potentially significant unless mitigation is incorporated. Mitigation Measure HM-1 is provided below.¹¹⁴

This finding of significance comes before any discussion of fire risk in the section analyzing release of hazardous materials due to upset or accident conditions. Moreover, Mitigation Measure HM-1 has nothing to do with fire safety and merely directs the Applicant to terminate work on the Project if the contractor detects soil contamination during construction.¹¹⁵ Thus, while numerous fire prevention and suppression measures are included in the DSEIR’s analysis on hazardous release into the environment, the DSEIR never explicitly concludes that fire risk creates a significant impact.

Despite never concluding that fire risk and resulting chemical release creates a significant impact, the DSEIR nevertheless includes mitigation measures disguised as project design features. Indeed, the DSEIR expressly substitutes mitigation for design features, stating “[f]ire risk factors would be mitigated through Project design and fire prevention features, as previously described”¹¹⁶ and

Measures would be taken to reduce the risk of potential lithium-ion battery fire at the site. As previously indicated, any potential fire risk that the traditional lithium-ion cells have will most likely be caused by over-charging or through short circuit due to age. This risk will be mitigated through monitoring and a fire suppression system....¹¹⁷

The DSEIR clearly contemplates that fire danger poses a large enough risk to include numerous design features to avoid it. Yet, the DSEIR never explicitly finds

¹¹³ *Ibid.*

¹¹⁴ *Id.* at 3.5-20.

¹¹⁵ *Id.* at 3.5-23.

¹¹⁶ *Id.* at p. 3.5-17.

¹¹⁷ *Id.* at 3.5-20.

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that fire risk poses a significant impact. Instead, the DSEIR evades a significance finding by leaping straight to mitigation measures that are disguised as project design features. This compression of mitigation measures into other sections of the CEQA document is exactly what *Lotus* forbids.

Furthermore, as described in *Lotus*, the danger of compressing mitigation measures into the significance analysis is that such compression “precludes both identification of potential environmental consequences arising from the project and also thoughtful analysis of the sufficiency of measures to mitigate those consequences.”¹¹⁸ This danger is realized in the DSEIR at hand. Precisely because the DSEIR fails to conduct a hazards analysis on the possibility of lithium-ion battery fire, the public and agency decision-makers cannot determine whether the fire prevention and suppression measures contained in the DSEIR are adequate. This problem is compounded by the fact that the fire suppression and prevention measures are only vaguely identified. For example, the DSEIR states that “[t]he Project will meet the latest standards from UL and National Fire Protection Association (NFPA)...”¹¹⁹ But the latest NFPA standards are insufficient to safely regulate energy storage systems, which is why NFPA is creating a new standard, NFPA 855, that is not yet finalized. As NFPA states:

While the technology [of Energy Storage Systems] is attractive, it is not without risks. Recent innovations allow more energy to be stored in less space, increasing the energy density and in turn increasing the fire and life safety hazards associated with certain ESS. Even though there are currently published requirements for ESS in NFPA 1, Fire Code, and NFPA 70®, National Electrical Code®, authorities having jurisdiction (AHJs) are looking for additional guidance when the request for an ESS installation lands on their desks.¹²⁰

Indeed, NFPA is developing NFPA 855 because there are gaps in current regulation regarding the fire safety of energy storage systems.¹²¹ Thus, when the DSEIR states that the Project will use NFPA’s latest standards, it could be referring either to

¹¹⁸ *Lotus*, 223 Cal.App.4th at 658.

¹¹⁹ DSEIR, p. 3.5-6.

¹²⁰ Bryan O’Connor, *A Handful of Highlights of NFPA 844, The New Standard for the Installation of Energy Storage Systems*, NFPA Journal, available at <https://www.nfpa.org/News-and-Research/Publications-and-media/NFPA-Journal/2019/May-June-2019/Features/Energy-Storage-Systems>

¹²¹ *Ibid.*

existing standards, such as NFPA 1 and NFPA 70, which both AHJs and NFPA recognize as insufficient for regulating energy storage systems, or NFPA 855, which is not yet finalized. Moreover, because NFPA 855 is not yet finalized,¹²² neither the public nor the agency decision-maker can determine whether these standards are sufficient to prevent and suppress lithium-ion battery fires at the Project site.

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The DSEIR must be revised to designate all fire prevention and suppression measures as mitigation. Moreover, the DSEIR must indicate exactly which fire safety standards the Project will use. Absent such information, it is impossible to determine whether the Project has fully mitigated the significant risk from a lithium-ion battery fire.

f. The DSEIR Improperly Defers Mitigation to an Indeterminate Future Date

In addition to improperly designating mitigation measures as project design features, the DSEIR improperly defers fire prevention and suppression mitigation to an indeterminate future date. Under CEQA, it is generally improper to defer the formulation of mitigation measures.¹²³ An exception to this general rule applies when the agency has committed itself to specific performance criteria for evaluating the efficacy of the measures to be implemented in the future, and the future mitigation measures are formulated and operational before the project activity that they regulate begins.¹²⁴ As the courts have explained, deferral of mitigation may be permitted only where the lead agency: (1) undertakes a complete analysis of the significance of the environmental impact; (2) proposes potential mitigation measures early in the planning process; and (3) articulates specific performance criteria that would ensure that adequate mitigation measures were eventually implemented.¹²⁵

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Here, the DSEIR improperly deferred mitigation. The DSEIR states:

¹²² See the NFPA website, stating NFPA 855 will not be available until September 6, 2019 electronically and will not be available until October 4, 2019 in hard copy, available at <https://catalog.nfpa.org/NFPA-855-Standard-for-the-Installation-of-Stationary-Energy-Storage-Systems-P20704.aspx?icid=D729> (last visited Sep. 3, 2019).

¹²³ 14 CCR § 15126.4(a)(1)(B); *POET v. CARB* (2013) 218 Cal.App.4th 681, 735.

¹²⁴ *POET*, 218 Cal.App.4th at 738.

¹²⁵ *Comtys. for a Better Env't v. City of Richmond* (2010) 184 Cal.App.4th 70, 95; *Cal. Native Plant Socy' v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 621.

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The Project will also be required to have an Emergency Response Plan (ERP) acceptable to County Fire, as a standard condition of the approval of the CUP. The ERP will address potential emergencies including chemical releases, fires, and injuries. The ERP will describe emergency response equipment and equipment locations, evacuation routes, procedures for reporting to local emergency response agencies, responsibilities for emergency response, and other required actions to be taken in the event of an emergency.¹²⁶

This deferral of the identification of measures to mitigate the possible release of chemicals and other fire hazards is impermissible under CEQA. The DSEIR not only defers the implementation of the ERP to the time the building permit is obtained, but also states that “[t]he Applicant will work with the fire marshal to design the Project in compliance with all local codes and standards.”¹²⁷ Once again, this future decision-making with the fire marshal is improperly proposed outside of CEQA review at a later, unspecified date, based on no analysis of the significance of the environmental impact and no specific performance criteria that would ensure that adequate mitigation measures were eventually implemented. Such future identification of mitigation is impermissible under CEQA. The DSEIR must be revised to include both the ERP and any other fire plan developed to minimize fire risks.

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g. The DSEIR Fails to Analyze and Mitigate Health Impacts from Pesticide and Herbicide Residues Contained in the Soil

The DSEIR analyzes the risk of pesticide and herbicide exposure during construction and operation, stating “[d]uring construction, ground disturbing activities have the potential to disperse pesticide residuals.”¹²⁸ Ultimately, based on compliance with County dust control regulation (Regulation VIII), the DSEIR concludes that the “impacts associated with hazard through upset/release of hazardous materials resulting from exposure to pesticide residue and herbicides during construction, operation and decommissions are considered less than

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¹²⁶ DSEIR, p. 2-16.

¹²⁷ DSEIR, p. 2-16, 2.5-20.

¹²⁸ *Id.* at 3.5-18.

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significant.”¹²⁹ Despite this finding of no significance, the DSEIR goes on to state, “there is potential for the discovery of unidentified hazards during construction. Mitigation Measure HM-1 describes procedures for managing unidentified hazards and reduce [sic] potential impacts related to unidentified hazards during construction to less than significant levels.”¹³⁰ However, requiring a mitigation measure despite a finding of no significance violates the court’s holding in *Lotus*, as discussed above.¹³¹ First, the Applicant must collect soil samples and analyze them for pesticide residue.¹³² Then, the DSEIR must be revised to make a clear significance finding about the risk of chemical residues in the soil. If the analysis reveals a significant impact, then mitigation is required. Moreover, if chemical residues in the soil do pose a significant impact, then Mitigation Measure HM-1, which purports to minimize this impact, is ineffective. Mitigation Measure HM-1 requires the contractor to terminate construction if the contractor “observes visual or olfactory evidence of contamination or if soil contamination is otherwise suspected...”¹³³ However, as stated in Dr. Fox’s comments, “[p]esticide and herbicide contamination cannot be detected by visual observation or smell...”¹³⁴ Thus, if soil contamination poses a significant impact, feasible and effective mitigation that will actually reduce the impact is necessary.

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h. The DSEIR Finds that Storage of Chemicals on Site is a Significant Impact but Fails to Mitigate this Impact

The DSEIR states that the Project will store hazardous materials onsite.¹³⁵ The DSEIR is silent as to what these hazardous materials are and how they will be used. The DSEIR also states that “[d]esign features and [Best Management Practices] would minimize spill and leak risks associated with use, handling, and storage of hazardous materials at the Project site” and that all such materials would be handled according to applicable regulations.¹³⁶ After this vague and brief description of an impact, the DSEIR then makes a significance finding, stating

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¹²⁹ *Ibid.*

¹³⁰ *Ibid.*

¹³¹ See *Lotus*, 223 Cal.App.4th at 565 stating, “By compressing the analysis of impacts and mitigation measures into a single issue, the EIR disregards the requirements of CEQA.”

¹³² Fox Comments, p. 31.

¹³³ DSEIR, p. 3.5-18.

¹³⁴ Fox Comments, p. 31.

¹³⁵ DSEIR, p. 3.5-19

¹³⁶ *Ibid.*

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“[t]he impacts associated with the reasonably foreseeable upset and accident conditions involving an accidental release of hazardous materials into the environment during operation are considered potentially significant unless mitigation is incorporated. Mitigation Measure HM-1 is provided below.”¹³⁷ Confusingly, Mitigation Measure HM-1 has nothing to do with the storage or handling of hazardous material during operation. Rather, Mitigation Measure HM-1, as discussed above, pertains to terminating construction if the contractor detects chemical residue in the soil.

The Guidelines require an EIR to “describe feasible mitigation measures which could minimize significant adverse impacts....”¹³⁸ Here, the DSEIR identified a significant adverse impact and then failed to describe feasible mitigation measures for that impact, instead referring to a mitigation measure (HM-1) that focuses on mitigating an entirely different impact. To further confuse the issue, HM-1 mitigates an impact that the DSEIR deemed **not** significant, as discussed above. The DSEIR’s failure to identify feasible mitigation measures for the handling and storage of hazardous materials at the Project site, which the DSEIR found significant, violates CEQA. The DSEIR’s reference to an irrelevant mitigation measure to mitigate that issue confuses the reader and frustrates CEQA’s requirement that the DSEIR serve as an informational document. The DSEIR must be revised to clarify this issue.

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i. The DSEIR Fails to Adequately Analyze the Project’s Air Quality Impacts During Construction

The DSEIR uses the CalEEMod to calculate Diesel Particulate Matter (“DPM”) emissions during Project construction. The calculation uses emissions data from “Tier 2” construction equipment and makes no significance finding about cancer risks from DPM exposure. However, the DSEIR never commits to using Tier 2 equipment, merely stating that “[a]ll on-site equipment is *expected* to be Tier 2 compliant.”¹³⁹ Thus, Tier 1 equipment could be used during Project construction. As explained in Dr. Fox’s comments, Tier 1 and older equipment have “DPM emissions that are at least three times higher than those from Tier 2 equipment.”¹⁴⁰ The

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¹³⁷ *Id.* at 3.5-20.

¹³⁸ 14 CCR § 15126.4

¹³⁹ DSEIR, p. 3.1-16 (emphasis added).

¹⁴⁰ Fox Comments, p. 29.
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DSEIR must either be revised to calculate reasonably foreseeable DPM emissions from construction using Tier 1 equipment, or the DSEIR must fully commit to using Tier 2 equipment. Absent this calculation or commitment, the DSEIR fails to analyze a potentially significant impact.

V. THE DSEIR'S CUMULATIVE IMPACTS ANALYSIS IS INADEQUATE

An EIR is required to discuss the cumulative impacts of a project “when the project’s incremental effect is cumulatively considerable.”¹⁴¹ Cumulative impact analyses are necessary because “environmental damage often occurs incrementally from a variety of small sources [that] appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact.”¹⁴² Mere conclusory statements are not sufficient to satisfy the cumulative impacts analysis requirement.¹⁴³ A proper cumulative impacts analysis must be supported by references to specific evidence.¹⁴⁴ As the Court in *Mountain Lion Coalition* explained, “it is vitally important that an EIR avoid minimizing the cumulative impacts. Rather, it must reflect a conscientious effort to provide public agencies and the general public with adequate and relevant detailed information about them.”¹⁴⁵ “A cumulative impacts analysis which understates information concerning the severity and significance of cumulative impacts impedes meaningful public discussion and skews the decisionmaker’s perspective concerning the environmental consequences of the project, the necessity for mitigation measures, and the appropriateness of project approval.”¹⁴⁶

Furthermore, the Guidelines specifically direct agencies to “define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used.”¹⁴⁷ An EIR’s cumulative impacts discussion “should be guided by the standards of practicality and reasonableness,” but several elements are deemed “necessary to an adequate

¹⁴¹ 14 CCR § 15130(a).

¹⁴² *Communities for a Better Env’t v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 114.

¹⁴³ *Mountain Lion Coalition v. Fish & Game Comm’n* (1989) 214 Cal.App.3d 1043, 1047.

¹⁴⁴ *Ibid.*

¹⁴⁵ *Id.* at 1051

¹⁴⁶ *Ibid.*

¹⁴⁷ 14 CCR § 15130(b)(3); *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1216.

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discussion of significant cumulative impacts” including “[a] list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.”¹⁴⁸

Here, the DSEIR mislabels the geographic scope used in the cumulative analysis on air impacts, fails to identify all similar projects in the “list of past, present, and probable future projects,” and replaces the cumulative impacts analysis on air quality with conclusory statements of insignificance.

a. The DSEIR Identifies the Salton Sea Air Basin as the Geographic Scope for Examining Cumulative Impacts on Air Quality but Uses a Much Smaller Geographic Scope Instead

The DSEIR identifies one geographic scope as appropriate for conducting the cumulative impacts analysis on air quality, but then uses a different geographic scope. The DSEIR properly identifies the Salton Sea Air Basin (“SSAB”) as the geographic scope for analyzing cumulative impacts on air quality, stating:

The SSAB is used as the geographic scope for the analysis of cumulative air quality impacts due to the geographic factors which are the basis for designating the SSAB, the existence of an AQMP, SIP, and requirements set forth by the ICAPCD, which apply to all cumulative projects within the SSAB. Table 4-1 lists the projects considered for the air quality cumulative impact analysis.¹⁴⁹

But Table 4-1 omits multiple similar projects located within the SSAB without explanation, including multiple solar plants located in and around the city of Calipatria.¹⁵⁰ Thus, while the DSEIR claims to use the SSAB as the geographical

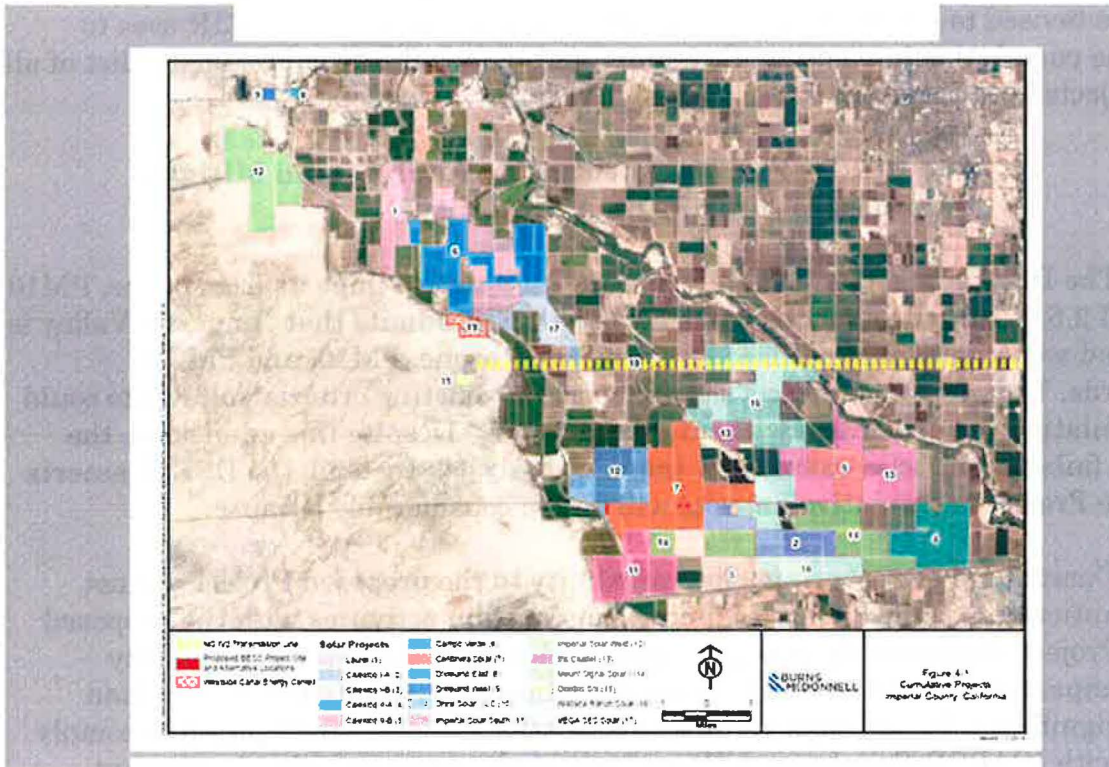
¹⁴⁸ 14 CCR § 15130(b); *Rialto Citizens for Responsible Growth v. City of Rialto* (2012) 208 Cal.App.4th 899, 928-29.

