D-181 cont. 31.2 ton/qtr of PM10,[66] exceeding the significance threshold of 2.5 ton/quarter. These significant PM10 emissions must be mitigated.

D-182 There are numerous feasible PM10 control methods that were not required in the Mitigation Monitoring and Reporting Plan that have been required in other CEQA documents and recommended by various air pollution control districts, including the Bay Area Air Quality Management District (BAAQMD)[67] and the South Coast Air Quality Management District (SCAQMD).[68] The following should be required for the Project:

1) Apply water every 4 hours to the area within 100 feet of a structure being demolished, to reduce vehicle trackout.
2) Use a gravel apron, 25 feet long by road width, to reduce mud/dirt trackout from unpaved truck exit routes.
3) Apply dust suppressants (e.g., polymer emulsion) to disturbed areas upon completion of demolition.
4) Apply water to disturbed soils after demolition is completed or at the end of each day of cleanup.
5) Prohibit demolition activities when wind speeds exceed 25 mph.
6) Apply water every 3 hours to disturbed areas within a construction site.
7) Require minimum soil moisture of 12% for earthmoving by use of a moveable sprinkler system or a water truck. Moisture content can be verified by lab sample or moisture probe.
8) Limit on-site vehicle speeds (on unpaved roads) to 15 mph by radar enforcement.
9) Replace ground cover in disturbed areas as quickly as possible.

[66] Earthmoving TSP emissions = (1.2 ton TSP/acre-mo)(27 acres) = **32.4 ton TSP/mo.** Assuming 32% of the TSP is PM10, PM10 emissions = (32.4 ton TSP/mo)(0.32) = 10.4 ton PM10/mo = **31.2 ton/qtr.**

[67] BAAQMD, CEQA Air Quality Guidelines, May 2017, Tables 8-2 and 8-2; https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

[68] SCAQMD, Fugitive Dust Mitigation Measure Tables; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust.

16

D-182 cont.

10) All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches.[69]

2.8. Construction Health Risks Were Not Evaluated and Are Significant

D-183

The DEIR is silent on construction health risks. CEQA requires lead agencies to disclose the health risks posed by toxic air contaminants released during construction and operation. The Office of Environmental Health Hazard Assessment's (OEHHA's) risk assessment guidelines recommend a formal health risk assessment for short-term construction exposures lasting longer than 2 months, and exposures from projects lasting more than 6 months should be evaluated for the duration of the project.[70] The construction of this Project will last for 7 to 34 months, depending upon the alternative.[71] The OEHHA risk assessment guidelines, which are used throughout California for assessing health risks under CEQA, state:

[69] SCAQMD, Fugitive Dust Mitigation Measure Table XI-A, http://www.aqmd.gov/docs/default-source/ceqa/handbook/mitigation-measures-and-control-efficiencies/fugitive-dust/fugitive-dust-table-xi-a.doc?sfvrsn=2.

[70] 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; https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

[71] DEIR, Table 3-21, pdf 335.

17

D-183 cont.

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.

Health risk assessments are routinely performed for construction projects when there are nearby sensitive receptors, as here. Numerous sensitive receptors are close to Project components. Thus, construction could result in significant public health and other impacts. Nearby sensitive receptors include residences near the substation site and along the reconductoring and new 70 kV powerline segments.

The PEA, for example, contains a list of 575 parcels within 300 feet of the Estrella Substation and the transmission line route.[72] Elsewhere, the PEA contains a list of sensitive receptors in the vicinity of the Project, summarized here as Table 1. See also Figure 2. Of greatest concern is the entry of "numerous residences" closer than 50 feet. The occupants of these residences are at great risk of adverse health impacts from construction emissions.

[72] PEA, Appendix A, Affected Properties, p. A-1 to A-19, May 2017.

18

D-183

Table 1: Sensitive Receptors in Vicinity of Project[73]

Type	Distance from Project Area	Direction from Project Area
Residence	Within 265 feet	Southwest of Estrella Substation
Residence	Within 1,320 feet	Southeast of Estrella Substation
2 Residences	Within 2,300 feet	Northwest of Estrella Substation
Residence	1,100 feet	East of Estrella Substation
2 Residences	20 feet	North of the new 70 kV power line segment
2 Residences	100 feet	North of the new 70 kV power line segment
10+ Residences	Within 200 feet	Along the new 70 kV power line segment
10+ Residences	Within 500 feet	Along the new 70 kV power line segment
15+ Residences	Within 1,000 feet	Along the new 70 kV power line segment
10+ Residences	Within 1,500 feet	Along the new 70 kV power line segment
1 Residence	1,600 feet	Along the new 70 kV power line segment
Jehovah's Witnesses Golden Hill	165 feet	South of new 70 kV power line segment in Paso Robles
Paso Robles Swim and Tennis Club	50 feet	North of the new 70 kV power line segment
Barney Schwartz Park	80 feet	Southwest of the new 70 kV power line segment
River Oaks Golf Course	1,320 feet	East of the reconductoring segment
Tots Landing Daycare	265 feet	East of the reconductoring segment
Grace Baptist Church	790 feet	East of the reconductoring segment
Numerous Residences	<50 feet	Along the reconductoring segment (too numerous to pinpoint)

[73] PEA, Table 3.12-6.

19

D-183
cont.

Figure 2: Proximity of Homes to Reconductoring[74]

[74] DEIR, Figure 2-7, pdf 113.

20

D-183 cont.

Residences, public open space, and recreation areas (e.g., Barney Schwartz Park, Cava Robles RV Resort) are present along the proposed 70 kV power line route. FTM Site 7 is located close to an existing church.[75] FTM Site 4 is near the Paso Robles High School. FTM Site 2 is adjacent to the Woodland Shopping Center II. FTM Site 3 is surrounded by residences.[76]

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.[77] It is also chronically[78] and acutely[79] 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 asthma attacks."[80] This is particularly critical given the current Covid epidemic.

Thus, a health risk assessment was prepared for Project construction for two cases: (1) DPM emissions as assumed in the DEIR based on the use of all Tier 4 Final construction equipment as assumed in the CalEEMod analysis and (2) DPM emissions assuming the use of Tier 2 construction equipment.

D-184

2.8.1. Construction Cancer Risks Are Significant

The following sections present the results of the health risk assessment prepared by Ray Kapahi[81] at Environmental Permitting Specialists, which is included in Exhibit 20 to these comments. This HRA indicates that cancer health risks of Project construction are highly significant, requiring additional construction mitigation. These significant impacts can be mitigated by requiring the use of all Tier 4 final construction

---

[75] DEIR, p. 4.3-10, pdf 428. See also Figures 3-15, 3-16, 3-24.

[76] DEIR, Figure 3-16.

[77] OEHHA and the American Lung Association of California, Health Effects of Diesel Exhaust; https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf. See also: OEHHA, Diesel Exhaust Particulate; https://oehha.ca.gov/chemicals/diesel-exhaust-particulate#:~:text=Cancer%20Potency%20Information&text=Listed%20as%20Particulate%20Emissions%20from,(ug%2Fm3)%2D1.

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

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

[80] OEHHA and the American Lung Association of California, Health Effects of Diesel Exhaust; https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf.

[81] Exhibit 21.

D-184 cont.

equipment, as assumed in the DEIR's construction emission calculations, but not required in the DEIR's mitigation measures.