¹⁴⁹ DSEIR, p. 4-9.

¹⁵⁰ Southern Company, Solar Gen 2 Solar Facility, https://www.southerncompany.com/content/dam/southern-company/pdf/southernpower/SolarGEN2_Solar_Facility_factsheet.pdf; Imperial County, FEIR for Citizens Imperial Solar, LLC Project, available at <http://www.icpds.com/CMS/Media/01---Citizens-Imperial-Solar-LLC.-Project.pdf>;

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scope for examining cumulative impacts on air quality, the DSEIR actually uses a far smaller geographic scope, which is depicted here.¹⁵¹



This inconsistency between the stated geographic and the actual geographic scope used in the DSEIR misleads the public and agency decision-makers and undermines the DSEIR's conclusion that cumulative impacts on air quality are not considerable.

Moreover, the DSEIR does not explain why this more limited geographic scope was chosen for examining cumulative impacts and the chosen area seems to be entirely arbitrary, violating CEQA's requirement to "provide a reasonable explanation for the geographic limitation used."¹⁵² Even more bewildering, the cumulative impacts analysis excludes projects located within this smaller, arbitrarily-chosen geographic scope. For example, the Heber Solar Project, located

¹⁵¹ DSEIR, p. 4-4; This geographic scope extends approximately 10 miles north of the project site, 6 miles west of the project site, 8 miles east of the project site, and 4 miles south of the project site.

¹⁵² 14 CCR § 15130(b)(3); *Bakersfield Citizens*, 124 Cal.App.4th at 1216.

approximately 6 miles northeast of the project is excluded without explanation.¹⁵³ A comprehensive list of the past, present, and probable future projects is “necessary to an adequate discussion of significant cumulative impacts.”¹⁵⁴ Thus, the DSEIR must be revised to correctly identify which geographic scope the DSEIR uses to examine cumulative impacts on air quality and to include a comprehensive list of all the projects located within that geographic region.

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b. The DSEIR Fails to Adequately Analyze and Mitigate Cumulative Impacts on Air Quality

The DSEIR fails to adequately analyze cumulative impacts from ozone, PM10 and PM 2.5 during construction. Indeed, the DSEIR admits that “Imperial Valley is classified as non-attainment for federal and state ozone, PM10, and PM2.5 standards. Therefore, the Project’s contribution to existing criteria pollutants could be cumulatively considerable without mitigation.”¹⁵⁵ Despite this admission, the DSEIR fails to conduct a cumulative impacts analysis. Instead, the DSEIR asserts that the Project’s cumulative impacts will not be considerable because:

Cumulative projects ... in close proximity to the proposed Project are not anticipated to involve overlapping construction activities with the proposed Project, therefore the potential for a cumulative, short-term air quality impact as a result of construction activities is anticipated to be less than significant. In addition, all other cumulative projects are required to comply with ICAPCD Regulation VIII and would also be assumed to implement mitigation measures to reduce their individual construction air quality emissions. In this way, each individual cumulative project would reduce construction emissions on a project by- project basis resulting in less than cumulatively considerable contributions to existing criteria pollutants. Because the proposed Project’s construction air quality emissions would fall below ICAPCD thresholds, and other cumulative projects would also mitigate construction emissions on a project- by-project basis, impacts associated with

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¹⁵³ See Solar Energy Industries Association, *Major Solar Projects List*, <https://www.seia.org/research-resources/major-solar-projects-list> (last visited Aug. 30, 2019).

¹⁵⁴ 14 CCR § 15130(b); *Rialto Citizens for Responsible Growth v. City of Rialto* (2012) 208 Cal.App.4th 899, 928-29.

¹⁵⁵ DSEIR, p. 3.1-21.
3800-013acp

a cumulatively considerable net increase of criteria pollutant would be considered less than cumulatively considerable.¹⁵⁶

But the DSEIR's reasons for evading a thorough cumulative impacts analysis defy logic. The DSEIR identified 11 similar projects that are either under construction currently, are approved but not built, or are pending entitlement.¹⁵⁷ Any of the construction activities associated with these 11 projects could overlap with the Project's construction. Moreover, these 11 concurrent projects are all located within 10 miles of the Project site.¹⁵⁸ Yet the DSEIR assumes that "cumulative projects ... are not anticipated to involve overlapping construction activities..."¹⁵⁹ This assertion lacks substantial evidence. The 11 identified projects, like the proposed Project, often have construction periods of a year or more. It therefore seems incredibly likely that these projects will have overlapping construction activities, and the DSEIR supplies no evidence indicating that the construction periods will be staggered or coordinated. Thus, the DSEIR's conclusion that there will be no overlapping construction and therefore the Project's cumulative impacts will not be considerable lacks substantial evidence and violates case law, which requires the cumulative impact analysis to "be supported by references to specific scientific and empirical evidence."¹⁶⁰

22

Finally, the DSEIR's reliance on ICAPCD Regulation VIII to avoid a cumulative impacts analysis is also unjustified. The DSEIR states that cumulative impacts of construction on air quality would be insignificant because "all other cumulative projects are required to comply with ICAPCD Regulation VIII."¹⁶¹ But for this assertion to be true, ICAPCD Regulation VIII must mandate zero or near zero emissions. Instead, ICAPCD Regulation VIII only requires that projects

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¹⁵⁶ DSEIR, pp. 3.1-21 to 3.1-22.

¹⁵⁷ *Id.* at 4-7 to 4-8. The 12 projects include Laurel Cluster Solar Farms—approved but not built; Calexico I-A—under construction; Calexico I-B—approved but not built; Calexico II-A—approved but not built; Drew Solar Project—pending entitlement; Iris Cluster—under construction; Ocotillo Sol—approved but not built; Wistaria Ranch Solar—under construction; Vega SES solar Project—approved but not built; North Gila Transmission Line Project—pending entitlement; Westside Canal Energy Center—pending entitlement.

¹⁵⁸ DSEIR, p. 4-4.

¹⁵⁹ *Id.* at 3.1-21 to 3.1-22.

¹⁶⁰ *Mountain Lion Coalition v. Fish & Game Comm'n* (1989) 214 Cal.App.3d 1043, 1047.

¹⁶¹ DSEIR, pp. 3.1-21 to 3.1-22.

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mitigate "Visual Dust Emissions" to 20% opacity,¹⁶² which limits PM 10 emissions from construction activities. The Project thus could still cumulatively have a significant environmental impact on air quality, depending on the number of concurrent projects, the size of those projects, and the location of those projects. Moreover, Regulation VIII does not mitigate any of the other air pollutants caused by construction activities for which the region is out of attainment, such as ozone precursors. Instead of performing an analysis to determine the impact of these various pollutants, the DSEIR asserts that compliance with a law aimed at reducing, but not eliminating, PM 10 from construction activities renders such an analysis unnecessary.

The DSEIR must be revised to either conduct an adequate cumulative impacts analysis, or revised with evidence showing that the Project will not overlap its construction phase with other projects. By failing to include that information, the DSEIR relies on empty conclusory statements and assumptions to evade a proper cumulative impacts analysis, thus violating CEQA.

VI. CONCLUSION

We urge the County to fulfill its responsibilities under CEQA by revising the DSEIR and preparing a legally adequate DSEIR to rectify the legal errors and address the potentially significant impacts described in this comment letter, the attached letter from Dr. Fox and Mr. Marcus, and the other public comments in the record. This is the only way the County and the public will be able to ensure that the Project's potentially significant environmental and public health impacts are disclosed and mitigated to less than significant levels.

Sincerely,



Danika L. Desai
Associate

Attachments
DLD:acp

¹⁶² See e.g. ICAPCD Regulation XIII § F.5.c, available at <https://www.co.imperial.ca.us/AirPollution/RULEBOOK/RULES/1RULE800.pdf>.
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ATTACHMENT A

Comments
on the
Draft Supplemental
Environmental Impact Report
for the
Le Conte Battery Energy
Storage System

Imperial County, California

September 3, 2019

Phyllis Fox

and

David Marcus

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1. INTRODUCTION

Le Conte Energy Storage, LLC (the Applicant) proposes to construct and operate a battery energy storage facility (BESS) on 3 to 5 acres of land within the fence line of the existing Centinela Solar Energy (CSE) facility, located at 319 Brockman Road, Calexico, California (Project). The Project will be installed on already disturbed land and consists of 125 MW of electrical storage capacity to receive and store cheap¹ electricity and return this electricity to the grid at a later time. Imperial County has prepared a Draft Supplemental Environmental Impact Report (DSEIR) for this Project.²

We reviewed the DSEIR for this Project prepared by Imperial County, the CEQA lead agency. The analyses in the appendices supporting the conclusions in the DSEIR attempt to address highly technical issues yet are poorly supported. Based on the available material and limited Project description, in our opinion the DSEIR is substantially deficient and does not fulfill its mandate as an informational document under CEQA to inform the public of potential impacts. It has omitted sources of emissions and underestimated others, thus underestimating greenhouse gas (GHG) and public health impacts. The DSEIR also failed to include risk of upset analyses to evaluate the impact of battery fire and explosion on local residents and motorists on adjacent roadways. It has further failed to require adequate mitigation for significant impacts that it did identify. Our analysis indicates that:

- The Project description is inadequate to support the DSEIR's conclusions.
- GHG emissions are significant and unmitigated.
- Fire and explosion impacts are significant and unmitigated.
- Hazards and hazardous material impacts are significant and unmitigated.
- Worker and public health impacts were not evaluated and are potentially significant.

These comments were prepared by Dr. Fox, with assistance from David Marcus on GHG emissions. Dr. Fox's resume is included in Exhibit 1 to these Comments and Mr. Marcus's resume in Exhibit 2. In sum, in our opinion the DSEIR is substantially deficient. Our analyses below indicate that the Project will result in significant GHG emissions and health impacts that have not been identified and/or mitigated. We

¹ The DSEIR contains no commitment to only use otherwise-curtailed renewable generation that would be "excess."

² Imperial County Planning and Development Services, Draft Supplemental Environmental Impact Report, Prepared by Burns McDonnell, July 15, 2019; available at <http://www.icpds.com/?pid=6973>.

recommend that the County recirculate a revised DSEIR that addresses the issues discussed below.

2. THE PROJECT DESCRIPTION IS INADEQUATE

The Project will consist of one or more buildings, totaling about 85,000 square feet, which will contain lithium-ion batteries, racks, and related building and electrical control systems; bidirectional inverters with 480 V AC output, a medium voltage (MV) transformer which steps up the voltage to 34.5 kV, an on-site substation that aggregates AC energy from the MV transformers and steps it up to 230-kw for delivery to the Drew Switchyard, and an overhead 230 kilovolt (kV) electric line.³ The inverters, on-site substation, and associated overhead electric tie-line will be located outdoors.⁴ The Project will connect to the adjacent San Diego Gas & Electric (SDG&E) Drew Switchyard. It will receive, store, and return up to 125 MW of electric energy to the electric grid, including solar energy currently produced by projects interconnected at the Drew and IV substations.⁵

The Project will use battery energy storage technology to absorb and discharge electrical energy into the SDG&E power grid. The facilities will include batteries and enclosures, power conversion systems, a substation, and ancillary systems, including fencing, security, lighting, fire protection, and heating, ventilation, and air conditioning.⁶ The description of the Project is not adequate to evaluate its environmental impacts.

First, the DSEIR does not contain a Material Safety Data Sheet (MSDS) for the batteries or otherwise disclose their chemical composition, a *sine qua non* for assessing the fire, explosion, health, and other risks of the battery storage facility. Rather, it only generally identifies some of the chemicals that will be present in the lithium-ion batteries, including cobalt oxide, manganese dioxide, nickel oxide, carbon, an unidentified electrolyte, polyvinylidene fluoride, aluminum foil, copper foil, aluminum, and unidentified “inert” materials. This list is sufficient to raise serious concerns about health and safety issues because fluoride compounds are highly toxic when released in fires and explosions. See Comment 5. However, the DSEIR failed to acknowledge and evaluate these potential impacts.

A1

³ DSEIR, pp. ES-3, 2-2.

⁴ DSEIR, p. 2-11.

⁵ DSEIR, p. ES-1 and ES-5.

⁶ DSEIR, p. ES-3.

Second, the DSEIR does not include any information on the layout of the batteries within the facility or the fire suppression system that will be used. This information is essential to evaluate the risk of fire and explosion. All details of the fire suppression system are deferred to the time of building permit submission.⁷ Third, accidents could occur during transport, on-site storage, and disposal. The DSEIR does not disclose where the batteries will be manufactured, how they will be transported to the site (ship, rail, or truck), the transportation routes, details of on-site storage during construction, where the batteries will be recycled and the routes and means of transport to the recycle center. Accidents can occur during transport, storage, and recycling.

A2

Third, the DSEIR does not include any vendor specifications for the ancillary equipment required to support the batteries, including the cooling and control systems, 56 inverters, 56 transformers, and 40 rooftop heating, ventilation, and air conditioning (HVAC) units.⁸ Substation equipment includes a step-up transformer and 2 HVAC units.⁹ This equipment requires electricity to operate and the generation of this electricity emits criteria and GHG emissions.

A3

The DSEIR also fails to explain the function of the various components of the Project. Some are obvious, like the HVAC units, but others are not generally understood by the reviewing public. Electricity from the batteries is generated as low voltage direct current (DC). Inverters convert the DC current to 480-volt alternating current (AC). Transformers increase the voltage to the 34.5 kV voltage level. This is done for each of 56 subgroups of batteries. The 34.5 kV AC output of the 56 transformers is then combined and run through another transformer to raise it to the 230 kV high voltage level at which it is delivered to the grid. When charging, the whole thing runs in reverse. The incoming high voltage AC is run through a transformer to become 34.5 kV voltage AC, which is run through 56 transformers that each produce 2.5 MW of 480 volt AC, which is then run through 56 inverters to produce low voltage DC that is used to charge 56 separate groupings of batteries.¹⁰

In fact, the description of the ancillary equipment in the noise appendix suggests the DSEIR may have understated the generating capacity of the facility. The noise

⁷ DSEIR, Section 2.6.4.1.

⁸ DSEIR, Appendix F, Section 7.1, Table 7-1.

⁹ DSEIR, Appendix F, Section 7.1, Table 7-1.

¹⁰ DSEIR, pp. ES-3, 2-2.

section discloses 56 2.5-MW inverters and 56 2.5-MW transformers.¹¹ This indicates a gross capacity of $56 \times 2.5 = 140$ MW, not the 125 MW capacity disclosed in the DSEIR. This implies a combined loss of slightly over 10% from the transformers and inverters, which may be excessive and is unsupported by vendor specification, or suggests that the BESS would generate 140 MW instead of 125 MW because there is no mitigation that limits generation to 125 MW.

Fourth, the DSEIR contains no information on the gross or net generation of electricity needed to operate the facility, storage capacity, storage efficiency, and expected energy output of the batteries. This information is essential to estimate emissions from operating the facility.

A4

The environmental impacts of the Project cannot be accurately determined without this information. Thus, the DSEIR is substantially deficient and does not fulfill its mandate as an informational document under CEQA to inform the public of potential impacts.

3. OPERATIONAL GREENHOUSE GAS EMISSIONS ARE SIGNIFICANT

The DSEIR states that “CO₂e emissions generated from the Project would primarily be from construction and to a lesser extent from operations.... All GHG emissions will be calculated using CalEEMod (Version 2016.3.1) which has been approved for use within Imperial County.”¹² This is incorrect for three reasons. First, it ignores the greenhouse gas (GHG) emissions from charging the batteries. CEQA requires that all GHG emissions generated either directly or indirectly must be considered.¹³ Second, the CalEEMod model only includes emissions from electricity usage and vehicle trips to service the facility. Third, the CalEEMod does not include GHG emissions from electricity usage at battery storage facilities.¹⁴ Instead, the DSEIR used an energy intensity for “General Light Industry” of 2.31 kilowatt hours per 1,000 square feet per year.¹⁵ A BESS is not “General Light Industry” because significantly more electricity would be required to operate the ancillary cooling and control systems in a BESS, including the 56 2.5 MW inverters, 56 2.5 MW transformers, and 40 rooftop HVAC units; and in the substation, a step-up transformer and 2 HVAC units.¹⁶ As

A5

A6

A7

¹¹ DSEIR, Appendix E, Table 7-1.