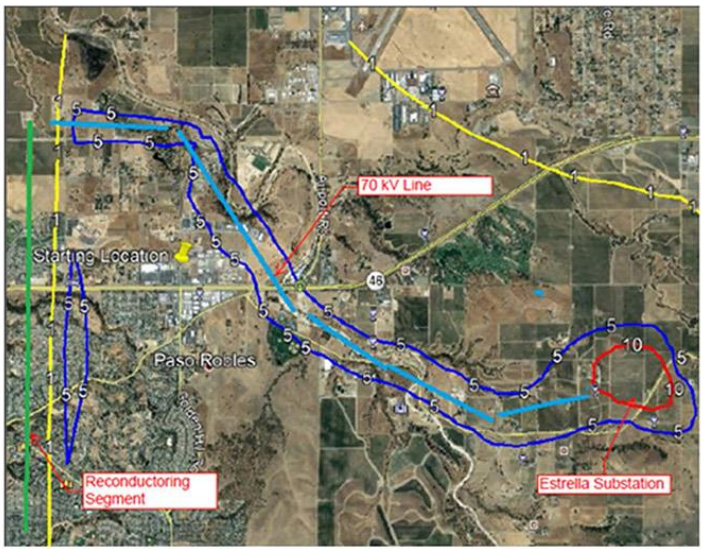
2.8.1.1. Scenario 1 Cancer Risks

D-185

The cancer risk results for Scenario 1, which used the DEIR's DPM construction emissions based on 100% Tier 4 Final engines, are summarized in Figure 3.[82] The cancer significance threshold is 10 cancer cases in one million exposed, or 10 in one million. The dark blue isopleth line corresponds to a cancer risk of 5 in one million, which is less than the cancer significance threshold.

Cancer risks only equal or exceed the significance threshold (red isopleth in lower right-hand corner of Figure 3 in the vicinity of the Estrella Substation). The PEA reports several residences within this isopleth. Table 1. Thus, if all Tier 4 Final engines are used for construction, cancer risks would only be significant in the vicinity of the Estrella Substation, requiring additional mitigation during construction of the Substation, such as mandating the use of biodiesel fuel in all construction equipment. However, the DEIR does not require all Tier 4 final engines or the use of biodiesel fuel.

Figure 3: Cancer Risk Isopleth Map, Scenario 1 (Tier 4 Final Engines)[83]



[82] Exhibit --, Figure --.

[83] Exhibit 20, Figure 4-1.

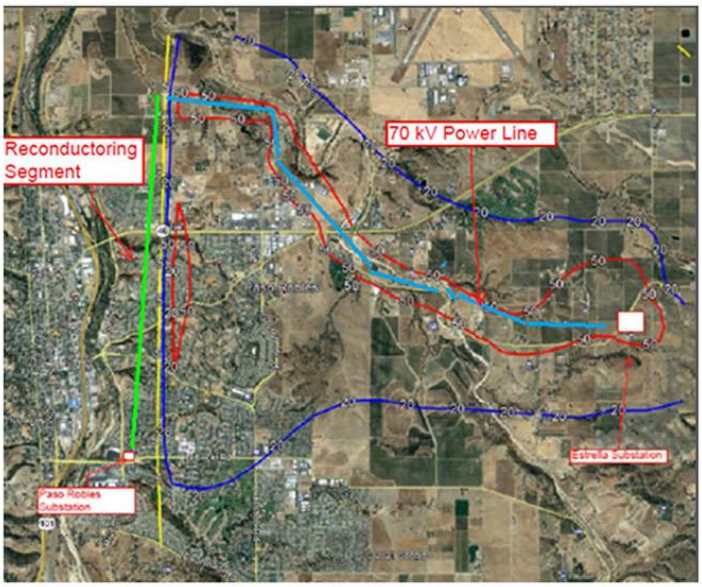
22

D-186

2.8.1.2. Scenario 2 Cancer Risks

The cancer risk results for Scenario 2, which is based on the use of all Tier 2 construction equipment, as allowed by the DEIR (which only encourages an increase in Tier 3 engines, but does not require them), is summarized in Figure 4. The red isopleth line corresponds to a cancer risk of 50 in one million. The dark blue isopleth line corresponds to a cancer risk of 10 in one million. All sensitive receptors within these isopleths will experience significant cancer risks during construction.

Figure 4: Cancer Risk Isopleth Map, Scenario 2 (Tier 2 Engines)[84]



The PEA identifies numerous sensitive receptors in the areas encompassed by these isopleths. Notably, it identifies residences "too numerous to pinpoint" within 50 feet of the reconductoring segment as well as a church, daycare center, golf course, park, and swim and tennis club, among others. Table 1.

Figure 5 shows a close-up view of the area east of the reconductoring segment. This figure shows hundreds of homes within the 20 to 50 cancer cases per million isopleths. These are highly significant cancer risks, two to five times higher than the significance threshold of 10 in one million, requiring mitigation. These risks can be

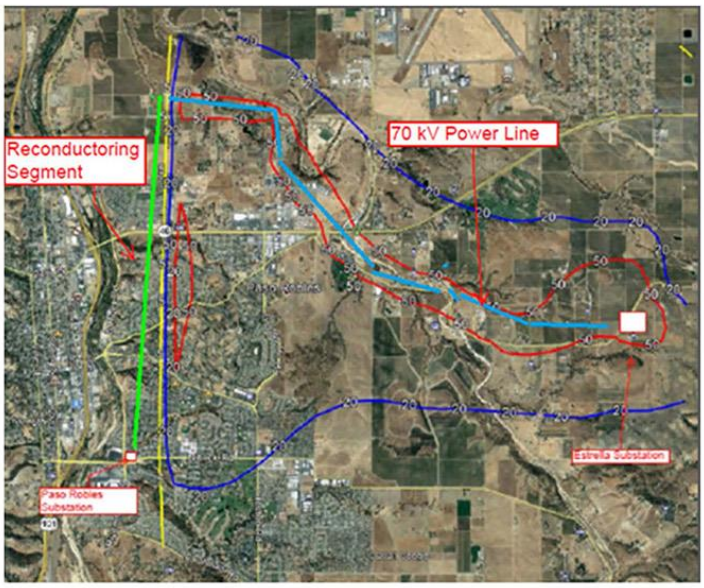
[84] Exhibit 20, Figure 4-2.

23

D-186 cont.

mitigated by requiring the use of all Tier 4 construction equipment and diesel particulate traps (soot filters)[85].

Figure 5: Cancer Risk Isopleths for Scenario 2, Showing Homes East of the Reconductoring Segment[86]



D-187

2.8.2. Construction Acute Health Impacts Are Significant

Acute health impacts occur over a 1-hour exposure time. OEHHA has not established an acute reference exposure level (REL) for DPM but other agencies have. The absence of an OEHHA acute risk exposure level does not excuse the Applicant from evaluating acute health risks. In the absence of an OEHHA significance threshold, it is standard practice to conduct a literature search to determine if other authorities have established a threshold. Since OEHHA last evaluated health impacts of DPM in

[85] See, e.g., CARB, A Guide to California's Clean Air Regulations for Heavy-Duty Diesel Vehicles, February 2020, pdf 12; https://ww3.arb.ca.gov/msprog/truckstop/pdfs/truck_bus_booklet.pdf and CARB, Heavy-Duty Diesel Emission Control Strategy Installation and Maintenance, June 28, 2019; https://ww2.arb.ca.gov/resources/fact-sheets/heavy-duty-diesel-emission-control-strategy-installation-and-maintenance.

[86] Exhibit 20, Figure 4-3.

24

D-187 cont.

1998,[87] substantial additional research has been conducted on acute health impacts of DPM.[88] Based on this more current research, Canada recently established an acute REL for DPM of 10 μg/m^3 to protect against adverse effects on the respiratory system.[89] There is no regulation or guidance requiring that only OEHHA RELs be used in California health risk assessments.

Figures 6 and 7 show isopleths for acute health impacts of DPM emissions during construction for Scenario 1, which assumed all Tier 4 final construction equipment and Scenario 2, which assumed all Tier 2 construction equipment. An acute hazard index greater than 1 is significant. Thus, the isopleths that show acute hazard indices greater than 1, such as those around the Estrella Substation, the 70 kV line, and the reconductoring segment are highly significant in both scenarios. Sensitive receptors in these locations will experience significant respiratory impacts.

[87] Findings of the Scientific Review Panel on the Report on Diesel Exhaust, 1998; https://www.arb.ca.gov/toxics/dieseltac/de-fnds.pdf.

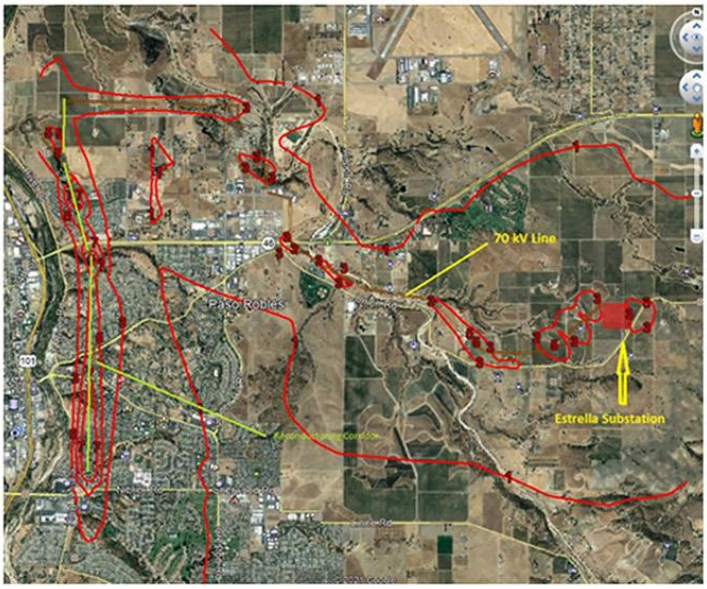
[88] See, e.g., A. A. Mehus and others, Comparison of Acute Health Effects from Exposures to Diesel and Biodiesel Fuel Emissions and references cited therein, *Journal of Occupational and Environmental Medicine*, v. 57, no. 7, pp. 705-712, July 2015; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4479787/.

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

25

D-187
cont.

Figure 6: Acute Health Isopleths for Scenario 1[90]

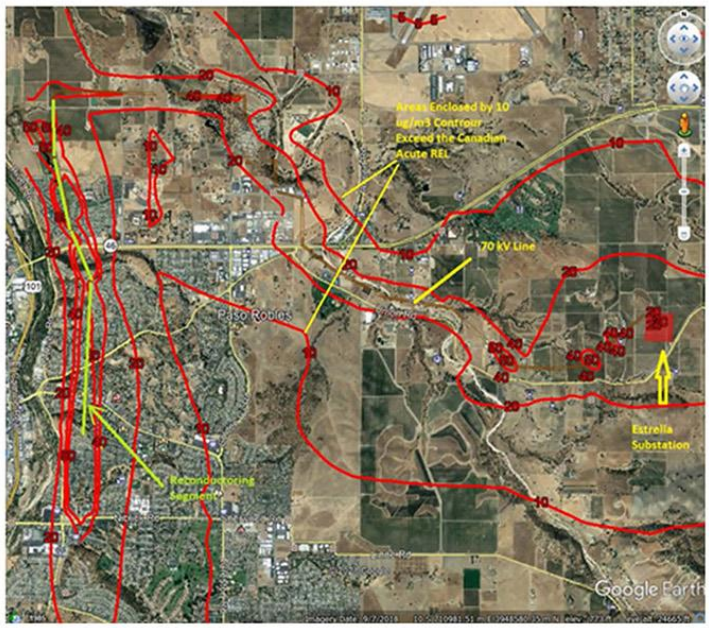


[90] Exhibit 20, Figure 4-4.

26

D-187 cont.

Figure 7: Acute Health Isopleths for Scenario 2[91]



D-188

2.9. Construction Ambient NOx Impacts Are Significant

California has established a short-term ambient air quality standard for NOx of 339 µg/m^3. Construction NOx emissions were modeled for two scenarios: (1) NOx emissions estimated in the DEIR, based on 100% Tier 4 final construction equipment and (2) NOx emissions five times higher than estimated in the DEIR, assuming 100% Tier 3 equipment.

The CalEEMod analysis assumed the use of 100% Tier 4 Final engines. As noted in Comment 2.3, the DEIR's mitigation in APM AIR-2 only requires "expanding use of Tier 3 off-road and 2010 on-road compliant engines."[92] Based on my calculations, if all Tier 3 engines were used, NOx emissions would be 5 to 8[93] times higher than estimated

[91] Exhibit 20, Figure 4-5.

[92] DEIR, Appendix F, p. F-16, APM AIR-2.

[93] Increase in NOx emissions if all Tier 3 engines were used for equipment of 56 to 130 kW: 2.5/0.3 =8.3. Increase in NOx if all Tier 3 engines were used for equipment of 130-560 kW = 1.5/0.3 = 5.0.

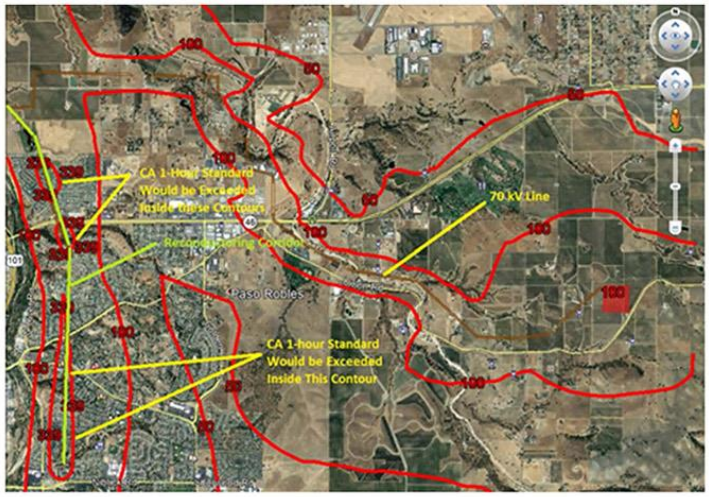
27

D-188 cont.

in the DEIR, depending upon the kW rating of the engines. We conservatively selected the lower end of this range to model ambient construction NOx concentrations.

The results of modeling the DEIR's construction NOx emissions are shown in Figure 8. This figure indicates that the California 1-hour NOx standard would be exceeded along the reconductoring line. This is both a significant air quality impact (violation of a state ambient air quality standard) and a significant health impact, as the state NOx standard was set to protect public health.

Figure 8: Ambient Construction NOx Concentrations (ug/m^3), Scenario 1[94]



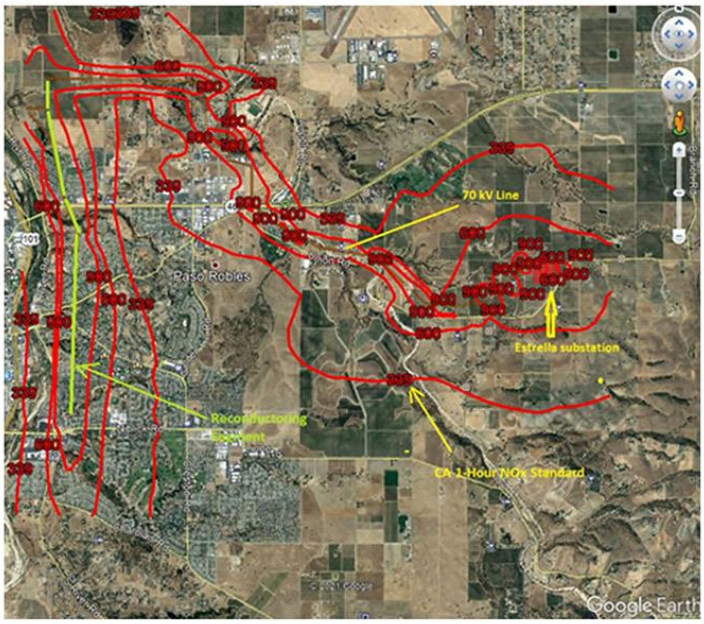
The result of modeling construction NOx emissions assuming the use of all Tier 3 construction equipment are shown in Figure 9. This figure shows that the California 1-hour NOx ambient air quality standard would be reach 900 ug/m^3, nearly a factor 3 higher than the California 1-hour ambient air quality standard, in the vicinity of all Project components in locations with numerous sensitive receptors. This is both a significant air quality impact (violation of a state ambient air quality standard) and a significant health impact, as the state NOx standard was set to protect public health.

[94] Exhibit 20, Figure 4-6.

28

D-188 cont.