¹² DSEIR, p. 3.1-17.

¹³ CEQA Guidelines, Appendix G, Section VIII(a), Greenhouse Gas Emissions and SDEIR, Appendix B, p. 2-11.

¹⁴ See <http://www.aqmd.gov/calceemod/user's-guide>.

¹⁵ DSEIR, Appendix B, Section 4.2, p. 4-2 and Appendix A or Appendix B, pdf 35.

¹⁶ DSEIR, Appendix F, Section 7.1.

demonstrated below, GHG emissions from the Project are significant when properly calculated.

The DSEIR states that “The Project will allow for efficient storage of energy available on the wholesale power grid, including renewable energy generated in the County so that it is available when needed most.”¹⁷ It also states that “Charging energy will be provided from the electric grid which will include solar energy currently produced by projects interconnected at the Drew and IV substations.”¹⁸

The environmental impacts of the Project from pollutant emissions during operation depends on how many megawatt hours (MWh) of generation are required to charge the Project batteries, which grid sources are the marginal sources¹⁹ of supply during the hours when Project charging or discharging is occurring, and the emission rates of those grid sources. The number of MWh of charging energy required will in turn depend on the expected Project generation and the Project efficiency (the percentage of charging energy which can be recovered as generation during discharge).

The DSEIR contains no information on the net generation of electricity needed to operate the facility. Absent regulatory requirements or mitigation measures to the contrary, battery storage facilities store whatever energy is the cheapest and displace whatever is the most expensive, with no concern for emissions that would result from this exchange because there is no price on carbon or any other pollutant.

If the charging energy is from conventional sources, such as gas or coal-fired generation, charging will generate emissions as those sources would not otherwise operate because there would be no market for them. That fraction is likely quite low because only a small fraction of solar generation (and virtually no non-solar renewable generation) is curtailed²⁰ generation that could have been used for battery charging.

A8

¹⁷ DSEIR, p. ES-3.

¹⁸ DSEIR, p. 2-4.

¹⁹ The marginal source of supply in a given hour is the source whose output would be increased if demand increases in that hour from the previous hour, or whose output would be decreased in that hour if demand decreases in that hour from the previous hour.

²⁰ Renewable energy is “curtailed” when it could have been physically produced (e.g., the sun is shining or the wind is blowing), but it was not produced due to economic (e.g., prices too low to be worth generating) or electrical system factors (e.g., the renewable generation would cause a nonrenewable generator to be turned off that is expected to be needed in the near future, without adequate time to restart it if it is turned off, and thus the CAISO orders renewable curtailment to avoid nonrenewable curtailment). The great majority of curtailment in California to date has been economic (over 99% in 2017, in 2018, and in 2019 to date; see http://www.caiso.com/Documents/Wind_SolarReal-TimeDispatchCurtailmentReportDec31_2017.pdf, http://www.caiso.com/Documents/Wind_SolarReal-TimeDispatchCurtailmentReportDec31_2018.pdf, and http://www.caiso.com/Documents/Wind_SolarReal-TimeDispatchCurtailmentReportAug27_2019.pdf).

Thus, if charging occurs in hours when the marginal fuel in the CAISO-controlled grid is a fossil fuel, the facility would increase GHG and criteria pollutant emissions that were not included in the DSEIR's analyses.

The DSEIR makes no commitment that the batteries will be charged with renewable energy. The DSEIR states: "The Project will allow for efficient storage of energy available on the wholesale power grid, including renewable energy generated in the County so that it is available when needed most."²¹ Elsewhere, the DSEIR states: "Charging energy will be provided from the electric grid which will include solar energy currently produced by projects interconnected at the Drew and IV substations."²² The phrases "including renewable energy generated in the County" and "include solar energy" say nothing about how often or how much renewable energy will be used for charging, let alone renewable energy generated on site. As the facility is a net consumer of electricity, operation of the Project will increase GHG and criteria pollutant emissions when the batteries are charged with nonrenewable energy sources, which will occur whenever incremental²³ wind and solar are not available to meet incremental charging loads because they are already being fully used.

A9

The DSEIR fails to provide any of the information required to estimate charging emissions, including the storage capacity, storage efficiency, and expected energy output of the batteries. The storage capacity is the amount of energy the batteries can store, usually measured in MWh or in hours of full capacity (125 MW) output. The expected energy output of the Project is the number of MWh of generation expected over the course of a typical year,²⁴ which will be less than 125 MW x 8760²⁵ hours due to hours when the Project will be either charging or not operating, or generating at less than full capacity. The storage efficiency (sometimes also called "round-trip efficiency") depends on the battery technology used and is relevant to the environmental impacts of the Project because lower efficiency means more grid generation required for each MWh of expected energy output. It is the ratio of energy output per MWh of charging energy (i.e., MWh of battery generation divided by MWh of battery charging energy).

A10

²¹ DSEIR, p. ES-3.

²² DSEIR, p. 2-4.

²³ "Incremental" is analogous to marginal. Incremental wind and solar means solar and wind in addition to what is already generating; incremental charging loads means charging loads in addition to whatever charging loads if any are already happening. Marginal can refer to small changes either up or down from the status quo ante, while incremental refers to upward changes only ("decremental" refers to small downward changes).

²⁴ Energy output = capacity factor x 8,760 hr/yr x 125 MW.

²⁵ 8,760 is the number of hours in a year.

All of this information is required to estimate emissions from Project operation. Thus, the DSEIR fails as an informational document under CEQA.

A10

Because the DSEIR does not provide any data on the expected efficiency, capacity factor, or its expected charging energy requirements or energy generation, we used CAISO data for existing energy storage projects. The CAISO currently has about the same level of operating battery storage as the Project. Specifically, during four 1-week periods in the middle of each of the last four seasons (fall 2018, winter 2018-19, spring 2019, and summer 2019), the maximum CAISO storage generation was 119 MW,²⁶ very close to the 125 MW proposed generating capacity of the Project.

The CAISO provides data at 5-minute intervals for the MW of storage generation (positive numbers) or charging (negative numbers). We downloaded the 5-minute data for 28 days over the last year, selected to represent one week each in the middle of each of the four seasons of the year. The use of a full week of data for each season accounts for day-of-the-week variation and also for multi-day responses to weather, where generation on one day may reflect charging on the previous day.²⁷ The use of data from each of the seasons of the year accounts for seasonal variation in insolation and loads.

We aggregated the CAISO 5-minute data by day, by season, and for the full year represented by the data.²⁸ From the aggregated data, we calculated an overall annual capacity (119 MW), generation capacity factor (9.7%), efficiency (80.7%), and charging energy (125,551 MWh, or 126 gigawatt hours (GWh)).²⁹ Assuming the proposed 125 MW Project will have the same efficiency and capacity factor as the existing 119 MW of CAISO storage, the corresponding expected charging energy requirements for the Project will be 132 GWh per year.³⁰ The net increase in energy generation, after taking account of hours when the Project would be discharging, will be 25.5 GWh per year.³¹

The CAISO does not provide any data on the marginal sources of supply for storage charging on its system. Nor does it provide any data on marginal sources of supply for individual time periods, which could be cross-matched with the 5-minute

²⁶ See the attached spreadsheet of CAISO storage data, column E.

²⁷ See, e.g., Exhibit 3 (Storage Data Spreadsheet, lines 3, 4, 7, 18, 24, and 37), where daily generation exceeded charging. This is only possible if some of the generation relied upon charging in the prior day(s).

²⁸ See Exhibit 3: Storage Data Spreadsheet, columns C-G.

²⁹ See Exhibit 3: Storage Data Spreadsheet, line 49.

³⁰ See Exhibit 3: Storage Data Spreadsheet, line 53.

³¹ See Exhibit 3 Storage Data Spreadsheet, line 54.

storage charging data to calculate the marginal sources of charging energy. The DSEIR also provides no information on the sources of charging energy, other than to suggest that some unspecified fraction will come from renewable energy resources.³² That fraction is likely quite low because only a small fraction of solar generation (and virtually no non-solar renewable generation) is curtailed generation that could have been used for battery charging.³³

The CAISO grid covers most of California, and because of the Western Energy Imbalance Market³⁴ marginal sources of generation outside the CAISO are also available from a wide swath of the Western U.S. grid. Thus, the CAISO's marginal source of generation is likely to be gas-fired generation in the great majority of hours. Therefore, we assumed that the most reasonable approximation to the expected emissions associated with battery charging are the emissions from a modern natural gas-fired combined cycle plant. Such plants are the most efficient gas-fired plants, and gas is the cleanest fossil fuel with the lowest emissions. Thus, for any hour in which gas (or coal) is the marginal fuel, the emissions from a gas-fired combined cycle plant are a lower-bound emissions estimate. There will be a small number of hours in which solar or wind are the marginal resources, as shown by their being curtailed in the absence of battery charging to absorb their generation. In those hours, assuming a combined cycle plant as the marginal resource will overstate the emissions associated with battery charging. That overstatement is offset by the hours in which the marginal source is a combustion turbine or steam plant, whose emissions are greater than those of a combined cycle plant.

The Project would interconnect to SDG&E-owned facilities on the CAISO-controlled grid. The most recent combined cycle gas plant connected to SDG&E-owned transmission lines is the Otay Mesa project, which began operation in October 2009. California Energy Commission (CEC) data for the five most recent years show that the average Otay Mesa heat rate over the 2014–2018 period was 7,183 Btu/kWh.³⁵ Based on that heat rate, and EIA data on emissions from Otay Mesa for the years 2013–2017,³⁶ we

³² DSEIR, p. ES-5, ES-11/12, 2-4, 5-2.

³³ In 2018, only 1.4% of solar generation and 0.2% of wind generation were curtailed, and no other renewable generation. The corresponding figures for January–July 2019, which are biased high because most curtailment occurs in the spring months, are 3.6% for solar and 0.3% for wind.

³⁴ The Western Energy Imbalance Market is a real-time, wholesale energy trading market that enables participants anywhere in the West to buy and sell energy when needed. See <https://www.westerneim.com/pages/default.aspx>.

³⁵ See Exhibit 4, Otay Mesa Data Spreadsheet, bottom left.

³⁶ The most recent 5 years of available data (2013–2017), from <https://www.eia.gov/electricity/data/emissions/>. Otay Mesa is plant #55345 in the EIA database.

have calculated emission factors for Otay Mesa of 420 tons of CO₂ per GWh, 3.33 pounds of SO₂ per GWh, and just under 30 pounds of NO_x per GWh.³⁷

Assuming 25.5 GWh per year of net charging energy for the Project, as discussed above, and further assuming emission rates for that energy equivalent to those for the Otay Mesa combined cycle project, the net emissions increases that would occur to operate the Project are:³⁸

- 10,716 tons of CO₂e per year
- 85 pounds of SO₂ per year
- 756 pounds of NO_x per year

The DSEIR estimated CO₂e emissions from operating the Project of 579.68 metric tons per year (MT/yr) using the CalEEMod model, which does not include charging energy for the batteries. The CalEEMod also underestimates GHG emissions from electricity used at the facility to operate ancillary equipment, including cooling and control systems, the inverters, transformers, and HVAC equipment³⁹ but we did not estimate those due to the lack of any equipment specification.

Thus, total GHG emissions for the Project are at least 10,331 MT/yr.⁴⁰ The DSEIR used the CAPCOA GHG significance threshold of 900 MT/yr⁴¹ to evaluate the significance of GHG emissions from Project operation.⁴² Thus, Project GHG emissions are highly significant, requiring mitigation. This is a new significant impact not disclosed in the DSEIR. The DSEIR must be modified to include GHG mitigation and recirculated for public review.

The Project should be modified to require no net increase in GHG emissions over the baseline by implementing projects to reduce GHG emissions as follows:

- (1) project design features/ on-site reduction measures;
- (2) offsets off-site within Imperial County;

³⁷ Exhibit 4, Otay Mesa Data Spreadsheet, bottom left, Excel cells C33-C35.

³⁸ Exhibit 4, Otay Mesa Data Spreadsheet, bottom left, Excel cells C40-C42. Note that these emissions are based on net emissions of 25.5 GWh per year, which is the net of the 131.9 GWh of increased generation to provide charging energy and the 106.4 GWh of reduced generation that would be displaced by battery generation. See Exhibit 3, Storage Data Spreadsheet, lines 53-54.

³⁹ DSEIR, Appendix F, Section 7.1.

⁴⁰ Total GHG emissions = (10,716 ton/yr)(0.91 MT/ton) + 579.68 MT/yr (DSEIR, Table 3.1-8) = **10,331 MT/yr.**

⁴¹ DSEIR, p. 3.1-25.

⁴² DSEIR, p. 3.1-25 and Appendix B, Section 4.2.1.

- (3) offsets off-site within the State of California;
- (4) offsets off-site within the United States;
- (5) offsets off-site internationally; and
- (6) charging restrictions that constrain battery charging to hours when CAISO renewable resources would otherwise be curtailed, but the curtailment would be demonstrably avoided by using otherwise curtailed generation as battery-charging energy, or if such demonstrations are not feasible
- (7) charging restrictions that constrain battery charging to hours when solar generation is potentially being curtailed, which would at a minimum mean no charging during night time hours.

4. HAZARDS AND HAZARDOUS MATERIAL IMPACTS WERE NOT EVALUATED AND ARE SIGNIFICANT

CEQA Guidelines, Appendix G, states that agencies should ask whether the project will result in any of the following:

- “Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?” or
- “Create a significant hazard to the public or the environment through the reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment?”⁴³

The batteries could result in a number of significant hazard and hazardous material impacts including fire, explosion, and the release of toxic chemicals. 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 DSEIR contains no analysis at all of the hazards and hazardous material impacts of the battery storage facility, thus failing as an informational document under CEQA. Instead, it generally discusses fire without performing any Project-specific analysis and plucks mitigation – compliance with existing codes and an undisclosed Emergency Response Plan (ERP) – out of thin air.

Thus, the DSEIR fails as an informational document under CEQA for failing to disclose the details of the fire protection system, for failing to include the ERP in the DSEIR, and for failing to include a hazard analysis to evaluate the impacts to nearby

⁴³ See CEQA Guidelines, Appendix G, Evaluation of Environmental Impacts, Section IX(a)-(b), Hazards and Hazardous Materials.

residents and facilities in the event of a fire. A fire at the Project could result in significant damage to the adjacent solar facility and nearby homes.

A12

4.1. Fire and Explosion Impacts Were Not Evaluated and Are Significant

The batteries contain flammable materials that can ignite and cause fires and explosions, resulting in irreversible damage in the surrounding area, including to the nearby CSE facility, local residents, agricultural and solar plant workers, and motorists on adjacent roadways. CEQA Guidelines Section 15126.2(c) requires a discussion of any significant irreversible environmental change that would be caused by a project. A project would result in significant irreversible changes if it involves uses in which irreversible damage could result from any potential environmental accidents associated with the project.⁴⁴ The DSEIR fails to include any analysis of fire and explosion impacts of the BESS.

A13

The batteries contain hazardous chemicals that would be released in fires, resulting in potentially significant health impacts to nearby farm and solar plant workers, local residents, motorists on adjacent roadways, and responding firefighters, as well as potential impacts to agricultural crops grown in surrounding farmlands. Fires also could occur during battery transportation to the site, during construction of the BESS, during BESS commissioning and decommissioning, as well as during operation. The DSEIR only generally discusses the risk of fire during operation of the BESS, tacitly assuming that Project design and compliance with local fire and other codes will mitigate operational fire impacts.⁴⁵ The DSEIR fails to analyze or even discuss the risk of transporting the batteries to the site and the risks of constructing, commissioning, and decommissioning the BESS when operational safety measures discussed in the DSEIR would not be present.

A14

The DSEIR lacks substantial evidence to conclude that there will be no fire or explosion during transport, construction, commissioning, operation, and decommissioning. Instead of identifying the specific risks and conducting a conventional risk of upset analysis for battery transport and BESS construction, commissioning, operation, and decommissioning, the DSEIR skips this step entirely and leaps directly to a general "fire protection plan" for the battery facility that only includes compliance with 2016 Fire Codes (that have been demonstrated to be ineffective against BESS fires) and other measures that will be developed in the future, outside of CEQA review, without describing the Project in sufficient detail to evaluate

A15

⁴⁴ DSEIR, p. ES-8.

⁴⁵ DSEIR, Section 3.5.2.4.

their effectiveness. See Comment 2. The SDEIR, for example, states: “The fire protection system **will be designed...**” “The fire protection plan is **anticipated** to include.....”, “the Applicant **will work** closely....”⁴⁶ This is not enforceable mitigation. See Comment 2. The mitigation must be in the CEQA document, not developed in the future, outside of CEQA review.