Figure 9: Ambient Construction NOx Concentrations, Scenario 2[95]



D-189

2.10. Significant Construction Health and Ambient NOx Impacts Must Be Mitigated

In sum, our analyses demonstrate significant health and air quality impacts that were not disclosed in the DEIR, as follows:[96]

[95] Exhibit 20, Figure 4-7.

[96] Exhibit 20, Table 5-1.

29

D-189 cont.

Summary of Maximum Project Level Health Risks				
Risk Metric	Scenario 1	Scenario 2	Significance Threshold	Significant?
Maximum Residential Cancer Risk	0.5 to 40 cancers per million	5 to 75 cancers/million	10 (per million)	Scenario 1 – Yes Scenario 2 - Yes
Maximum Acute Hazard Index from 1-Hour Exposure to DPM	0.1 to less than 0.5	1 to < 4	1.0	Scenario 1 – No Scenario 2 - Yes
Maximum Acute Impact from Exposure to 1-Hour NOx	100 to 500 ug/m^3	00 to 760 ug/m^3	339 ug/m^3	Scenario 1 – Yes Scenario 2 - Yes

The significant cancer and acute health impacts and wide-spread violations of the California 1-hour NOx ambient air quality standards can and must be mitigated by requiring the following measures: [97,98,99,100]

- Require the use of biodiesel in all construction equipment;
- Require the use of Tier 4 final engines in all construction equipment;
- Install engine particulate filters;[101]
- Install diesel oxidation catalysts;
- Prohibit and/or restrict unnecessary idling or lugging of engines;
- Limit idling to no more than 2 minutes, enforced by an on-site construction monitor;
- Restrict the amount of diesel-powered equipment and total engine horsepower operating in a given area;
- Modify and/or extend the construction schedule to minimize the amount of diesel-powered equipment operating in a given area at the same time;
- Relocate significantly impacted sensitive receptors;

[97] See, e.g., Michael C. Block, Application of Diesel Emissions Reduction Controls for Nonroad Construction Equipment, June 5, 2007 (e.g., CAT/Johnson Matthey (JMI) passive diesel particulate filter, p. 15-17); https://www.cdc.gov/niosh/mining%5C/UserFiles/workshops/dieselelko2007/2c-Block.pdf.

[98] See, e.g., U.S. Department of Labor, Hazard Alert: Diesel Exhaust/Diesel Particulate Matter; https://www.osha.gov/dts/hazardalerts/diesel_exhaust_hazard_alert.html; U.S. EPA, Reducing Emissions from Construction Equipment, January 2006; https://nepis.epa.gov/Exe/tiff2png.exe/P10039SN.PNG?-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C06THRU10%5CTIFF%5C00000342%5CP10039SN.TIF.

[99] MECA, What Is Retrofit?; http://www.meca.org/diesel-retrofit/what-is-retrofit.

[100] H. Fan, 2017; Exhibit 19.

[101] CARB 2020 in footnote 83.

30

D-189 cont.

- Require routine maintenance of construction equipment;
- Hire only highly skilled equipment operators; and
- Retain an on-site construction manager to assure all mitigation is achieved in practice.

D-190

3. VALLEY FEVER IMPACTS ARE SIGNIFICANT AND UNMITIGATED

The DEIR discloses that the Project is located in an area designated as "suspected endemic" for Valley Fever and that incidence rates for San Luis Obispo County per year per 100,000 population are among the highest rates in the state during 2011 to 2018. The DEIR also discloses that construction fugitive dust-causing activities have the potential to disperse Valley Fever spores, concluding "the potential for additional Valley Fever infections is high." However, the DEIR erroneously concludes, with no support, that "[m]itigation measures that reduce fugitive dust will also reduce the chances of dispersing CI spores."[102] This unsupported assertion is misleading and wrong.

Valley Fever, "coccidioidomycosis" or "cocci," is an infectious disease caused by inhaling the spores of *Coccidioides ssp.*[103,104] The Project area is not just "suspected endemic" but is endemic for Valley Fever,[105] confirmed with the highest infection rate in the County and one of the highest in California. The San Luis Obispo County Public Health Department reports that "people can get Valley Fever anywhere in San Luis Obispo County. More cases occur in the north and east parts of the county, where conditions are often more dusty and windy."[106] Figure 10A. The Project is located in these highly endemic areas. In fact, the most highly endemic area is zip code 93446, Atascadero (Figure 10B), where most of the sensitive receptors adjacent to construction work are located.[107] Thus, not only construction workers, but also residents near construction work in zip code 93446 are at risk of Valley Fever.

---

[102] DEIR, p. 4.3-9, pdf 427.

[103] Two species of *Coccidioides* are known to cause Valley Fever: C. *immitis*, which is typically found in California, and C. *posadasii*, which is typically found outside California. See Centers for Disease Control, Coccidioidomycosis (Valley Fever), Information for Health Professionals; https://www.cdc.gov/fungal/diseases/coccidioidomycosis/health-professionals.html.

[104] D. R. Hospenthal, Coccidioidomycosis and Valley Fever, Medscape, updated August 27, 2019; https://emedicine.medscape.com/article/215978-overview.

[105] California Department of Public Health, Valley Fever Fact Sheet; https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ValleyFeverFactSheet.pdf.

[106] SLO Public Health Department, Valley Fever; https://www.slocleanair.org/air-quality/valleyfever.php.

[107] Sensitive receptors listed in PEA, Appendix A, all with addresses in zip code 93446.

D-190 cont.

Figure 10A: San Luis Obispo County Valley Fever Rates per 100,000, 2005–2015[108]

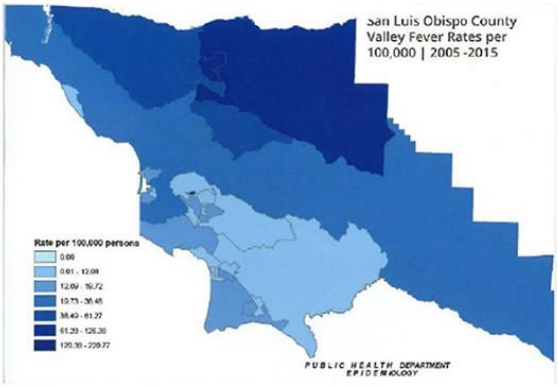
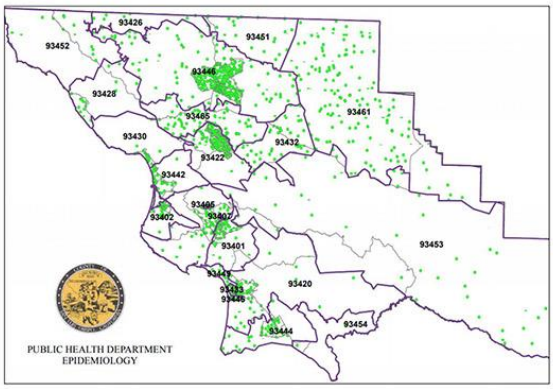


Figure 10B: San Luis Obispo County Valley Fever Cases 2005-2015[109]



San Luis Obispo County had more occupational Valley Fever outbreaks in 2011-2014 than any other county in California. Table 2.[110]

[108] Ibid.

[109] Valley Fever Incidence Map; https://www.slocounty.ca.gov/Departments/Health-Agency/Public-Health/Forms-Documents/Epidemiology-and-Disease-Surveillance/Valley-Fever-Incidence_MAP_2005-2015.pdf.

[110] Marie A. de Perio et al., Occupational Coccidioidomycosis Surveillance and Recent Outbreaks in California, *Medical Mycology*, v. 57, issue Supplement 1, February 2019, pp. S41-S45; https://academic.oup.com/mmy/article/57/Supplement_1/S41/5300137.

32

D-190 cont.

Table 2: Summary of Work-Associated Outbreaks of Coccidioidomycosis – California, 2007–2014

Outbreak	Persons with clinically compatible illness	Laboratory confirmed cases	Hospitalizations	Disseminated disease
San Luis Obispo County, 2007[3,7]	10	8	0	1
Kern County, 2008	9	8	2	2
Ventura County, 2012[10]	10	5	2	1
San Luis Obispo County, 2011–2014[11,12]	133	44	9	2

Clinical manifestations of Valley Fever range from influenza-like illness to progressive pulmonary disease and, in 1% of infections, potentially fatal disseminated disease.[111] When soil containing this fungus is disturbed by activities such as digging, vehicle use, construction, dust storms, or during earthquakes, the fungal spores become airborne.[112,113] Valley Fever outbreaks during construction in California have been widely reported.[114,115,116,117,118,119,120] Spores raised during construction and/or wind

[111] Cummings et al., Point-Source Outbreak of Coccidioidomycosis in Construction Workers, *Epidemiology and Infection*, v. 138, no. 4, 2010, pp. 507-511, 2010 (Exhibit 6).

[112] California Department of Public Health, Valley Fever Fact Sheet, January 2016; https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ValleyFeverFactSheet.pdf. *See also* G. Sondermeyer Cooksey et al., Update on Coccidioidomycosis in California, pp. 20-21, *Medical Board of California Newsletter*, v. 141, Winter 2017; https://www.mbc.ca.gov/Download/Newsletters/newsletter-2017-01.pdf.

[113] Cummings et al. 2010 (Exhibit 6).

[114] Jason A. Wilken et al., Coccidioidomycosis among Workers Constructing Solar Power Farms, California, USA, 2011–2014, *Emerging Infectious Diseases*, v. 21, no. 11, November 2015; https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4622237/.

[115] The Associated Press, Valley Fever Hits 28 at Calif. Solar Plant Sites, *The San Diego Union-Tribune*, May 1, 2013; http://www.sandiegouniontribune.com/sdut-valley-fever-hits-28-at-calif-solar-plant-sites-2013may01-story.html.

[116] G. L. Sondermeyer Cooksey et al., Dust Exposure and Coccidioidomycosis Prevention Among Solar Power Farm Construction Workers in California, *American Journal of Public Health*, August 2017 (Exhibit 7).

[117] Rupal Das et al., Occupational Coccidioidomycosis in California, Outbreak Investigation, Respirator Recommendations, and Surveillance Findings, *Journal of Occupational and Environmental Medicine*, May 2012, vol. 54, no. 5, pp. 564-571 (Exhibit 8).

[118] D. Pappagianis and the Coccidioidomycosis Serology Laboratory, Coccidioidomycosis in California State Correctional Institutions, *Annals of the New York Academy of Sciences*, v. 1111, pp. 103-111, 2007 (Exhibit 9).

[119] Cummings et al. 2010 (Exhibit 6).

[120] CDPH, Preventing Work-Related Coccidioidomycosis (Valley Fever), June 2013; https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf.

33

D-190 cont.

storms,[121] which are common in the Project area (Figure 11), can result in significant worker and public health impacts. The spores are usually found 2 to 12 inches below the surface. The infectious dose is very low, typically less than 10 spores.[122]

Figure 11: Typical Dust Storm in Project Area[123]

"Workers disturbing soil in areas where Valley Fever is common are at highest risk," with construction workers topping the list.[124] Figure 12 shows an example from the California Department of Public Health (CDPH) website.[125]

Figure 12: Construction Crew Valley Fever

In October 2007, a construction crew excavated a trench for a new water pipe. Within three weeks, 10 of 12 crew members developed coccidioidomycosis (Valley Fever), an illness with pneumonia and flu-like symptoms. Seven of the 10 had abnormal chest x-rays, four had rashes, and one had an infection that had spread beyond his lungs and affected his skin. Over the next few months, the 10 ill crew members missed at least 1660 hours of work and two workers were on disability for at least five months.

[121] P. L. Williams, D. L. Sable, P. Mendez, and L. T. Smyth, Symptomatic Coccidioidomycosis Following a Severe Natural Dust Storm: An Outbreak at the Naval Air Station, Lemoore, Calif, *Chest*, pp. 566-70, 1979; https://pubmed.ncbi.nlm.nih.gov/498830/.

[122] Jennifer McNary and Mary Deems, Preventing Valley Fever in Construction Workers, March 4, 2020, pdf 10; https://www.safetybayarea.com/media/2020-3A.pdf.

[123] McNary and Deems, 2020, pdf 50.

[124] Wilken et al. 2015, pdf 19.

[125] CDPH; http://elcosh.org/document/3684/d001224/preventing+work-related+coccidioidomycosis+(valley+fever).html.

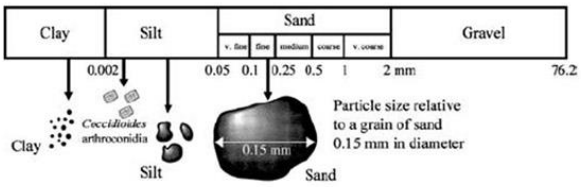
34

D-190 cont.

However, the potentially exposed population is much larger than construction workers because the non-selective raising of dust during Project construction will carry the very small spores, 0.002–0.005 millimeters ("mm") (Figure 13), into off-site areas, potentially exposing large non-construction worker populations.[126,127] Many of the Project components, for example, are adjacent to sensitive receptors, including residential areas, schools, and parks. Fugitive dust containing Valley Fever spores from Project construction could result in significant public health impacts due to the proximity of numerous sensitive receptors.[128] Figure 10B. The DEIR failed to identify this significant risk.

Valley Fever spores are 1,250 to 5,000 times smaller than fugitive dust raised during construction.[129] Figure 13. Thus, standard construction dust mitigation measures specified in DEIR Appendix F are not effective at controlling them.

Figure 13: Size of Cocci Spores Compared to Soil Particles (in mm)[130]



Valley Fever spores can be carried on the winds into surrounding areas, exposing farm and vineyard workers, students at nearby schools, and residents adjacent to many of the construction sites. Valley Fever spores, for example, have been documented to travel as far as 500 miles,[131] and thus dust raised during construction could potentially expose a large number of people hundreds of miles away.

---

[126] Schmelzer and Tabershaw, 1968, p. 110; Pappagianis and Einstein, 1978 (Exhibit 17).

[127] Pappagianis and Einstein, 1978, p. 527 ("The northern areas were not directly affected by the ground level windstorm that had struck Kern County but the dust was lifted to several thousand feet elevation and, borne on high currents, the soil and arthrospores along with some moisture were gently deposited on sidewalks and automobiles as "a mud storm" that vexed the residents of much of California." The storm originating in Kern County, for example, had major impacts in the San Francisco Bay Area and Sacramento) Exhibit 17.

[128] PEA, Appendix A.

[129] Relative to PM2.5: 2.5 mm/0.002 mm **= 1,250**; Relative to PM10 = 10 mm/0.002 mm **= 5,000.**

[130] Frederick S. Fisher, Mark W. Bultman, and Demosthenes Pappagianis, Operational Guidelines (version 1.0) for Geological Fieldwork in Areas Endemic for Coccidioidomycosis (Valley Fever), U.S. Geological Survey Open-File Report 00-348, 2000, Figure 3; https://pubs.usgs.gov/of/2000/0348/.

[131] David Filip and Sharon Filip, Valley Fever Epidemic, Golden Phoenix Books, 2008, p. 24 (Exhibit 15).

35

3.1. A Conventional Dust Control Plan Is Inadequate to Address Potential Health Risks Posed by Exposure to Valley Fever

D-191

Conventional dust control measures, such as those included in DEIR Appendix F, are not effective at controlling Valley Fever[132] because they largely focus on visible dust or larger dust particles—the PM10 fraction—not the very fine particles where the Valley Fever spores are found. While dust exposure is one of the primary risk factors for contracting Valley Fever and dust-control measures are an important defense against infection, it is important to note that PM10 and visible dust, the targets of conventional dust control mitigation, are only indicators that *Coccidioides ssp.* spores may be airborne in a given area. Freshly generated dust clouds usually contain a larger proportion of the more visible coarse particles, PM10 (</=0.01 mm), compared to cocci spores (0.002 mm). However, these larger particles settle more rapidly and the remaining fine respirable particles may be difficult to see and are not controlled by conventional dust control measures.