In fact, there is substantial evidence to conclude that the Project will have a significant impact due to fires, explosions, and the release of toxic gases that could occur during transport, construction, commissioning, operation, and decommissioning. These events could result in significant damage at the adjacent CSE facility, nearby residences, motorists on adjacent and other roadways, agricultural workers, and crops grown in the surrounding area. Yet the DSEIR fails to analyze these risks, leaping to general mitigation that will be developed in the future, outside of CEQA review. Thus, the DSEIR fails as an informational document under CEQA.

A15

The DSEIR downplays the risk of fires by comparing Project battery fires to battery fires in electric vehicles, arguing that the Project batteries “will be stationary, whereas electric vehicle battery fires often occur as the result of a crash where the battery is crushed or penetrated in a way that bypasses safety mechanisms.”⁴⁷ However, this is wrong. Fires in cars with lithium-ion batteries also have occurred while the vehicles are parked and during charging.^{48,49} About 40 fires involving lithium-ion batteries in electric cars have been reported.^{50,51} The DSEIR fails to acknowledge these occurrences or explain how the Project BESS will be designed to avoid them.

A16

The DSEIR fails to explain (or even acknowledge) the history of fires at similar battery storage facilities and how the proposed Project design will guard against similar fires. Instead, the DSEIR only acknowledges fires that have occurred in similar lithium-ion batteries used in cars, which have burst into flames in collisions, and asserts that the

A17

⁴⁶ DSEIR, pp. 3-20 to 3-22 (**emphasis added**).

⁴⁷ DSEIR, p. 3.5-7.

⁴⁸ Jonathon Klein, Parked Teslas Keep Catching on Fire Randomly, and There’s No Recall In Sight, *The Drive*, June 18, 2019; available at <https://www.thedrive.com/news/28420/parked-teslas-keep-catching-on-fire-randomly-and-theres-no-recall-in-sight>.

⁴⁹ Dongxu Ouyang et al., A Review on the Thermal Hazards of the Lithium-Ion Battery and the Corresponding Countermeasures, *Applied Sciences*, June 18, 2019, Table 1, Exhibit 5.

⁵⁰ Ibid. See also Ashlee Vance, *Elon Musk: Tesla, SpaceX, and the Quest for a Fantastic Future*, Harper Collins, 2015.

⁵¹ <https://www.google.com/search?q=tesla+battery+fire&aq=chrome.1.69i57j015.12984j0j4&sourceid=chrome&ie=UTF-8>. See also <https://electrek.co/2018/06/16/tesla-model-s-battery-fire-investigating/>.

battery cells and modules will have “automotive grade anti-crush and anti-penetration safety technologies built in, designed to disable the battery cell in the event that the cell housing is damaged due to improper handling or any other type of accident.”⁵²

A17

The DSEIR further asserts that “the likelihood of a stationary storage BESS getting crushed or penetrated through a collision with an exterior object would be comparatively less.” Setting aside for the moment that collision is not the main cause of lithium-ion battery failure, the facility is located less than 500 feet from a freeway (SR-98) and is immediately adjacent to a local road (Drew Road) where traffic accidents could impact the battery storage facility. Figure 1.⁵³ The DSEIR indicates that average daily traffic on SR 98 is 1,953 trips and on Drew Road, 321 trips, with capacities of 20,900 and 16,200 trips.⁵⁴ Thus, a traffic accident involving the BESS cannot be ruled out. Regardless of the built-in protections, which are not disclosed in sufficient detail to evaluate their effectiveness, the risk of fire from battery malfunctions or traffic collisions is not zero because the technology is new and there is still much to learn.

A18

Figure 1: Project Location



 Proposed Battery Energy Storage System

⁵² DSEIR, p. 2-17, 3.5-6/7.

⁵³ DSEIR, Figure 2-1.

⁵⁴ DSEIR, Appendix G, Table 4.1.



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.^{55,56} These batteries are susceptible to thermal runaway, which is a chain reaction leading to self-heating and release of stored energy.⁵⁷ As described in a recent refereed journal article:⁵⁸

⁵⁵ 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>.

⁵⁶ Thomas F. Armistead, Fire at Arizona Energy Storage Battery Bank Draws Scrutiny, *Engineering News-Record*, July 7/8, 2019, p. 18. Exhibit 6.

⁵⁷ 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_lithium_batteries.pdf?version=1&modificationDate=1398443780029&api=v2.

⁵⁸ 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>.

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.

It is well known that lithium-ion battery fires are some of the most difficult fires to suppress. Lithium-ion batteries have high power-to-density ratios that allow them to store large amounts of energy. When a lithium-ion battery catches fire, this stored energy coupled with the materials in the battery makes it difficult to suppress or extinguish.⁵⁹ Fires in lithium-ion batteries are generally hotter than a standard fire and can reignite days after they are extinguished, presenting unique firefighting challenges. See discussion of individual fires in Comment 4.1.2.

Fires in battery storage facilities can start in the batteries themselves, be ignited from foreign materials, a ground arc fault electrical surge, an external fire, or be triggered by a failure of the control system. A recent summary of the fire history of BESS facilities concluded that: "What we're learning over time is that it's not necessarily always a battery problem ... 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

⁵⁹ Jeremy Snow, Suppressing Lithium Ion Battery Fires; available at <http://venturaaerospace.com/news/suppressing-lithium-ion-battery-fires/>.

the battery.”⁶⁰ Conventional sprinkler systems have failed in similar applications because water is a poor fire retardant for the chemicals present in lithium-ion batteries. The DSEIR indicates it will use water combined with a cleaning agent such as FM-200 or Novatech, but fails to provide an MSDS and offers no evidence that this would be effective in controlling a BESS fire.⁶¹

The DSEIR also indicates that measures will be taken “to reduce the risk of potential lithium-ion battery fires at the site.”⁶² However, “reducing the risk” does not eliminate the risk. The risk of a fire is not zero and the consequences potentially catastrophic, even when “reduced.” The risks include explosions, adverse health impacts, and damage to nearby facilities and equipment. The DSEIR did not disclose or evaluate these risks and thus fails as an informational document under CEQA.

A19

The DSEIR discusses a “fire protection plan” that is “anticipated” to include using water and/or an unidentified suppression agent (e.g., FM-200, Novatech) and complying with applicable fire codes and other standards.⁶³ However, the DSEIR does not include the “fire protection plan,” deferring it to the future outside of CEQA review. The layout of battery facilities can prevent adequate firefighting access.

A20

The DSEIR does not contain any information on battery system layout, other than to note batteries would be placed in cabinets and installed in separate battery rooms.⁶⁴ The design of the fire protection plan is deferred to the future.⁶⁵ Existing fire codes⁶⁶ (which are currently being updated to specifically address BESS systems) and fire tests on Li-ion batteries indicate that the layout of the batteries and ancillary facilities is critical to preventing fires – including separation between batteries, separation between the batteries and other noncombustible and combustible objects, use of and location of thermal barriers, design of rack enclosures, materials of construction, and design of the sprinkler system.⁶⁷ The DSEIR, for example, fails to

A21

⁶⁰ Armistead 2019, p. 18, Exhibit 6.

⁶¹ DSEIR, p. 3.5-20.

⁶² DSEIR, p. 3.5-20.

⁶³ DSEIR, p. 3.5-20.

⁶⁴ DSEIR, Sections 0.4, 2.6.

⁶⁵ Conditional Use Permit (CUP), pdf 7, June 21, 2018.

⁶⁶ <https://www.iccsafe.org/wp-content/uploads/Energy-Storage-Systems-Fire-Safety-Concepts-in-the-2018-IFC-and-IRC.pdf>.

⁶⁷ Klaus Bruckner and Associates, Lithium-Ion Battery Energy Storage Systems, June 17, 2019; available at <http://www.klausbruckner.com/blog/lithium-ion-based-energy-storage-systems/>; R. Thomas Long and Amy M. Misera, Sprinkler Protection Guidance for Lithium-Ion Based Energy Storage System, NFPA

state how close the batteries will be placed to each other, other Project components, or the building walls, or to disclose the material of construction. In addition, the DSEIR fails to state how much wattage may be contained in a single enclosure. This failure makes it impossible to determine the fire risk associated with the Project.

A21

Fire conditions within a battery storage facility are distinct from those addressed in existing fire codes and require site-specific analysis and mitigation design, which is missing from the DSEIR. A recent article explained it this way:⁶⁸

Moving and storing energy in any form carries inherent risks: Fuel depots can catch on fire. Transmission lines can fall and cause shocks. Gas pipelines can explode. Liquid fuels can leak. But rescue workers have decades of experience fighting these challenges, and the industry has established procedures to prevent problems.

Grid-level energy storage, on the other hand, is a new frontier, and establishing safety standards is crucial not just to protect human life and the environment, but also to safeguard expensive energy investments.

There are many causes of battery storage fires that are not disclosed or mitigated in the DSEIR. These are discussed in Comment 4.1.1, followed by a discussion of some of the fires that have occurred.

4.1.1. Causes of BESS Fires

The DSEIR fails to identify and analyze the numerous ways that a fire at the proposed BESS could be triggered. The DSEIR asserts that fire risks of traditional lithium-ion batteries are predominantly associated with overcharging or through short circuiting, due to age.⁶⁹ This is incorrect. There are many additional causes of fires at battery storage facilities – including manufacturing defects, battery aging, thermal runaway, malfunction of the cooling system, and charging a severely discharged cell – which can result in internal cell breakdown and damage to neighboring cells. Li-ion

A22

Research Foundation, June 2019; available at <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Suppression/RFESSSprinklerProtection.pdf>.

⁶⁸ Umair Irfan, Battery Fires Pose New Risks to Firefighters, *E&E News*, February 27, 2015 (“The vast majority of codes were not developed for energy storage.”); available at <https://www.scientificamerican.com/article/battery-fires-pose-new-risks-to-firefighters/>. See also Umair Irfan, Electricity Storage Booms as Regulators Race to Develop Standards, *E&E News* Reported in *Scientific American*, February 27, 2015; available at <https://www.scientificamerican.com/article/battery-fires-pose-new-risks-to-firefighters/>.

⁶⁹ DSEIR, p. 2-16, 3.5-20.

batteries are sensitive to abusive conditions such as high temperatures, crashing, overcharge, over-discharge, and short circuit.⁷⁰ The DSEIR is silent on how these conditions would be prevented during transport, construction, and operation. The DSEIR fails as an informational document under CEQA for failing to identify these failure modes, failing to evaluate their impact on the environment, and failing to identify mitigation measures to protect against them.

A22

The major risk of lithium-ion batteries is thermal runaway, a cycle in which excessive heat keeps creating more heat. Thermal runaway can be caused by a battery having internal cell defects, mechanical failures/damage, or overvoltage. These lead to high temperatures, gas build-up, and potential explosive rupture of the battery cell, resulting in fire and/or explosion. Without disconnection, thermal runaway can also spread from one cell to the next, causing further damage.⁷¹ The DSEIR does not even mention this failure mode or explain how the proposed fire control measures (proposed with no analysis at all of the actual risk) would address it.

A23

Lithium-ion batteries are stabilized by an ultrathin protective film that coats both electrodes. Studies have demonstrated that when this film is destroyed, which could happen in a battery large enough to overheat beyond 80 C, such as those proposed for this Project, the reaction of the battery electrolyte with the material of the unprotected positive electrode results in the formation of toxic fluoro-organic compounds.

The negative electrode in these batteries is usually graphite and the positive electrode contains lithium and a transition metal; cobalt in this case. However, with a lead voltage of about 4 volts, no electrolyte is thermodynamically stable, so operation relies on a combination of ethylene carbonate and LiPF₆ or other similar compound producing a continuous film to assure adequate ionic conductivity and electronic insulation. However, above 80 C, thermal runaway can occur spontaneously as a result of the breakup of this protective film.⁷² The DSEIR is silent on the design of the batteries – critical information required to evaluate hazards – thus failing as an informational document under CEQA.

A24

Another cause of fire is failure of the protection and control system. No matter the design, failure is still possible. For example, a battery management system failure

⁷⁰ Ouyang et al., 2019, Exhibit 5.

⁷¹ Siemens AG, Fire Protection for Li-ion Battery Energy Storage Systems, White Paper, January 2019; available at <https://www.downloads.siemens.com/download-center/Download.aspx?pos=download&fct=getasset&id1=A6V11636417>.

⁷² Amer Hammami, Nathalie Raymond, and Michel Armand, Runaway Risk of Forming Toxic Compounds, *Nature*, v. 424, August 7, 2003, p. 635. Exhibit 7. Abstract available at <https://www.nature.com/articles/424635b>.

can lead to overcharging and the inability to monitor the operating environment, such as temperature or cell voltage.⁷³ There are currently no publicly available data that prove any particular type of fire protection can prevent or control thermal runaway in battery storage systems.

Lithium-ion batteries are also very sensitive to mechanical damage and electrical surges. This type of damage can result in internal battery short circuits that lead to internal battery heating, battery explosions, and fires. The loss of a single battery can rapidly cascade to surrounding batteries, resulting in a large fire.⁷⁴

Further, the battery facility is located in a moderate fire hazard severity zone⁷⁵ and a seismically active zone.⁷⁶ In the event of a fire, which could be triggered by natural conditions, a seismic event, or accidents along the electrical infrastructure in the area,⁷⁷ the battery storage facility could be engulfed in flames. A typical trigger accident, for example, could be separation of a power line conductor from a connector, as occurred in the recent “Blue Fire.”⁷⁸ Of particular concern here is that when lithium-ion batteries are exposed to heat, such as from an external fire, the substances inside the batteries react and explode.⁷⁹ Equipment owned by California’s three largest utilities ignited more than 2,000 fires in three and a half years. Investigations indicate that electrical lines making contact with vegetation and other line malfunctions sparked

⁷³ See, for example, Paul Hesler and Kenneth A. Travers, *Lithium-ion Battery Energy Storage Systems – The Risks and How to Manage Them*, July 17, 2019; available at <http://www.hazardsonthenet.net/article/171930/Lithium-ion-Battery-Energy-Storage-Systems-The-risks-and-how-to-manage-them.aspx>.

⁷⁴ *Ibid.*

⁷⁵ DSEIR, p. 3.5-6; CPUC Fire-Threat Map, Adopted by CPUS January 19, 2018; available at <http://cpuc.ca.gov/general.aspx?id=6442454972>.

⁷⁶ DSEIR, Section 4.2.4 and p. 4-19 (“Long term impacts associated with the project include potential damage to proposed BESS facility due to seismic hazards that could occur over the operational life of the Project.... The Project site is located in a seismically active area which would make it susceptible to seismic ground shaking in the event of an earthquake. Exposure of the site to strong seismic ground shaking is a potentially significant site-specific impact.”).

⁷⁷ DSEIR, Figures 2-4 and 2-5.

⁷⁸ John Ross Ferrara, *PG&E Power Lines Tied to 12 Northern California Wildfires that Killed 18 Last Fall, Calfire Says; Eight Fire Investigations Sent to DAs’ Offices for “Evidence of Alleged Violations of State Law,”* *Lost Coast Outpost*, June 10, 2018; available at <https://lostcoastoutpost.com/2018/jun/10/pg-e-power-lines-connected-12-northern-californias/>.

⁷⁹ Cameron Polom, *Solar Storage Facilities Present Unique Hazard for Firefighters*, *West Valley News*, April 21, 2019; available at <https://www.abc15.com/news/region-west-valley/surprise/solar-storage-facilities-present-unique-hazard-for-firefighters>.

most of the fires.⁸⁰ Alternatively, a fire at the battery facility could trigger a major fire in the surrounding area.

In fact, the risk of fire at a battery storage facility such as the Project is a nonzero risk, regardless of the facility's design and the fire codes that are followed. Due to the potentially significant consequences, including release of toxic gases and damage to the adjacent CSE facility, the risk of fire and its consequences should have been quantitatively evaluated in a risk of upset analysis and mitigation proposed to minimize the risk. The DSEIR does not include a risk of upset analysis, or any analysis at all, of the likelihood of a fire and its consequences. Instead, it lays out a general fire protection plan, asserting that it reduces fire risk to less than significant, without ever estimating the unmitigated risk or demonstrating that the general mitigation (not disclosed in the DSEIR) will reduce the risk to an insignificant level.⁸¹

A25

The DSEIR asserts that fire impacts will be addressed by using a monitoring and fire suppression system that will include water and/or other suppression agents, smoke detectors, control panels, alarms, piping, and nozzles that will comply with all codes in effect at the time of building permit submission⁸² as well as an Emergency Response Plan (ERP) to protect against and respond to fires, should they occur.⁸³ However, the ERP is not included in the DSEIR, preventing review. Further, the details of the fire suppression system are not disclosed in the DSEIR, but deferred to the future, outside of CEQA review. Instead, "[t]he Applicant will work with the fire marshal to design the Project in compliance with all local codes and standards."⁸⁴ These are critical omissions because one of the major environmental issues that has been experienced with existing battery storage systems is fire. There is no guarantee that following existing or future fire codes, using an undisclosed fire suppression system, and following an undeveloped ERP will prevent fire and its consequences, as demonstrated by accidents at similar facilities, discussed in Comment 4.1.2.