Spores of *Coccidioides ssp.* have slow settling rates in air due to their small size (0.002 mm), low terminal velocity, and possibly also due to their buoyancy, barrel shape, and commonly attached empty hyphae cell fragments.[133] Thus spores, whose size is well below the limits of human vision, may be present in air that appears relatively clear and dust free. Such ambient, airborne spores with their low settling rates can remain aloft for long periods and be carried hundreds of miles from their point of origin. Thus, implementation of conventional dust control measures will not provide sufficient protection for both on-site workers and the general public.

Further, infections by *Coccidioides ssp.* frequently have a seasonal pattern with infection rates that generally spike in the first few weeks of hot dry weather that follow extended milder rainy periods. In California, infection rates are generally higher during the hot summer months, especially if weather patterns bring the usual winter rains between November and April.[134] The majority of cases of Valley Fever accordingly occur during the months of June through December, which are typically periods of peak construction activity.

---

[132] *See, e.g.*, Cummings and others, 2010, p. 509 (Exhibit 6); Schneider et al., 1997, p. 908 ("Primary prevention strategies (*e.g.*, dust-control measures) for coccidioidomycosis in endemic areas have limited effectiveness.") Exhibit 16.

[133] Fisher et al. 2007.

[134] Ibid.

D-192

3.2. The DEIR Fails to Require Adequate Mitigation for Valley Fever

The risk of Valley Fever at construction sites in California has been known for decades, and is particularly significant in San Luis Obispo County where the Project will be located. Adjacent Ventura County published Valley Fever construction mitigation measures in 2003, to be implemented in addition to conventional construction mitigation, as follows:[135]

1. Restrict employment to persons with positive coccidioidin skin tests (since those with positive tests can be considered immune to reinfection).
2. Hire crews from local populations where possible, since it is more likely that they have been previously exposed to the fungus and are therefore immune.
3. Require crews to use respirators during project clearing, grading, and excavation operations in accordance with California Division of Occupational Safety and Health regulations.
4. Require that the cabs of grading and construction equipment be air-conditioned.
5. Require crews to work upwind from excavation sites.
6. Pave construction roads.
7. Where acceptable to the fire department, control weed growth by mowing instead of discing, thereby leaving the ground undisturbed and with a mulch covering.
8. During rough grading and construction, the access way into the project site from adjoining paved roadways should be paved or treated with environmentally-safe dust control agents.

At two photovoltaic solar energy projects in San Luis Obispo County, Topaz Solar Farm[136] and California Valley Solar Ranch,[137] 44 construction workers contracted Valley Fever, including 13 electricians/linemen/wiremen; 11 equipment operators; 6 laborers; 5 carpenters/ironworkers/millwrights/mechanics; 4 managers/superintendents, and 3 others. Of these, 39% visited an emergency room, 20% were hospitalized, and 77% missed work.[138,139] Exposures included "performing soil-disruptive work, such as digging trenches, and working in a trench. In addition, workers reported working in a dust cloud or dust storm, and operating heavy

[135] Ventura County Air Quality Assessment Guidelines, October 2003, pp. 7-7 to 7-8; http://www.vcapcd.org/pubs/Planning/VCAQGuidelines.pdf.

[136] U.S. Department of Energy, Final Environmental Impact Statement, Volume 1, Loan Guarantee to Royal Bank of Scotland for Construction and Startup of the Topaz Solar Farm, San Luis Obispo County, California, August 2011; https://www.energy.gov/sites/prod/files/Topaz-FEIS-Volume-I-PDF-Version.pdf.

[137] U.S. Department of Energy, Final Environmental Assessment, Volume 1, Loan Guarantee to High Plains II, LLC for the California Valley Solar Ranch Project in San Luis Obispo County and Kern County, California, August 2011; California Valley Solar Ranch; https://www.energy.gov/sites/prod/files/EA-1840-FEA-vol1-2011.pdf.

[138] McNary and Deems, 2020, pdf 22.

[139] Julie Cart, Officials Study Valley Fever Outbreak at Solar Power Projects, Los Angeles Times, April 30, 2013; https://www.latimes.com/local/la-xpm-2013-apr-30-la-me-solar-fever-20130501-story.html.

37

D-192 cont.

equipment without enclosed cabs, closed windows, and air-conditioned with high-efficiency particle (HEPA) filtration."[140]

Both of the EISs for these projects recognized Valley Fever impacts and included mitigation[141] that was much more comprehensive than the short list of conventional PM10 dust mitigation in the DEIR. The EISs for these projects contained no Valley Fever construction mitigation, recommending only conventional fugitive dust control measures. The Topaz Farm EIS, for example, recommended only to "reduce fugitive dust,"[142] concluding (as for the Project) with no analysis at all, that implementation of conventional dust control measures would reduce Valley Fever impacts to less than significant.[143] The California Valley Solar Ranch EIS only required "dust control measures" and provided no information on Valley Fever to workers and nearby residents.[144]

The Topaz Solar Farm EIS recommended the following dust control measures that are much more extensive than the short list in the Project EIR:

[140] de Perio et al., 2019, p. S-43.

[141] Topaz EIS, pp. 2-65/66, MM AQ-1.3 and California Valley Solar Ranch FEIR,, p. 3-126, 3-128 ("Dust control measures and the integration of San Luis Obispo Health Agency Interim Valley Fever Recommendations for Workers into construction operations would reduce exposure to Valley Fever. Therefore, effects on public or occupational health related to disease vectors would be negligible and not significant.").

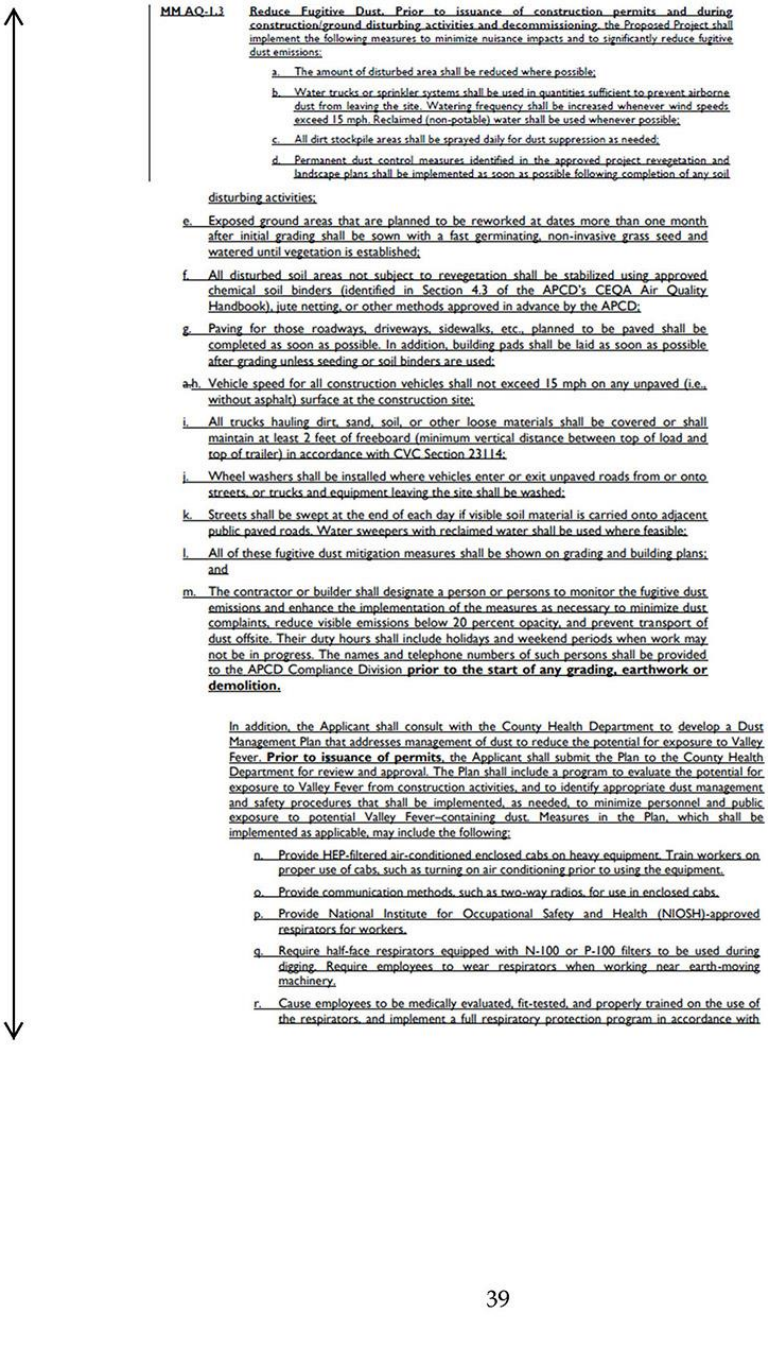
[142]Topaz EIS, Volume I, March 2011, Table ES-4, AQ-1.3.