A26

⁸⁰ Taryn Luna, California Utility Equipment Sparked More Than 2,000 Fires in Over Three Years, Los Angeles Times, January 28, 2019; available at <https://www.latimes.com/politics/la-pol-ca-california-utilities-wildfires-regulators-20190128-story.html>.

⁸¹ DSEIR, pp. 3.5-21/23.

⁸² DSEIR, p. 2-16.

⁸³ DSEIR, p. 3.5-6/7.

⁸⁴ DSEIR, p. 2-16, 2.5-20.

4.1.2. Fires at Existing Battery Storage Facilities Demonstrate That Lithium-Ion Battery Fires Pose a Serious Risk to Human Health and the Environment

Fires at existing battery storage facilities demonstrate the severe risk lithium-ion battery fires pose to human health and the environment. Fires have occurred at 23 battery storage facilities in Korea, caused by faulty battery management, system control, or battery protection systems, and faulty installation practices.⁸⁵ Fires have also occurred at battery storage facilities in the European Union, including in Belgium,⁸⁶ and in a Dreamliner 787 at Heathrow Airport.⁸⁷

Several battery fires have occurred in Hawaii and Arizona. These fires can result in significant impacts that are not addressed by the DSEIR, including significant worker and public health impacts from hazardous air pollutants (HAPs) and damage to the adjacent solar facility. The DSEIR failed to even mention these existing fires.

For example, in describing firefighting challenges at a Hawaiian 10-MW battery storage system supporting a 12-turbine, 30-MW wind farm, the Honolulu Fire Department reported:^{88,89}

⁸⁵ Andy Colthorpe, Korea's ESS Fires: Batteries Not to Blame But Industry Takes Hit Anyway, PV Tech, June 19, 2019; available at <https://www.energy-storage.news/news/koreas-ess-fires-batteries-not-to-blame-but-industry-takes-hit-anyway>.

⁸⁶ Jason Deign, Engie Investigates Source of Belgian Battery Blaze, Energy Storage, December 18, 2017; available at <https://www.greentechmedia.com/articles/read/engie-investigates-source-of-belgian-battery-blaze#gs.v25569>.

⁸⁷ AIG, Lithium-ion Battery Energy Storage Systems: The Risks and How to Manage Them; available at <https://www.aig.co.uk/content/dam/aig/emea/united-kingdom/documents/Insights/battery-storage-systems-energy.pdf>.

⁸⁸ Fire at Kahuku Wind Farm Destroys Crucial Building, *Hawaii News Now*, August 1, 2012; available at <https://www.hawaiinewsnow.com/story/19173811/hfd-battling-kahuku-wind-farm-blaze/>.

⁸⁹ Michael A. Stosser, What Are the Risks and What Regulations Should We Consider, DOE Energy Storage Safety Meeting, 2014. See also <https://www.energy.gov/sites/prod/files/2014/12/f19/OE%20Safety%20Strategic%20Plan%20December%202014.pdf>; <http://www.hawaiinewsnow.com/story/19173811/hfd-battling-kahuku-wind-farm-blaze/>; <https://www.scientificamerican.com/article/battery-fires-pose-new-risks-to-firefighters/>.

"This is a very dangerous environment to fight a fire in because of the confined nature of the warehouse. It's a big warehouse, but what's inside are rows of racks of batteries that have very small aisles in between"



www.sutherland.com

"The risks from scalding heat, poisonous fumes, a collapsing structure and the potential for battery explosions kept firefighters outside the warehouse."⁹⁰ Firefighters at this site faced thick smoke, toxic fumes, and other hazards.^{91,92} "The August ... fire, the third since opening in March 2011, was so fierce that firefighters could not enter the building for 7 hours."⁹³

The typical layout for battery storage facilities is rows of batteries with narrow separating aisles. The DSEIR contains no information on the layout of batteries in the storage facility and thus fails as an informational document under CEQA. The DSEIR should have included a diagram showing facility layout, including number of battery storage buildings (one or two?), battery spacing, design of sprinkler system, and location of ancillary facilities. Other fire departments have reported: "Basically you need to overwhelm it with more water than you think you need."⁹⁴

A27

Responding to a fire at the proposed site, which is 2 miles from the nearest fire station,⁹⁵ could be challenging. In the case of the Hawaii fires discussed above, a recent

⁹⁰ Irfan 2015.

⁹¹ Ibid.

⁹² Ibid.

⁹³ Ros Davidson, Analysis: First Wind Project Avoids Storage After \$30m Fire, *Wind Power*, March 6, 2014; available at <https://www.windpowermonthly.com/article/1284038/analysis-first-wind-project-avoids-storage-30m-fire>. See also Eric Wesoff, Battery Room Fire at Kahuku Wind-Energy Storage Farm, *Energy Storage*, August 3, 2012; available at <https://www.greentechmedia.com/articles/read/battery-room-fire-at-kahuku-wind-energy-storage-farm#gs.xdxv6h>.

⁹⁴ Cameron Polom, Solar Storage Facilities Present Unique Hazard for Firefighters, *West Valley News*, April 21, 2019; available at <https://www.abc15.com/news/region-west-valley/surprise/solar-storage-facilities-present-unique-hazard-for-firefighters>.

⁹⁵ Based on Google Maps, the nearest fire station is El Centro Fire Department Station 1, which is located about 2 miles from the Project site. See: <https://www.google.com/search?q=imperial+county+fire+station&npsic=0&rflfq=1&rlha=0&rllag=32782454,-115106377,44480&tbm=lcl&ved=2ahUKEwjRye2Iz6vkAhWJr54KHdCQBMUQtgN6BAgKEAQ&tbs=lr!2>

article in Scientific American reported: “By the time you get enough firefighting forces and the right extinguishing sources, the fire is going to progress quite a bit.”⁹⁶ It also explained: “One important lesson is to have fire response resources on-site, like dry chemicals and deployment systems.” Further, in the case of the Project, the facility would be unmanned⁹⁷ in a rural location. This means firefighters from a distant location may have to extinguish a blaze without knowing what chemicals to use, where the electrical shutoffs are, or what kind of fire retardant to use.

The Hawaii fire occurred in August 2012 at a 12-turbine, 30-MW Kahuku wind farm, supported by a 15-MW battery from Xtreme Power. Firefighters did not enter the building until 7 hours after the flames started due to questions about the toxicity of the 12,000 batteries. Two other fires occurred in the battery storage building, attributed to ECI capacitors in inverters from Dynapower.^{98,99}

Another major fire in the US recently occurred on April 19, 2019 in Surprise, Arizona at the APS McMicken Energy Storage Facility, equipped with two 2-MW AES Advancion battery arrays.^{100,101} An explosion in the McMicken battery system led to a fire.^{102,103} This event injured eight firefighters, one critically.¹⁰⁴ Four firefighters were

[m1!1e2!3s!AE!f!1!f ui:2&rdoc=1#r!fi=hd;si;mv:!1m2!1d32.80983505834799!2d-115.53286897802207!2m2!1d32.76199462120436!2d-115.64659464025351!4m2!1d32.785918055927596!2d-115.58973180913779!5i14.](https://www.greentechmedia.com/articles/read/battery-room-fire-at-kahuku-wind-energy-storage-farm#gs.9exghx)

⁹⁶ Irfan 2015.

⁹⁷ DSEIR, pp. 2-15, 3.1-16, 3.1-18, 3.7-15, 5-11, 5-18.

⁹⁸ Eric Wesoff, Battery Room Fire at Kahuku Wind-Energy Storage Farm, GTM, August 3, 2012; available at <https://www.greentechmedia.com/articles/read/battery-room-fire-at-kahuku-wind-energy-storage-farm#gs.9exghx>.

⁹⁹ *Hawaii News Now*, August 1, 2012.

¹⁰⁰ Ibid.

¹⁰¹ Jennifer Runyon, APD Battery Energy Storage Facility Explosion Injures Four Firefighters; Industry Investigates, *Renewable Energy World*, April 23, 2019; available at <https://www.renewableenergyworld.com/articles/2019/04/aps-battery-energy-storage-facility-explosion-injures-four-firefighters-industry-investigates.html>.

¹⁰² Arizona Public Service, Equipment Failure at McMicken Battery Facility, April 26, 2019; available at <https://www.aps.com/en/ourcompany/news/latestnews/Pages/mcmicken-battery-facility-notes.aspx>.

¹⁰³ Julian Spector, What We Know and Don't Know About the Fire at an APS Battery Facility, April 23, 2019; available at <https://www.greentechmedia.com/articles/read/what-we-know-and-dont-know-about-the-fire-at-an-aps-battery-facility#gs.9czowd>.

¹⁰⁴ Eight AZ Firefighters Hurt, One Critically, in Explosion, *Firehouse.Com News*, April 20, 2019; available at <https://www.firehouse.com/safety-health/news/21077221/eight-az-firefighters-injured-one-critically-in-a-large-utility-battery-explosion>.

hospitalized for chemical inhalation burns.¹⁰⁵ Of the firefighters injured, three required an extended hospital stay. The most serious injuries included a firefighter who had a “nose fracture, skull fracture, collapsed lung, rib fractures, broken tibia and fibula and an artery cut in his left leg.” Others sustained multiple fractures, burns, and concussions.¹⁰⁶

Firefighters are a significant at-risk population because batteries may rupture when exposed to extreme heat/fire, leaking corrosive materials, and/or emit toxic fumes. Burning batteries may emit acrid smoke, irritating fumes, and toxic fumes of fluoride, resulting in acute and chronic health effects in responding firefighters (and any nearby workers and residents). Acute health hazards include chemical inhalation burns and damage to lungs, eyes, and skin. Cobalt, present in the Project’s batteries, is a suspected human carcinogen.¹⁰⁷

The McMicken Facility fire was not the first APS battery fire. Another smaller fire has been reported at another APS system.¹⁰⁸ In November 2012, a 1.5-MW system at the APS Elden Substation near Flagstaff, Arizona, also caught fire.¹⁰⁹ The root cause analysis for this fire identified a near miss in May 2012 when a battery cell was severely discharged and the cell was continuously charged against its intended design.¹¹⁰ Arizona Public Service recently shut down two other battery systems following the explosion.¹¹¹

¹⁰⁵ Julian Spector, What We Know and Don’t Know About the Fire at an APS Battery Facility, GTM, April 23, 2019; available at <https://www.greentechmedia.com/articles/read/what-we-know-and-dont-know-about-the-fire-at-an-aps-battery-facility#gs.w82d63>.

¹⁰⁶ Chris Dubay, Vice President/Chief Engineer, National Fire Protection Association, ENR Letters, August 21, 2019; available at <https://www.enr.com/articles/47377-letter-battery-storage-fire-risks-need-greater-attention>.

¹⁰⁷ Honeywell, Material Safety Data Sheet, Lithium-ion Battery; available at https://www.analog.com/media/en/technical-documentation/application-notes/hdr202li_hd220rli_battery_msds.pdf.

¹⁰⁸ Karl-Erik Stromsta, APS and Fluence Investigating Explosion at Arizona Energy Storage Facility, GTM, April 22, 2019; available at <https://www.greentechmedia.com/articles/read/aps-and-fluence-investigating-explosion-at-arizona-energy-storage-facility#gs.9cnh9x>.

¹⁰⁹ H. J. Mai, APS Storage Facility Explosion Raises Questions about Battery Safety, Utility Dive, April 30, 2019; available at <https://www.utilitydive.com/news/aps-storage-facility-explosion-raises-questions-about-battery-safety/553540/>. See also Eckhouse and Chediak, April 24, 2019; and Colthorpe, June 2019.

¹¹⁰ 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>.

¹¹¹ Mai, April 30, 2019.

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 explosion.”¹¹² My review of the limited available information in the DSEIR indicates that the proposed BESS will use batteries with similar chemistries, mostly notably chemicals that include compounds that can release hydrogen fluoride.

The DSEIR indicates that the chemical composition of the lithium-ion batteries planned to be installed includes cobalt oxide; manganese dioxide; nickel oxide; carbon; unidentified electrolyte; polyvinylidene fluoride; aluminum foil; copper foil; aluminum; and inert materials.¹¹³ However, the DSEIR failed to support this information with an MSDS from the battery supplier, to indicate the relative amounts of each compound present in the battery, or to confirm that no other chemicals were present. A recent letter from Tesla to the Arizona Corporation Commission explained that the term “lithium-ion batteries”:¹¹⁴

actually encompasses a broad set of storage technologies – there are many different sub-chemistries of lithium-ion batteries, each with their own unique characteristics. Common lithium-ion sub-chemistries for stationary storage include nickel manganese cobalt oxide (NMC) and lithium iron phosphate (LFP) but there are many other sub-chemistries such as lithium manganese oxide (LMO) and nickel cobalt aluminum oxide (NCA). Different types of lithium-ion battery systems have different properties and associated risks.

Polyvinylidene fluoride decomposes into hydrogen fluoride gas in fires.¹¹⁵ Hydrogen fluoride is an extremely poisonous gas.¹¹⁶ As there are residences within 500 feet of the facility, a fire in the BESS would likely result in significant health impacts to

¹¹² 8/2/19 APS Report.

¹¹³ DSEIR, pdf 78, Sec. 2.6.3.9.

¹¹⁴ Letter from Sarah Van Cleve, Manager, US Energy Policy, Tesla, Inc., to Arizona Corporation Commission, Re: Tesla Response to Commissioner Kennedy’s August 2nd Letter Regarding Lithium-Ion Battery Safety/Docket No. E-01345A-19-0076, August 19, 2019; available at <https://docket.images.azcc.gov/E000002454.pdf>.

¹¹⁵ Craig L. Beyler and Marcelo M. Hirschler, Thermal Decomposition of Polymers, Chapter 7, Table 1-7.1; available at <https://pdfs.semanticscholar.org/d3fa/4a1616fd1457c02d4f477dcbdae706c9667f.pdf>; Material Safety Data Sheet, Poly(vinylidene fluoride), (“Combustion products include carbon monoxide (CO), carbon dioxide (CO₂), **hydrogen fluoride**, and other pyrolysis products typical of burning organic material” (emphasis added)), pdf 3; available at <http://datasheets.scbt.com/sc-264080.pdf>.

¹¹⁶ CDC, Facts About Hydrogen Fluoride (Hydrofluoric Acid): “Breathing in hydrogen fluoride at high levels or in combination with skin contact can cause death from an irregular heartbeat or from fluid buildup in the lungs”; available at <https://emergency.cdc.gov/agent/hydrofluoricacid/basics/facts.asp>. See also ATSDR, Medical Guidelines for Hydrogen Fluoride; available at <https://www.atsdr.cdc.gov/MMG/MMG.asp?id=1142&tid=250>.

nearby residents, as well as workers at the adjacent solar facility. Thus, the DSEIR fails as an informational document under CEQA for failing to include an MSDS and other characterization data on the batteries that would be used and for failing to evaluate the health and other impacts of a BESS fire.

Further, the cobalt, nickel, copper, aluminum, and manganese in these batteries could be volatilized at the very high temperatures encountered in battery fires and result in significant environmental impacts, including adverse health impacts to firefighters, workers, and residents; and toxicity to vegetation, including farm crops in surrounding fields. These potential impacts are not disclosed or analyzed in the DSEIR.

The 2019 Kennedy analysis of the Arizona fires discloses fires with flame lengths of 10 to 15 feet that grew into flame lengths of 50 to 75 feet. The Flagstaff Fire Department Report for the 2012 incident expressed concerns about “a serious risk of a large-scale explosion.” The ACC concluded that “a similar fire event at a very large lithium ion battery facility (250 MW+) would have very severe and potentially catastrophic consequences, and that responders would have a very difficult time trying to handle such an incident.” The 2019 Kennedy report goes on to conclude:

To appropriately plan for such a catastrophic event, the large-scale lithium ion battery facility using the same chemistries as the APS Elden Substation (Flagstaff) facility fire and the McMicken facility would need to be built in isolation far from everything else, because an explosion could potentially level buildings at some distance from the battery facility site. The energy stored at a 2 MW battery facility is equivalent to 1.72 tons of TNT. The energy stored at a 250 MW battery facility is equivalent to 215 tons of TNT. Also, large amounts of hydrogen fluoride could be released and dispersed that would affect and harm the public at a substantial distance downwind. There would be concerns also about lingering hydrogen fluoride contamination in the affected areas.

Based on this analysis, an explosion at the proposed BESS would be equivalent to 108 tons of TNT. This is sufficient to seriously damage the adjacent solar facility and result in mortality of nearby residents and solar plant and agricultural workers. The DSEIR fails as an informational document under CEQA for failing to disclose and evaluate the risk and consequences of explosions at the proposed BESS.

4.2. Handling and Transportation Accidents

CEQA Guidelines Section 15126.2(c) requires a discussion of any significant irreversible environmental change that would be caused by a project. A project would result in significant irreversible changes if it involves uses in which irreversible damage could result from any potential environmental accidents associated with the project.¹¹⁷ The batteries will likely be shipped from warehouses in unknown location(s) and

¹¹⁷ 14 CCR § 15126.2; DSEIR, p. ES-8.

transported to the site from these undisclosed locations by undisclosed means (rail, truck, ship?), over undisclosed routes and roadways. These routes could include sensitive desert habitat that would be irreversibly damaged in the event of a transportation accident. Further, an explosion triggered by a fire during handling and transportation could result in injuries and deaths of workers and motorists and could irreversibly damage the immediately adjacent CSE facility, as well as other nearby solar facilities.¹¹⁸

Lithium-ion batteries are sensitive to damage, especially during handling and transport.¹¹⁹ They are also sensitive to high ambient temperatures,¹²⁰ which will be experienced by the Project's batteries as they will have to pass through the desert areas of Imperial County. It is well known that battery accidents occur during handling, loading, and unloading in warehouses and during transportation.¹²¹ The DSEIR fails to discuss the risk of accidents during battery storage, handling, and transportation to the site and thus fails as an informational document under CEQA.

A29

5. HEALTH IMPACTS WERE NOT EVALUATED AND ARE POTENTIALLY SIGNIFICANT

The DSEIR did not evaluate health impacts of Project construction, operation, or decommissioning. As to Project construction, the DSEIR states that "[t]he construction activities and overall size of the proposed Project footprint is so small that cancer health risks from diesel particulate matter would not be anticipated. Decommissioning emissions are assumed to be similar to construction emissions."¹²² The DSEIR is silent as to health impacts of Project operation.

A30

In the event of a fire, which is possible given the history of similar facilities (Comment 4.1.2), toxic chemicals will be released. The DSEIR indicates that the chemical composition of the lithium-ion batteries planned to be installed is cobalt oxide, manganese dioxide, nickel oxide, carbon, unidentified electrolyte, polyvinylidene

¹¹⁸ DSEIR, pdf 289.

¹¹⁹ Kjell-Arne Jonsson, The Dangerous Consequences of Taking Shortcuts When Shipping Lithium Ion Batteries, March 9, 2018; available at <http://info.nefab.com/lib-blog/lithium-ion-batteries-shipping-shortcuts>.

¹²⁰ Allianz Risk Consulting, Lithium-Ion Batteries, Risk Bulletin, 2017; available at <https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/pdfs-risk-advisory/risk-bulletins/ARC-Lithium-Ion-Batteries.pdf>.

¹²¹ FAA Office of Security and Hazardous Materials Safety, Lithium Batteries & Lithium Battery-Powered Devices, August 1, 2019; available at https://www.faa.gov/hazmat/resources/lithium_batteries/media/Battery_incident_chart.pdf.

¹²² DSEIR, p. 3.1-16.

fluoride, aluminum foil, copper foil, aluminum, and inert materials.¹²³ As discussed below, the release of hydrogen fluoride (HF) during Li-ion battery fires is a well-known health risk.

5.1. Exposed Populations

The DSEIR does not contain a map that locates sensitive receptors (e.g., residences and workers). This is a critical omission. The on-site exposed populations include construction workers and support personnel at the BESS. Off-site exposed parties include workers at the adjacent CSE facility, agricultural workers in nearby agricultural fields, passengers in vehicles on adjacent roadways, and nearby residences. The facility will be located adjacent to Hwy 98. See Figure 1. The battery building will be located 489 feet south of Hwy 98 and 222 feet southwest of Drew Road.¹²⁴ A few rural residences and mobile homes are located about 500 feet east of the site and additional mobile homes are located to the north along SR 98 and Brockman Road. Motorists will be present on SR 98 and Brockman Road.¹²⁵ The Phase I ESA Reports in Appendix H disclose other rural residential properties.¹²⁶ Construction and operation of the Project will expose these populations to Hazardous Air Pollutants (HAPs).

A31

5.2. Hazardous Air Pollutants

All of these sensitive receptors will be exposed to hazardous air pollutants (HAPs) from Project construction, operation, and decommissioning. Diesel particulate matter (DPM) will be emitted from on-road and off-road equipment during Project construction and decommissioning. DPM is a potent human carcinogen. It is also chronically¹²⁷ and acutely¹²⁸ toxic. California's Office of Environmental Health Hazard Assessment (OEHHA) concluded that "[e]xposure to diesel exhaust can have immediate health effects," which include "inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of

¹²³ DSEIR, pdf 78, Sec. 2.6.3.9.

¹²⁴ Scaled from DSEIR, Figure 2-3. See also Figure 2-6.

¹²⁵ DSEIR, p. ES-4, 2-10.

¹²⁶ DSEIR, Appendix H, pdf 134, 136.

¹²⁷ OEHHA Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary, June 28, 2016; available at <https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary>.

¹²⁸ Government of Canada, Human Health Risk Assessment for Diesel Exhaust, March 4, 2016; available at http://publications.gc.ca/collections/collection_2016/sc-hc/H129-60-2016-eng.pdf.

asthma attacks.”¹²⁹ A fire or explosion at the battery storage facility would release other HAPs that could result in significant acute health impacts. See Comment 5.3.

The construction emission calculations of DPM (expressed as PM2.5) assumed the use of Tier 2 engines in all equipment.¹³⁰ However, the DSEIR does not make any commitment, as in a mitigation measure, requiring the use of Tier 2 equipment. In all instances in the DSEIR where Tier 2 is cited, it is cited as “expected to be Tier 2 compliant.”¹³¹ Thus, there is no requirement that Tier 2 equipment will be used. Tier 1 or other older equipment could be substituted,¹³² which has DPM emissions that are at least three times higher than those from Tier 2 equipment.¹³³ Construction equipment DPM emissions could result in significant cancer, acute, and chronic health impacts to on-site workers and nearby off-site workers and residents.

A32

5.3. Construction Health Impacts

The DSEIR did not evaluate construction health impacts. Project construction could result in significant health impacts from three sources: (1) diesel particulate matter (DPM) emitted by construction equipment; (2) HAPs released by battery accidents during battery building setup; and (3) pesticides and herbicides in disturbed soils.

A33

First, the Office of Environmental Health Hazard Assessment’s (OEHHA’s) risk assessment guidelines require a formal health risk assessment for short-term construction exposures lasting longer than 2 months.¹³⁴ The OEHHA risk assessment guidelines, which are used throughout California for assessing health risks under CEQA, state:

¹²⁹ OEHHA and the American Lung Association of California, Health Effects of Diesel Exhaust, available at <https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf>.

¹³⁰ DSEIR, Section 2.6.3.1 and Appendix B.

¹³¹ DSEIR, p. 2-12, 3.1-16, 3.1-20, 3.1-21, 3.1-22, 4-10, 4-11.

¹³² Compliance Guide to Construction Vehicles and Equipment, January 2019, pdf 4; available at http://media.metro.net/projects_studies/gcp/images/gcp_arbscaqmd_compliance_guide_to_constructi_on_vehicles_equipment.pdf.

¹³³ Emission Standards, Nonroad Diesel Engines, Table 1; available at <https://dieselnet.com/standards/us/nonroad.php>.

¹³⁴ Office of Environmental Health Hazard Assessment (OEHHA), Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, February 2015 (OEHHA 2015), Section 8.2.10: Cancer Risk Evaluation of Short Term Projects, pp. 8-17/18; available at <https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>.

Due to the uncertainty in assessing cancer risk from very short-term exposures, we do not recommend assessing cancer risk for projects lasting less than two months at the MEIR. We recommend that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs (OEHHA, 2009). Thus, for example, if the District is evaluating a proposed 5-year mitigation project at a hazardous waste site, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first five years of life.

For the MEIW, we recommend using the same minimum exposure requirements used for the residential receptor (i.e., no evaluation for projects less than 2 months; projects longer than 2 months but less than 6 months are assumed to last 6 months; projects longer than 6 months would be evaluated for the duration of the project). Although the off-site worker scenario assumes that the workers are 16 years of age or older with an Age-Sensitivity Factor of 1, another risk management consideration for short-term project cancer assessment is whether there are women of child bearing age at the worksite and whether the MEIW receptor has a daycare center. In this case, the Districts may wish to treat the off-site MEIW in the same way as the residential scenario to account for the higher susceptibility during the third trimester of pregnancy, and for higher susceptibility of infants and children.

Finally, the risk manager may want to consider a lower cancer risk threshold for risk management for very short-term projects. Typical District guidelines for evaluating risk management of Hot Spots facilities range around a cancer risk of 1 per 100,000 exposed persons as a trigger for risk management. Permitting thresholds also vary for each District. There is valid scientific concern that the rate of exposure may influence the risk – in other words, a higher exposure to a carcinogen over a short period of time may be a greater risk than the same total exposure spread over a much longer time period. In addition, it is inappropriate from a public health perspective to allow a lifetime acceptable risk to accrue in a short period of time (e.g., a very high exposure to a carcinogen over a short period of time resulting in a 1×10^{-5} cancer risk). Thus, consideration should be given for very short term projects to using a lower cancer risk trigger for permitting decisions.

The DSEIR does not contain the type of information normally relied upon to determine if the OEHHA risk assessment guidance is complied with, including a detailed construction schedule and maps that locate each project construction site and identify all nearby sensitive receptors, as well as their distance from construction work and duration of exposure. The conceptual construction schedule indicates that construction will last for about 12 months.¹³⁵

A34

Health risk assessments are routinely performed for construction projects. The proximity of identified sensitive receptors and the duration of construction indicate that

¹³⁵ DSEIR, Section 0.2, p. ES-1 and Section 2.2, p. 2-4.

a health risk assessment should have been prepared for this Project. Based on my experience, I expect that cancer and acute health impacts from DPM would be significant for on-site construction workers and nearby residents.

Second, an accident could occur; for example, during offloading of the Li-ion batteries, their on-site storage, or setting up the batteries in the storage buildings. These accidents would release toxic compounds that could result in significant health impacts to construction workers, solar plant workers, agricultural workers, motorist on nearby roadways, and adjacent residents. The emissions of toxic gases can be a larger threat than heat if a battery fire occurred during battery building setup. See discussion of toxic emissions in Comment 5.2.

Third, the site was historically farmed and the soils may be contaminated with pesticides from these prior agricultural uses.¹³⁶ The DSEIR relies on studies conducted for the adjacent CSE facility, where pesticide residues were below regulatory levels.¹³⁷ Thus, the DSEIR concluded that hazards associated with exposure to pesticide and herbicide residues during construction, operation, and decommissioning are less than significant.¹³⁸ However, the DSEIR concluded that “there is a potential for the discovery of unidentified hazards during construction” and imposed Mitigation Measure HM-1,¹³⁹ which describes procedures for managing unidentified hazards and reducing potential impacts during construction to less than significant levels.¹⁴⁰

Mitigation Measure HM-1 requires that “If during grading or excavation work, the contractor observes visual or olfactory evidence of contamination or if soil contamination is otherwise suspected, work near the excavation site shall be terminated, the work area cordoned off, and appropriate health and safety procedures implemented...”¹⁴¹ Pesticide and herbicide contamination cannot be detected by visual observation or smell, but only by collecting soil samples and analyzing them for pesticides that were historically used in the area. Thus, this mitigation measure does nothing.

A35

¹³⁶ DSEIR, p. 3.5-1.

¹³⁷ DSEIR, p. 3.5-5.

¹³⁸ DSEIR, p. 3.5-18 (“Therefore, impacts associated with hazards through upset/release of hazardous materials resulting from exposure to pesticide residue and herbicides during construction, operation and decommissioning are considered less than significant.”).

¹³⁹ DSEIR, p. ES-33.

¹⁴⁰ DSEIR, p. 3.5-18.

¹⁴¹ DSEIR, p. 3.5-18, Impact 3.5-2, MM HM-1.

Construction workers, nearby residents, and motorists will be exposed to residual pesticide contamination during construction. Thus, the DSEIR must be modified to require pesticide and herbicide testing in advance of construction and the results used to estimate health risks to workers and to determine if contaminated soils need to be removed prior to the start of construction.

A35

5.4. Operational Health Impacts

As discussed in Comment 4.1, the DSEIR fails to discuss or evaluate the health impacts of thermal runaway or fire at the battery storage buildings. The fire history reviewed in Comment 4.1 indicates that there is a nonzero risk of thermal runaway and fires. Studies have demonstrated that the emission of toxic gases can be a larger threat to public health than the heat from a fire.¹⁴²

A36

Toxic compounds released during thermal runaway, for example, include primarily hydrogen fluoride (HF), carbon monoxide (CO), nitric oxide (NO), sulfur dioxide (SO₂), hydrogen chloride (HCl), and hydrogen (H₂).¹⁴³

Many other toxic chemicals also have been identified in the combustion products of Li-ion batteries including:^{144,145}

¹⁴² Jie Sun et al., Toxicity, a Serious Concern of Thermal Runaway from Commercial Li-ion Battery, *Nano Energy*, v. 27, pp. 313–319, 2016. Abstract at available at <https://www.inфона.pl/resource/bwmeta1.element.elsevier-170baaf8-bfbd-35ed-b122-66f7a76c6e87>. Exhibit 8.

¹⁴³ Ouyang et al. 2019, pp. 9–10. Exhibit 5.

¹⁴⁴ Jie Sun et al. 2016, pp. 313–319. Exhibit 8.

¹⁴⁵ Antonio Nedjalkov et al., Toxic Gas Emissions from Damaged Lithium Ion Batteries – Analysis and Safety Enhancement Solution, Batteries, 2016, Table 1. Exhibit 9.

Table 1: Toxic Chemicals Released During Thermal Runaway¹⁴⁶

Substance	Hazards According to EU Regulation (EG) Act 1272/2008
EMC	Eye irritation; flammable liquid; H226; H315; H319; H335; Skin irritation, specific target organ toxicity-single exposure.
DEC	Eye irritation; flammable liquid; H226; H315; H319; H335; skin irritation; specific target organ toxicity-single exposure.
EC	Eye irritation; H315; H319; H335; skin irritation; specific target organ toxicity-single exposure.
Benzene	Aspiration hazard; carcinogenicity; eye irritation; H225; H304; H315; H319; H340; H350; H372; germ cell mutagenicity.
Toluene	Aspiration hazard; flammable liquid; H225; H304; H315; H336; H361d; H373; reproductive toxicity; skin irritation; specific target organ toxicity-repeated exposure.
Styrene	Acute toxicity; eye irritation; flammable liquid; H226; H315; H319; H332; H361d; H372; Skin irritation; Specific target organ toxicity-repeated exposure.
Biphenyl	Aquatic acute toxicity; aquatic chronic toxicity; eye irritation; H315; H319; H335; H400; H410.
Acrolein	Acute toxicity; aquatic acute toxicity; aquatic chronic toxicity; carcinogenicity; corrosive to the respiratory tract; eye damage; flammable liquid; H225; H300; H300 + H330; H302; H311; H314; H317; H318; H330; H341; H351; H400; H410; germ cell mutagenicity; skin corrosion; skin sensitization.
CO	Acute toxicity; flammable gases; H220; H280; H331; H360DM H372M gases under pressure; reproductive toxicity; specific target organ toxicity-repeated exposure.
COS	Acute toxicity; eye irritation; flammable gases; H220; H280; H315; H319; H331; H335; Gases under pressure.
Hydrogen fluoride	Acute toxicity; corrosive to the respiratory tract; H300; H310; H314; H330; skin corrosion.

Among these, HF is generally present in the largest amount and is the most toxic. Studies have demonstrated that large amounts of HF may be generated during a battery fire, ranging between 20 and 200 mg/Wh of nominal battery energy capacity.¹⁴⁷ In addition, 15–22 mg/Wh of phosphoryl fluoride (POF₃) is generated during fires. These are highly toxic chemicals. The Project consists of 125 MW of electrical storage capacity. Thus, a fire could generate 6 to 55 lb of HF and its derivate hydrofluoric acid,¹⁴⁸ and 4 to 6 lb of POF₃.¹⁴⁹ The toxicity of HF and hydrofluoric acid is well known.^{150,151,152} Hydrogen fluoride is one of the substances for which emissions must be

¹⁴⁶ EMC = ethyl methyl carbonate; DEC = diethyl carbonate; EC = ethylene carbonate; CO = carbon monoxide; and COS = carbonyl sulfide.

¹⁴⁷ Larson et al. 2017.

¹⁴⁸ Amount of HF that could be generated during a fire: (20 mg/Wh)(125 MW)(1000 Wh/MW)/(1000 mg/g)(454 g/lb) = **5.5 lb**. (200 mg/Wh)(125 MW)(1000 Wh/MW)/(1000 mg/g)(454 g/lb) = **55 lb**.

¹⁴⁹ Amount of POF₃ that could be generated during a fire: (15 mg/Wh)(125 MW)(1000 Wh/MW)/(1000 mg/g)(454 g/lb) = **4.1 lb**. (22 mg/Wh)(125 MW)(1000 Wh/MW)/(1000 mg/g)(454 g/lb) = **6.1 lb**.

¹⁵⁰ Centers for Disease Control and Prevention, Hydrogen Fluoride (as F), Immediately Dangerous to Life or Health Concentrations (IDLHs), 1994; available at <https://www.cdc.gov/niosh/idlh/7664393.html>.