[143] Ibid., p. ES-16.

[144] Table 2-1, pdf 34 and 217.

38

D-192 cont.



MM AQ-1.3 **Reduce Fugitive Dust. Prior to issuance of construction permits and during construction/ground disturbing activities and decommissioning, the Proposed Project shall implement the following measures to minimize nuisance impacts and to significantly reduce fugitive dust emissions:**

a. The amount of disturbed area shall be reduced where possible;

b. Water trucks or sprinkler systems shall be used in quantities sufficient to prevent airborne dust from leaving the site. Watering frequency shall be increased whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water shall be used whenever possible;

c. All dirt stockpile areas shall be sprayed daily for dust suppression as needed;

d. Permanent dust control measures identified in the approved project revegetation and landscape plans shall be implemented as soon as possible following completion of any soil disturbing activities;

e. Exposed ground areas that are planned to be reworked at dates more than one month after initial grading shall be sown with a fast germinating, non-invasive grass seed and watered until vegetation is established;

f. All disturbed soil areas not subject to revegetation shall be stabilized using approved chemical soil binders (identified in Section 4.3 of the APCD's CEQA Air Quality Handbook), jute netting, or other methods approved in advance by the APCD;

g. Paving for those roadways, driveways, sidewalks, etc., planned to be paved shall be completed as soon as possible. In addition, building pads shall be laid as soon as possible after grading unless seeding or soil binders are used;

a-h. Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved (i.e., without asphalt) surface at the construction site;

i. All trucks hauling dirt, sand, soil, or other loose materials shall be covered or shall maintain at least 2 feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with CVC Section 23114;

j. Wheel washers shall be installed where vehicles enter or exit unpaved roads from or onto streets, or trucks and equipment leaving the site shall be washed;

k. Streets shall be swept at the end of each day if visible soil material is carried onto adjacent public paved roads. Water sweepers with reclaimed water shall be used where feasible;

l. All of these fugitive dust mitigation measures shall be shown on grading and building plans; and

m. The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints, reduce visible emissions below 20 percent opacity, and prevent transport of dust offsite. Their duty hours shall include holidays and weekend periods when work may not be in progress. The names and telephone numbers of such persons shall be provided to the APCD Compliance Division **prior to the start of any grading, earthwork or demolition.**

In addition, the Applicant shall consult with the County Health Department to develop a Dust Management Plan that addresses management of dust to reduce the potential for exposure to Valley Fever. **Prior to issuance of permits**, the Applicant shall submit the Plan to the County Health Department for review and approval. The Plan shall include a program to evaluate the potential for exposure to Valley Fever from construction activities, and to identify appropriate dust management and safety procedures that shall be implemented, as needed, to minimize personnel and public exposure to potential Valley Fever–containing dust. Measures in the Plan, which shall be implemented as applicable, may include the following:

n. Provide HEP-filtered air-conditioned enclosed cabs on heavy equipment. Train workers on proper use of cabs, such as turning on air conditioning prior to using the equipment.

o. Provide communication methods, such as two-way radios, for use in enclosed cabs.

p. Provide National Institute for Occupational Safety and Health (NIOSH)-approved respirators for workers.

q. Require half-face respirators equipped with N-100 or P-100 filters to be used during digging. Require employees to wear respirators when working near earth-moving machinery.

r. Cause employees to be medically evaluated, fit-tested, and properly trained on the use of the respirators, and implement a full respiratory protection program in accordance with

39

D-192 cont.

the applicable Cal/OSHA Respiratory Protection Standard (8 CCR 5144).

s. Provide separate, clean eating areas with hand-washing facilities.

t. Thoroughly clean equipment, vehicles, and other items before they are moved offsite to other work locations.

u. Train workers to recognize the symptoms of Valley Fever, and to promptly report suspected symptoms of work-related Valley Fever to a supervisor.

v. Work with a medical professional to develop a protocol to medically evaluate employees who develop symptoms of Valley Fever.

w. Work with a medical professional, in consultation with the County Health Department, to develop an educational handout for on-site workers and surrounding residents within three miles of the project site, and include the following information on Valley Fever: what are the potential sources/ causes, what are the common symptoms, what are the options or remedies available should someone be experiencing these symptoms, and where testing for exposure is available. **Prior to construction permit issuance**, this handout shall have been created by the Applicant and reviewed by the County. **No less than 30 days prior to any work commencing**, this handout shall be mailed to all existing residences within three miles of the project boundaries.

Reduce Fugitive Dust. Prior to issuance of construction permits and during construction/ground disturbing activities and decommissioning, the Proposed Project shall implement the following measures to minimize nuisance impacts and to significantly reduce fugitive dust emissions:

a. The amount of disturbed area shall be reduced where possible;

b. Water trucks or sprinkler systems shall be used in quantities sufficient to prevent airborne dust from leaving the site. Watering frequency shall be increased whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water shall be used whenever possible;

c. All dirt stockpile areas shall be sprayed daily for dust suppression as needed;

d. Permanent dust control measures identified in the approved project revegetation and landscape plans shall be implemented as soon as possible following completion of any soil

Presumably, these measures, which are far more extensive than the few air quality mitigation measures included in DEIR APM AIR-3, were inadequate and/or not followed.

D-193

3.3. Recommended Mitigation to Control Valley Fever

In response to these outbreaks within San Luis Obispo County,[145] its Public Health Department, in conjunction with the California Department of Public Health,[146] developed recommendations to limit exposure to Valley Fever based on scientific information from the published literature. The recommended measures, which failed to control Valley Fever, go far beyond the conventional dust control measures included in the DEIR.[147] Controls recommended to minimize workers' dust exposure and risk of Valley Fever in endemic areas based on the experience at these two solar sites included

[145] McNary and Deems, 2020, pdf 16 *et seq.*

[146] California Department of Public Health, Preventing Work-Related Coccidioidomycosis (Valley Fever), June 2013, pp. 4-7; https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf. See also Wilken et al., 2015, and Sondermeyer Cooksey et al. (Exhibit 7).

[147] DEIR, Appendix F.

40

D-193 cont.

the following measures, none of which is required by the DEIR's construction mitigation measures:[148,149]

Preventing Valley Fever exposure

There is no vaccine to prevent Valley Fever. Employers can reduce worker exposure by incorporating the following elements into the company's Injury and Illness Prevention Program and project-specific health and safety plans:

1. Determine if the worksite is in an area where Valley Fever is endemic (consistently present). Check with your local health department to determine whether cases have been known to occur in the proximity of your work area. See the map on page 2 to determine whether your company will be working in an endemic county.
2. Train workers and supervisors on the location of Valley Fever endemic areas, how to recognize symptoms of illness (see page 3), and ways to minimize exposure. Encourage workers to report respiratory symptoms that last more than a week to a crew leader, foreman, or supervisor.
3. Limit workers' exposure to outdoor dust in disease-endemic areas. For example, suspend work during heavy wind or dust storms and minimize amount of soil disturbed.
4. When soil will be disturbed by heavy equipment or vehicles, wet the soil before disturbing it and continuously wet it while digging to keep dust levels down.
5. Heavy equipment, trucks, and other vehicles generate heavy dust. Provide vehicles with enclosed, air-conditioned cabs and make sure workers keep the windows closed. Heavy equipment cabs should be equipped with high efficiency particulate air (HEPA) filters. Two-way radios can be used for communication so that the windows can remain closed but allow communication with other workers.
6. Consult the local Air Pollution Control District regarding effective measures to control dust during construction. Measures may include seeding and using soil binders or paving and laying building pads as soon as possible after grading.
7. When digging a trench or fire line or performing other soil-disturbing tasks, position workers upwind when possible.
8. Place overnight camps, especially sleeping quarters and dining halls, away from sources of dust such as roadways.
9. When exposure to dust is unavoidable, provide NIOSH-approved ***respiratory protection*** with particulate filters rated as N95, N99, N100, P100, or HEPA. Household materials such as washcloths, bandanas, and handkerchiefs do not protect workers from breathing in dust and spores.