¹⁵¹ National Research Council, Committee on Toxicology, Acute Exposure Guideline Levels for Selected Airborne Chemicals, Volume 4, Subcommittee on Acute Exposure Guideline Levels, 2004; available at <https://www.ncbi.nlm.nih.gov/books/NBK207732/>.

quantified under the California Air Toxics Hot Spots Program.¹⁵³ Further, the use of water as an extinguishing agent may promote the formation of additional toxic gases and increase the production of HF.¹⁵⁴ The DSEIR indicates that the fire suppression system will include water.¹⁵⁵ Thus, the DSEIR fails as an informational document under CEQA. Experimental studies in which HF was measured indicate that “HF can pose a serious toxic threat, especially for large Li-ion batteries and in confined environments.... The release of hydrogen fluoride from a Li-ion battery fire can therefore be a severe risk and an even greater risk in confined or semi-confined spaces.”¹⁵⁶ Another study concluded as follows:

Reaction of a widely used electrolyte salt – LiPF₆ – upon contact with water is known to result in the generation of gaseous HF. This very toxic and corrosive compound poses a serious health risk upon exposure to it. Our assessment shows that at room temperature a release of ca. 20 ml of 1M LiPF₆ electrolyte into a room of ca. 62 m³ may generate sufficient HF to reach an acute exposure concentration limit, such as PAC-2 level, where irreversible and other serious health effects are expected to occur. In

If the toxic chemicals in battery electrolytes are released in an enclosed space during thermal runaway, such as would be encountered during on-site battery storage, transportation and recycling and by maintenance workers or fire fighters at the facility, significant health impacts would result.¹⁵⁷ One recent study, for example, concluded as follows:¹⁵⁸

¹⁵² OEHHA, OEHHA Acute, 8-hour and Chronic Reference Exposure Level (REL) Summary, June 28, 2015; available at <https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary>. See also: OEHHA, Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments, Appendices A, B, and C, 2015; available at <https://oehha.ca.gov/air/crnrr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0>.

¹⁵³ OEHHA, Air Toxics Hot Spots Program, Appendices A-F, p. A-10; available at <https://oehha.ca.gov/media/downloads/crnrr/2015gmappendicesaf.pdf>.

¹⁵⁴ Larson et al. 2017, Figure 5.

¹⁵⁵ DSEIR, Section 2.6.4.1.

¹⁵⁶ Larson et al. 2017.

¹⁵⁷ Natalia P. Lebedeva and Lois Boon-Brett, Considerations on the Chemical Toxicity of Contemporary Li-Ion Battery Electrolytes and Their Components, *Journal of The Electrochemical Society*, v. 163, no. 6, 2016, p. A829, 2016, Exhibit 10.

¹⁵⁸ Lebedeva and Boon-Brett 2016, p. A829, Exhibit 10.

Many of the currently used solvents are (very) volatile. Our calculations show that at room temperature a small solvent release, typically below ca. 250 ml, can evaporate and in a room of ca. 62 m³ can result in the formation of a toxic atmosphere with concentration of the released compound reaching an acute exposure limit, such as PAC-2 level, where irreversible and other serious health effects are expected to occur.

The DSEIR fails to identify the solvent used in the batteries or to evaluate the health impacts of an accidental release. The available research indicates worker and public health impacts would be significant in the event of a fire or release of electrolytes during thermal runaway. Thus, the DSEIR fails as an informational document under CEQA for failing to identify and analyze health risks of thermal runaways and fires at the BESS.

5.5. Aquatic Impacts

Finally, if an accident occurred during transport of the batteries to the site, releases into a waterway could result in acute and chronic toxicity.¹⁵⁹ The DSEIR is silent on aquatic toxicity and thus fails as an informational document under CEQA.

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¹⁵⁹ F. Gschwind et al., Fluoride Ion Batteries: Theoretical Performance, Safety, Toxicity, and a Combinatorial Screening of New Electrodes, *Journal of Fluorine Chemistry*, v. 182, Table 6. Exhibit 11.

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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)

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

property redevelopment projects (e.g., Mission Bay, Southern Pacific Railyards, Moscone Center expansion, San Diego Padres Ballpark); residential developments; commercial office parks, campuses, and shopping centers; server farms; transportation plans; and a wide range of mines including sand and gravel, hard rock, limestone, nacholite, coal, molybdenum, gold, zinc, and oil shale.

EXPERT WITNESS/LITIGATION SUPPORT

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

omission of VOC and CO emissions from wastewater treatment, cooling tower, tank roof landings, and malfunctions. *Sierra Club, Ohio Valley Environmental Coalition, Coal River Mountain Watch, West Virginia Highlands Conservancy v. John Benedict, Director, Division of Air Quality, West Virginia Department of Environmental Protection and TransGas Development System, LLC*, Appeal No. 10-01-AQB. Virginia Air Quality Board remanded the permit on March 28, 2011 ordering reconsideration of potential to emit calculations, including: (1) support for assumed flare efficiency; (2) inclusion of startup, shutdown and malfunction emissions; and (3) inclusion of wastewater treatment emissions in potential to emit calculations.

- For plaintiffs, expert on BACT emission limits for gas-fired combined cycle power plant. Prepared declaration in support of CBE's Opposition to the United States' Motion for Entry of Proposed Amended Consent Decree. Assisted in settlement discussions. *U.S. EPA, Plaintiff, Communities for a Better Environment, Intervenor Plaintiff, v. Pacific Gas & Electric Company, et al.*, U.S. District Court, Northern District of California, San Francisco Division, Case No. C-09-4503 SI.
- Technical expert in confidential settlement discussions with large coal-fired utility on BACT control technology and emission limits for 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

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 NO_x and SO₂, control costs, and excess emissions of NO_x, 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 NO_x, 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

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*

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

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, Intervenors, v. Wisconsin Electric Power Company, Defendant*, U.S. District Court for the Eastern District of Wisconsin, Civil Action No. 2:03-CV-00371-CNC. Order issued 10-1-07 denying petition.
- For a coalition of Nevada labor organizations (ACE), reviewed preliminary determination to issue a Class I Air Quality Operating Permit to Construct and supporting files for a 250-MW pulverized coal-fired boiler (Newmont). Prepared about 100 pages of technical analyses and comments on BACT, MACT, emission calculations, and enforceability. Assisted counsel draft petition and reply brief appealing PSD permit to U.S. EPA Environmental Appeals Board (EAB). Order denying review issued 12/21/05. *In re Newmont Nevada Energy Investment, LLC, TS Power Plant*, PSD Appcal 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.

- 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

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 Sempra Energy Resources Cross-Border Transmissions Lines in the U.S. and four associated power plants located in Mexico (DOE EA-1391). Prepared 20-page declaration in support of motion for summary judgment addressing emissions, including 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

responses to comments and assisted counsel draft appeal to BAAQMD hearing board, opening brief, motion to strike, and rebuttal brief. Case settled.

- Assisted California Central Coast city obtain controls on a proposed new city that would straddle the Ventura-Los Angeles County boundary. Reviewed several environmental impact reports, prepared an air quality analysis, a diesel exhaust health risk assessment, and detailed review comments. Governor intervened and State dedicated the land for conservation purposes April 2004.
- Assisted Central California city to obtain controls on large alluvial sand quarry and asphalt plant proposing a modernization. Prepared comments on Negative Declaration on air quality, public health, noise, and traffic. Evaluated process flow diagrams and engineering reports to determine whether proposed changes increased plant capacity or substantially modified plant operations. Prepared comments on application for categorical exemption from CEQA. Presented testimony to County Board of Supervisors. Developed controls to mitigate impacts. Assisted counsel draft Petition for Writ. Case settled June 2002. Substantial improvements in plant operations were obtained including cap on throughput, dust control measures, asphalt plant loadout enclosure, and restrictions on truck routes.
- Assisted oil companies on the California Central Coast in defending class action citizen's lawsuit alleging health effects due to emissions from gas processing plant and leaking underground storage tanks. Reviewed regulatory and other files and advised counsel on merits of case. Case settled November 2001.
- Assisted oil company on the California Central Coast in defending property damage claims arising out of a historic oil spill. Reviewed site investigation reports, pump tests, leachability studies, and health risk assessments, participated in design of additional site characterization studies to assess health impacts, and advised counsel on merits of case. Prepare health risk assessment.
- Assisted unions in appeal of Initial Study/Negative Declaration ("IS/ND") for an MTBE phaseout project at a Bay Area refinery. Reviewed IS/ND and supporting agency permitting files and prepared technical comments on air quality, groundwater, and public health impacts. Reviewed responses to comments and final IS/ND and ATC permits and assisted counsel to draft petitions and briefs appealing decision to Air District Hearing Board. Presented sworn direct and rebuttal testimony with cross examination on groundwater impacts of ethanol spills on hydrocarbon contamination at refinery. Hearing Board ruled 5 to 0 in favor of appellants, remanding ATC to district to prepare an EIR.
- Assisted Florida cities in challenging the use of diesel and proposed BACT determinations in prevention of significant deterioration (PSD) permits issued to two 510-MW simple cycle peaking electric generating facilities and one 1,080-MW simple cycle/combined cycle facility. Reviewed permit applications, draft permits, and FDEP engineering evaluations, assisted counsel in drafting petitions and responding to discovery. Participated in settlement discussions. Cases settled or applications withdrawn.

- Assisted large California city in federal lawsuit alleging peaker power plant was violating its federal permit. Reviewed permit file and applicant's engineering and cost feasibility study to reduce emissions through retrofit controls. Advised counsel on feasible and cost-effective 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

plaintiffs, concluding that the EIR "2) erred in using outdated information in assessing the emission of toxic air contaminants (TACs) from jet aircraft; 3) failed to support its decision not to evaluate the health risks associated with the emission of TACs with meaningful analysis," thus accepting my technical arguments and requiring the Port to prepare a new EIR. See *Berkeley Keep Jets Over the Bay Committee, City of San Leandro, and City of Alameda et al. v. Board of Port Commissioners* (August 30, 2001) 111 Cal.Rptr.2d 598.

- Assisted lessor of former gas station with leaking underground storage tanks and TCE contamination from adjacent property. Lessor held option to purchase, which was forfeited based on misrepresentation by remediation contractor as to nature and extent of contamination. Remediation contractor purchased property. Reviewed regulatory agency files and advised counsel on merits of case. Case not filed.
- Advised counsel on merits of several pending actions, including a Proposition 65 case involving groundwater contamination at an explosives manufacturing firm and two former gas stations with leaking underground storage tanks.
- Assisted defendant foundry in Oakland in a lawsuit brought by neighbors alleging property contamination, nuisance, trespass, smoke, and health effects from foundry operation. Inspected and sampled plaintiff's property. Advised counsel on merits of case. Case settled.
- Assisted business owner facing eminent domain eviction. Prepared technical comments on a negative declaration for soil contamination and public health risks from air emissions from a proposed redevelopment project in San Francisco in support of a CEQA lawsuit. Case settled.
- Assisted neighborhood association representing residents living downwind of a Berkeley asphalt plant in separate nuisance and CEQA lawsuits. Prepared technical comments on air quality, odor, and noise impacts, presented testimony at commission and council meetings, participated in community workshops, and participated in settlement discussions. Cases settled. Asphalt plant was upgraded to include air emission and noise controls, including vapor collection system at truck loading station, enclosures for noisy equipment, and improved housekeeping.
- Assisted a Fortune 500 residential home builder in claims alleging health effects from faulty installation of gas appliances. Conducted indoor air quality study, advised counsel on merits of case, and participated in discussions with plaintiffs. Case settled.
- Assisted property owners in Silicon Valley in lawsuit to recover remediation costs from insurer for large TCE plume originating from a manufacturing facility. Conducted investigations to demonstrate sudden and accidental release of TCE, including groundwater modeling, development of method to date spill, preparation of chemical inventory, investigation of historical waste disposal practices and standards, and on-site sewer and storm drainage inspections and sampling. Prepared declaration in opposition to motion for summary judgment. Case settled.

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

- Assisted defendant oil company in class action lawsuit alleging health impacts from remediation of petroleum contaminated site on California Central Coast. Reviewed documents, designed and conducted monitoring program, and participated in settlement discussions. Case settled.
- Consultant to attorneys representing irrigation districts and municipal water districts to evaluate a potential challenge of USFWS actions under CVPIA section 3406(b)(2). Reviewed agency files and collected and analyzed hydrology, water quality, and fishery data. Advised counsel on merits of case. Case not filed.
- Assisted residents downwind of a Carson refinery in class action lawsuit involving soil and groundwater contamination, nuisance, property damage, and health effects from air emissions. Reviewed files and provided 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

the Environmental Appeals Board challenging permit based on faulty BACT analysis for electric arc furnace and reheat furnace and faulty permit conditions, among others, and drafted briefs responding to four parties. EPA Region V and the EPA General Counsel intervened as amici, supporting petitioners. EAB ruled in favor of petitioners, remanding permit to IDEM on three key issues, including BACT for the reheat furnace and lead emissions from the EAF. Drafted motion to reconsider three issues. Prepared 69 pages of technical comments on revised draft PSD permit. Drafted second EAB appeal addressing lead emissions from the EAF and BACT for reheat furnace based on European experience with SCR/SNCR. Case settled. Permit was substantially improved. See *In re: Steel Dynamics, Inc.*, PSD Appeal Nos. 99-4 & 99-5 (EAB June 22, 2000).

- Assisted defendant urea manufacturer in Alaska in negotiations with USEPA to seek relief from penalties for alleged violations of the Clean Air Act. Reviewed and evaluated regulatory files and monitoring data, prepared technical analysis demonstrating that permit limits were not violated, and participated in negotiations with EPA to dismiss action. Fines were substantially reduced and case closed.
- Assisted construction unions in challenging PSD permitting action for an Indiana grain mill. Prepared technical comments on draft PSD permit and assisted counsel draft appeal of agency permit action to the Environmental Appeals Board challenging permit based on faulty BACT analyses for heaters and boilers and faulty permit conditions, among others. Case settled.
- As part of a consent decree settling a CEQA lawsuit, assisted neighbors of a large west coast port in negotiations with port authority to secure mitigation for air quality impacts. Prepared technical comments on mobile source air quality impacts and mitigation and negotiated a \$9 million CEQA mitigation package. Represented neighbors on technical advisory committee established by port to implement the air quality mitigation program. Program successfully implemented.
- Assisted construction unions in challenging permitting action for a California hazardous waste incinerator. Prepared technical comments on draft permit, assisted counsel prepare appeal of EPA permit to the Environmental Appeals Board. Participated in settlement discussions on technical issues with applicant and EPA Region 9. Case settled.
- Assisted environmental group in challenging DTSC Negative Declaration on a hazardous waste treatment facility. Prepared technical comments on risk of upset, water, and health risks. Writ of mandamus issued.
- Assisted several neighborhood associations and cities impacted by quarries, asphalt plants, and cement plants in Alameda, Shasta, Sonoma, and Mendocino counties in obtaining mitigations for dust, air quality, public health, traffic, and noise impacts from facility operations and proposed expansions.

- For over 100 industrial facilities, commercial/campus, and redevelopment projects, developed the record in preparation for CEQA and NEPA lawsuits. Prepared technical comments on hazardous materials, solid wastes, public utilities, noise, worker safety, air quality, public health, water resources, water quality, traffic, and risk of upset sections of EIRs, EISs, 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

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.

- 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.

- 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,

Board of Land Appeals, Appeal of Decision Record for the Casa Diablo IV Geothermal Development Project.

- In September 2013, prepared technical report on Effluent Limitation Guidelines for Best Available Technology Economically Available (BAT) for Bottom Ash Transport Waters from Coal-Fired Power Plants in the Steam Electric Power Generating Point Source Category.
- In July 2013, prepared technical report on Initial Study/Mitigated Negative Declaration for the Valero Crude by Rail Project, Benicia, California, Use Permit Application 12PLN-00063.
- In July 2013, prepared technical report on fugitive particulate matter emissions from coal train staging at the proposed Coyote Island Terminal, Oregon, for draft Permit No. 25-0015-ST-01.
- In July 2013, prepared technical comments on air quality impacts of the Finger Lakes LPG Storage Facility as reported in various Environmental Impact Statements.
- In July 2013, prepared technical comments on proposed Greenhouse Gas PSD Permit for the Celanese Clear Lake Plant, including cost analysis of CO₂ capture, transport, and sequestration.
- In June/July 2013, prepared technical comments on proposed Draft PSD Preconstruction Permit for Greenhouse Gas Emission for the ExxonMobil Chemical Company Baytown Olefins Plant, including cost analysis of CO₂ capture, transport, and sequestration.
- In June 2013, prepared technical report on a Mitigated Negative Declaration for a new rail terminal at the Valero Benicia Refinery to import increased amounts of "North American" crudes. Comments addressed air quality impacts of refining increased amounts of tar sands crudes.
- In June 2013, prepared technical report on Draft Environmental Impact Report for the California Ethanol and Power Imperial Valley 1 Project.
- In May 2013, prepared comments on draft PSD permit for major expansion of midwest refinery to process 100% tar sands crudes, including a complex netting analysis involving debottlenecking, piecemealing, and BACT analyses.
- In April 2013, prepared technical report on the Draft Supplemental Environmental Impact Statement (DSEIS) for the Keystone XL Pipeline on air quality impacts from refining increased amount of tar sands crudes at Refineries in PADD 3.
- In October 2012, prepared technical report on the Environmental Review for the Coyote Island Terminal Dock at the Port of Morrow on fugitive particulate matter emissions.
- In October 2012-October 2014, review and evaluate Flint Hills West Application for an expansion/modification for increased (Texas, Eagle Ford Shale) crude processing and related modification, including netting and BACT analysis. Assist in settlement discussions.

- In February 2012, prepared comments on BART analysis in PA Regional Haze SIP, 77 FR 3984 (Jan. 26, 2012). On Sept. 29, 2015, a federal appeals court overturned the U.S. EPA's approval of this plan, based in part on my comments, concluding "...we will vacate the 2014 Final Rule to the extent it approved Pennsylvania's source-specific BART analysis and remand to the EPA for further proceedings consistent with this Opinion." Nat'l Parks Conservation Assoc. v. EPA, 3d Cir., No. 14-3147, 9/19/15.
- Prepared cost analyses and comments on New York's proposed BART determinations for NOx, SO2, and PM and EPA's proposed approval of BART determinations for Danskammer Generating Station under New York Regional Haze State Implementation Plan and Federal Implementation Plan, 77 FR 51915 (August 28, 2012).
- Prepared cost analyses and comments on NOx BART determinations for Regional Haze State Implementation Plan for State of Nevada, 77 FR 23191 (April 18, 2012) and 77 FR 25660 (May 1, 2012).
- Prepared analyses of and comments on New Source Performance Standards for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, 77 FR 22392 (April 13, 2012).
- Prepared comments on CASPR-BART emission equivalency and NOx and PM BART determinations in EPA proposed approval of State Implementation Plan for Pennsylvania Regional Haze Implementation Plan, 77 FR 3984 (January 26, 2012).
- Prepared comments and statistical analyses on hazardous air pollutants (HAPs) emission controls, monitoring, compliance methods, and the use of surrogates for acid gases, organic HAPs, and metallic HAPs for proposed National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units, 76 FR 24976 (May 3, 2011).
- Prepared cost analyses and comments on NOx BART determinations and emission reductions for proposed Federal Implementation Plan for Four Corners Power Plant, 75 FR 64221 (October 19, 2010).
- Prepared cost analyses and comments on NOx BART determinations for Colstrip Units 1- 4 for Montana State Implementation Plan and Regional Haze Federal Implementation Plan, 77 FR 23988 (April 20, 2010).
- For EPA Region 8, prepared report: Revised BART Cost Effectiveness Analysis for Tail-End Selective Catalytic Reduction at the Basin Electric Power Cooperative Leland Olds Station Unit 2 Final Report, March 2011, in support of 76 FR 58570 (Sept. 21, 2011).
- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Selective Catalytic Reduction at the Public Service Company of New Mexico San Juan Generating Station, November 2010, in support of 76 FR 52388 (Aug. 22, 2011).

- For EPA Region 6, prepared report: Revised BART Cost-Effectiveness Analysis for Flue Gas Desulfurization at Coal-Fired Electric Generating Units in Oklahoma: Sooner Units 1 & 2, Muskogee Units 4 & 5, Northeastern Units 3 & 4, October 2010, in support of 76 FR 16168 (March 26, 2011). My work was upheld in: *State of Oklahoma v. EPA*, App. Case 12-9526 (10th 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

Sources: Electricity Utility Steam Generating Units (MACT standards for coal-fired power plants).

- Prepared Authority to Construct Permit for remediation of a large petroleum-contaminated site on the California Central Coast. Negotiated conditions with agencies and secured permits.
- Prepared Authority to Construct Permit for remediation of a former oil field on the California Central Coast. Participated in negotiations with agencies and secured permits.
- Prepared and/or reviewed hundreds of environmental permits, including NPDES, UIC, Stormwater, Authority to Construct, Prevention of Significant Deterioration, Nonattainment New Source Review, Title V, and RCRA, among others.
- Participated in the development of the CARB document, *Guidance for Power Plant Siting and Best Available Control Technology*, including attending public workshops and filing technical comments.
- Performed data analyses in support of adoption of emergency power restoration standards by the California Public Utilities Commission for “major” power outages, where major is an outage that simultaneously affects 10% of the customer base.
- Drafted portions of the Good Neighbor Ordinance to grant Contra Costa County greater authority over safety of local industry, particularly chemical plants and refineries.
- Participated in drafting BAAQMD Regulation 8, Rule 28, Pressure Relief Devices, including participation in public workshops, review of staff reports, draft rules and other technical materials, preparation of technical comments on staff proposals, research on availability and costs of methods to control PRV releases, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and cost of low-leak technology, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 25, Pumps and Compressors, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak and seal-less technology, and negotiations with staff.
- Participated in amending BAAQMD Regulation 8, Rule 5, Storage of Organic Liquids, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of controlling tank emissions, and presentation of testimony before the Board.

- Participated in amending BAAQMD Regulation 8, Rule 18, Valves and Connectors at Petroleum Refinery Complexes, including participation in public workshops, review of staff reports, proposed rules and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 22, Valves and Flanges at Chemical Plants, etc, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability and costs of low-leak technology, and presentation of testimony before the Board.
- Participated in amending BAAQMD Regulation 8, Rule 25, Pump and Compressor Seals, including participation in public workshops, review of staff reports, proposed rules, and other supporting technical material, preparation of technical comments on staff proposals, research on availability of low-leak technology, and presentation of testimony before the Board.
- Participated in the development of the BAAQMD Regulation 2, Rule 5, Toxics, including participation in public workshops, review of staff proposals, and preparation of technical comments.
- Participated in the development of SCAQMD Rule 1402, Control of Toxic Air Contaminants from Existing Sources, and proposed amendments to Rule 1401, New Source Review of Toxic Air Contaminants, in 1993, including review of staff proposals and preparation of technical comments on same.
- Participated in the development of the Sunnyvale Ordinance to Regulate the Storage, Use and Handling of Toxic Gas, which was designed to provide engineering controls for gases that are not otherwise regulated by the Uniform Fire Code.
- Participated in the drafting of the Statewide Water Quality Control Plans for Inland Surface Waters and Enclosed Bays and Estuaries, including participation in workshops, review of draft plans, preparation of technical comments on draft plans, and presentation of testimony before the SWRCB.
- Participated in developing Se permit effluent limitations for the five Bay Area refineries, including review of staff proposals, statistical analyses of Se effluent data, review of literature on aquatic toxicity of Se, preparation of technical comments on several staff proposals, and presentation of testimony before the Bay Area RWQCB.
- Represented the California Department of Water Resources in the 1991 Bay-Delta Hearings before the State Water Resources Control Board, presenting sworn expert testimony with cross examination and rebuttal on a striped bass model developed by the California Department of Fish and Game.

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

WATER QUALITY/RESOURCES

- Directed and participated in research on environmental impacts of energy development in the Colorado River Basin, including contamination of surface and subsurface waters and modeling of flow and chemical transport through fractured aquifers.
- Played a major role in Northern California water resource planning studies since the early 1970s. Prepared portions of the Basin Plans for the Sacramento, San Joaquin, and Delta basins including sections on water supply, water quality, beneficial uses, waste load allocation, and agricultural drainage. Developed water quality models for the Sacramento and San Joaquin Rivers.
- Conducted hundreds of studies over the past 40 years on Delta water supplies and the impacts of exports from the Delta on water quality and biological resources of the Central Valley, Sacramento-San Joaquin Delta, and San Francisco Bay. Typical examples include:
 1. Evaluate historical trends in salinity, temperature, and flow in San Francisco Bay and upstream rivers to determine impacts of water exports on the estuary;

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

pesticides and mining wastes, salinity intrusion from channel dredging, loss of riparian and marsh habitat, sedimentation from upstream land alternations, and changes in dissolved oxygen, flow, and temperature below dams.

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

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.

- Performed nuisance investigations (odor, noise, dust, smoke, indoor air quality, soil contamination) for businesses, industrial facilities, and residences located proximate to and downwind of pollution sources.

PUBLICATIONS AND PRESENTATIONS (Partial List - Representative Publications)

J.P. Fox, P.H. Hutton, D.J. Howes, A.J. Draper, and L. Sears, Reconstructing the Natural Hydrology of the San Francisco Bay-Delta Watershed, *Hydrology and Earth System Sciences*, Special Issue: Predictions under Change: Water, Earth, and Biota in the Anthropocene, v. 19, pp. 4257-4274, 2015. <http://www.hydrol-earth-syst-sci.net/19/4257/2015/hess-19-4257-2015.pdf>.

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

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POST GRADUATE COURSES
(Partial)

S-Plus Data Analysis, MathSoft, 6/94.
Air Pollutant Emission Calculations, UC Berkeley Extension, 6-7/94
Assessment, Control and Remediation of LNAPL Contaminated Sites, API and USEPA, 9/94
Pesticides in the TIE Process, SETAC, 6/96
Sulfate Minerals: Geochemistry, Crystallography, and Environmental Significance,
Mineralogical Society of America/Geochemical Society, 11/00.
Design of Gas Turbine Combined Cycle and Cogeneration Systems, Thermoflow, 12/00
Air-Cooled Steam Condensers and Dry- and Hybrid-Cooling Towers, Power-Gen, 12/01
Combustion Turbine Power Augmentation with Inlet Cooling and Wet Compression,
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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
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Optimizing Generation and Air Emissions, Power-Gen, 12/02
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ADMINISTRATION / TRAINING

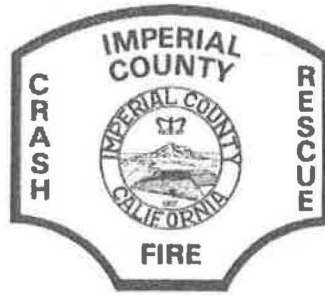
1078 Dogwood Road
Heber, CA 92249

Administration

Phone: (442) 265-6000
Fax: (760) 482-2427

Training

Phone: (442) 265-6011



OPERATIONS/PREVENTION

2514 La Brucherie Road
Imperial, CA 92251

Operations

Phone: (442) 265-3000
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Prevention

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September 18, 2019

RE: Conditional Use Permit #18-0018
Le Conte Energy Storage, LLC
319 Brockman Rd. Calexico CA 92231

Imperial County Fire Department Fire Prevention Bureau would like to thank you for the opportunity to review and comment on CUP #16-0043 for Le Conte Energy Storage facility located at 319 Brockman Rd, Calexico CA 92231.

The propose project will consist of one or two warehouse-style buildings totaling approximately 85,000 square feet that will contain batteries and related systems, power conversion and control equipment. Also stated in the description that the project will have little or no impact on environmental resources or local services, given its small foot print (3-5 acres), its low or no emission operating profile, its location completely with a disturbed area previously evaluated, and its proximity to existing electrical energy infrastructure (Drew/CSE).

3-1

Energy storage facilities create a special hazards for firefighter and emergency responders with possibility of water-reactive materials, electrical shock, corrosives, chemical burns, toxic fumes, flammable gases, and explosion. These hazards listed can create a negative impact on Imperial County Fire Department due to response time to the facility, equipment needed to effectively perform firefighting operations and personnel to safely perform firefighting operations for a large scale energy storage facility.

NFPA Standards for energy storage system includes but not limited to:
NFPA: 1 Fire Code

70 National Electrical Code

855 Standard for the installation of Energy Storage System

110 Standard for Emergency and Standby Power Systems

111 Stored Electrical Energy Emergency and Standby Power System

3-2

Fire apparatus and firefighting personnel will be engaging a potentially hazards form of structural firefighting in large scale energy storage facilities. The apparatus required shall meet all NFPA standards for structural firefighting and be a type 1 fire apparatus. The location of the facility is within the response area of Imperial County Fire Department Station 3 location in the community of Seeley, CA. Currently ICFD station 3 type 1 fire apparatus is a 2007 International/KME fire engine with a pump capacity of 1250 GPM and a 1250 water storage tank. NFPA recommend front line apparatus should be carefully considered for its value (or risk) to their firefighter of keeping fire apparatus in first-line service when the apparatus is more than 15 years old. Imperial County Fire Department shall evaluate their apparatus and its condition for front line firefighting operation in response to potentially hazardous facility.

3-3

Impacts from this project shall be evaluated by Imperial County Fire Department Fire Chief and Fire Code Official in determining any impacts of the project can or will cause a negative effect on Imperial County Fire Department and/or County of Imperial. Any impacts will be address between Imperial County Fire Department official, County of Imperial officials, applicants and/or developers which may include but not limited to:

- Capital purchases which may be required in providing services to this project
- Training
- Fiscal and operational costs

3-4

Additional requirements to follow but not limited to:


- An approved water supply capable of supplying the required fire flow determined by appendix B in the California Fire Code shall be installed and maintained. Private fire service mains and appurtenance shall be installed in accordance with NFPA 24.
- An approved automatic fire suppression system shall be installed on all required structures as per the California Fire Code. All fire suppression systems will be installed and maintained to the current adapted fire code and regulations.
- An approved automatic fire detection system shall be installed on all required structures as per the California Fire Code. All fire detection systems will be installed and maintained to the current adapted fire code and regulations.
- Fire department access roads and gates will be in accordance with the current adapted fire code and the facility will maintain a Knox Box for access on site.
- Compliance with all required sections of the fire code.
- Applicant shall provide product containment areas(s) for both product and water run-off in case of fire applications and retained for removal
- A Hazardous Waste Material Plan shall be submitted to Certified Unified Program Agency (CUPA) for their review and approval.
- All hazardous material and wastes shall be handled, store, and disposed as per the approved Hazardous Waste Materials Plan. All spills shall be documented and reported to Imperial County Fire Department and CUPA as required by the Hazardous Waste Material Plan

3-5

Imperial County Fire Department reserve the right to comment at a later time if necessary.

If you have any questions, please contact the Imperial County Fire Prevention Bureau at 442-265-3020 or 442-265-3021.

Sincerely
Andrew Loper
Lieutenant/Fire Prevention Specialist
Imperial County Fire Department
Fire Prevention Bureau

Robert Malek 
Deputy Chief
Imperial County Fire Department
Fire Prevention Bureau

**APPENDIX B – FINAL MITIGATION MONITORING AND
REPORTING PROGRAM, MATERIAL SAFETY DATA SHEETS,
AND SPECIFICATION SHEETS**

Mitigation Monitoring and Reporting Program

Le Conte Battery Energy Storage Project SEIR - Imperial County, CA

The County of Imperial will adopt this Mitigation Monitoring and Reporting Program (MMRP) in accordance with Public Resources Code (PRC) Section 21081.6 and Section 15097 of the California Environmental Quality Act (CEQA) Guidelines. The purpose of the MMRP is to ensure that the Le Conte Battery Energy Storage Project (Project), which is the subject of the Supplemental Environmental Impact Report (SEIR), complies with all the environmental mitigation measures for the Project adopted by the County of Imperial, in conjunction with the adoption of the SEIR. The mitigation measures have been integrated into this MMRP. Within this document, the approved mitigation measures are organized and referenced by subject category. The mitigation measures are provided in the table below. The specific mitigation measures are identified, as well as the monitoring method, responsible monitoring party, monitoring phase, verification/approval party, date mitigation measure verified or implemented, location of documents (monitoring record), and completion requirement for each mitigation measure.

The mitigation measures applicable to the Project include avoiding certain impacts altogether, minimizing impacts by limiting the degree or magnitude of the action and its implementation, and/or reducing or eliminating impacts over time by maintenance operations during the life of the action. Public Resources Code Section 21081.6 requires the Lead Agency, for each project that is subject to CEQA, to monitor performance of the mitigation measures included in any environmental document to ensure that implementation does, in fact, take place. The County of Imperial is the designated CEQA lead agency for the Mitigation Monitoring and Reporting Program. The County of Imperial is responsible for review of all monitoring reports, enforcement actions, and document disposition as it relates to impacts within the County's jurisdiction. The County of Imperial will rely on information provided by the monitor as accurate and up to date and will field check mitigation measure status as required.

A record of the MMRP will be maintained at County of Imperial, Department of Planning and Development Services, 801 Main Street, El Centro, CA 92243.

Mitigation Measure No.	Mitigation Measure	Monitoring Method	Responsible Monitoring Party	Monitoring Phase	Verification/ Approval Party	Location of Documents (Monitoring Record)	Completion Requirement
Biological Resources							
BIO-1	Noxious, Invasive and Non-Native Weeds: To minimize the introduction and spread of weed species the Project shall continue to implement relevant elements of the previously approved CSE facility Weed Management Plan, including a discussion of specific weeds identified on site that will be targeted for eradication or control as well as a variety of measures that will be undertaken during construction and operations and maintenance activities to prevent the introduction and spread of new weed species as a result of the project.	Prior to the issuance of a grading permit, Planning and Development Services shall review and confirm that the existing CSE Weed Management Plan covers the Project Site.	Department of Planning and Development Services	Prior to the issuance of a grading permit	Department of Planning and Development Services		