Type of Control: Engineering and Work Practice Controls (to control dust at the source or isolate worker from exposure.)

Actions: Minimize exposure to outdoor dust:

- Suspend (stop) work in dust storms or high winds.
- Minimize the amount of digging by hand. Instead, use heavy equipment with operator in an enclosed, airconditioned, HEPA-filtered cab.

Continuously wet the soil before and while digging or moving the earth. Landing zones for helicopters and areas where bulldozers, graders, or skid steers operate are examples where wetting the soil is necessary.

When digging in soil is required, train workers to reduce the amount of dust inhaled by staying upwind when possible.

Type of Control: Administrative Controls (to increase hazard awareness and knowledge of safe work practices and select safer work practices.)

Actions: Train workers and supervisors on:

- Distribution of endemic areas
- Symptoms and signs, and need to report to supervisor to obtain medical evaluation
- People at highest risk of serious disease
- Effective controls, including proper use of equipment.

Type of Control: Personal Protective Equipment (to decrease quantity of fungal spores inhaled.)

Actions: Provide respirators when digging or working near earthmoving trucks or equipment:

- Powered air-purifying respirator (PAPR) with high efficiency particulate air (HEPA) filter or
- Full-face respirator with particulate filter or
- Half-mask respirator with particulate filter and
- Implement a comprehensive respirator program including medical clearance, training, fit testing, and procedures for cleaning and maintaining respirators.

Provide coveralls to prevent street clothes from being contaminated with fungal spores and then taken home.

Type of Control: Clean up (to decrease quantity of fungal spores inhaled.)

Actions: Provide lockers and require change of clothing and shoes at worksite so workers don't take dust and spores home.

Wash equipment before moving offsite.

Type of Control: Medical care for disease recognition and prompt, appropriate treatment.

Actions: Contract with local medical clinics

- Provide prompt evaluation and care
- Make sure clinic has a protocol for evaluation, follow-up, and treatment of Valley Fever

Make sure in-house physician is aware of work in Valley Fever endemic areas.

Preventing transport of spores

- **Clean tools, equipment, and vehicles with water to remove soil before transporting offsite** so that any spores present won't be re-suspended in air and inhaled at a later time.
- **Provide workers with coveralls or disposable Tyvek™ daily**. At the end of the work day, require workers to remove their work clothes at the worksite.
- **Keep street clothes and work clothes separate by providing separate lockers or other storage areas**. If possible, store work boots at the worksite; otherwise, have workers use a boot wash before getting into their vehicles.
- **Encourage workers to shower and wash their hair at the workplace** (if at a fixed location) or as soon as they get home.

[148] CDPH, Preventing Work-Related Coccidioidomycosis (Valley Fever); https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf.

[149] McNary and Deems, 2020, pdf 30-45.

41

D-194

In a more recent Valley Fever outbreak among solar plant construction workers in Monterey County, public health officials conducted a site visit to the solar farm to observe and interview workers and employers about work practices, dust control, and use of protective equipment; review training materials; and discuss prevention strategies. The visit confirmed dust control issues, serious lapses in use of respiratory protection, insufficient Coccidioidomycosis employee training, and no system for tracking or reporting illness. Thus, in November 2017, the CDPH issued prevention recommendations before the start of the second construction phase, which was scheduled to continue through the end of 2018. Recommendations for employers included:[150]

(1) reducing dust exposure by ensuring ample and efficient water truck capacity to wet soil;

(2) using only heavy equipment with enclosed cabs and temperature-controlled, high efficiency particulate air–filtered air;[151]

(3) providing clean coveralls daily to employees who disturb soil;

(4) implementing a mandatory respiratory protection program (8 CCR §5144, Respiratory Protection: https://www.dir.ca.gov/title8/5144.html) that specifically requires National Institute for Occupational Safety and Health–approved respirators be worn while performing or in the near vicinity of job activities that create airborne dust;

(5) developing effective Valley Fever training for all employees, including ways to reduce exposure, how to recognize symptoms, and where to seek care; and

(6) tracking and reporting of all suspected Valley Fever illnesses that occur at the worksite to the Imperial County Public Health Department.

The study concluded that prevention methods need to be better incorporated into the planning and monitoring of construction projects in areas with endemic *Coccidioides* (e.g., by involving public health practitioners in pre-project reviews). Specifically, the following was recommended: "Outdoor workers in these areas should

[150] R. L. Laws, G. S. Cooksey, S. Jain and others, Coccidioidomycosis Outbreak Among Workers Constructing a Solar Power Farm – Monterey County, California, 2016–2017, *Morbidity and Mortality Weekly Report*, August 24, 2018, v. 67, no. 33, pp. 931-934; https://www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6733a4-H.pdf.

[151] De Perio et al.'s (p. S43) analysis of outbreaks at solar farms in San Luis Obispo County concluded that "frequently performing soil-disruptive activities was a risk factor only for employees who did not frequently use respiratory protection."

42

D-194 cont.

be trained by employers about the potential for infection, how to limit dust exposure, how to recognize symptoms, where to seek care, and how to ask a health care provider to assess them for coccidioidomycosis. Clinicians should inquire about occupational history and should suspect coccidioidomycosis in patients who are outdoor workers in areas with endemic *Coccidioides* and who have a clinically compatible illness."[152]

D-195

Similarly, the California Department of Public Health (CDPH) has summarized recommendations to control Valley Fever on its website.[153] The recommended measures are summarized in Table 3.

Table 3: CDPH Controls to Minimize Worker Dust Exposure

Summary of Controls to Minimize Workers' Dust Exposure and Risk of Valley Fever in Endemic Areas

Type of Control	Actions
Engineering and Work Practice Controls ➤ *to control dust at the source or isolate worker from exposure.*	Minimize exposure to outdoor dust: • Suspend (stop) work in dust storms or high winds. • Minimize the amount of digging by hand. Instead, use heavy equipment with operator in an enclosed, air-conditioned, HEPA-filtered cab. Continuously wet the soil before and while digging or moving the earth. Landing zones for helicopters and areas where bulldozers, graders, or skid steers operate are examples where wetting the soil is necessary. When digging in soil is required, train workers to reduce the amount of dust inhaled by staying upwind when possible.
Administrative Controls ➤ *to increase hazard awareness and knowledge of safe work practices and select safer work practices.*	Train workers and supervisors on: • Distribution of endemic areas • Symptoms and signs, and need to report to supervisor to obtain medical evaluation • People at highest risk of serious disease • Effective controls, including proper use of equipment.
Personal Protective Equipment ➤ *to decrease quantity of fungal spores inhaled.*	Provide respirators when digging or working near earth-moving trucks or equipment: • Powered air-purifying respirator (PAPR) with high efficiency particulate air (HEPA) filter or • Full-face respirator with particulate filter or • Half-mask respirator with particulate filter and • Implement a comprehensive respirator program including medical clearance, training, fit testing, and procedures for cleaning and maintaining respirators. Provide coveralls to prevent street clothes from being contaminated with fungal spores and then taken home.
Clean up ➤ *to decrease quantity of fungal spores inhaled.*	Provide lockers and require change of clothing and shoes at worksite so workers don't take dust and spores home. Wash equipment before moving offsite.
Medical care for disease recognition and prompt, appropriate treatment.	Contract with local medical clinics • Provide prompt evaluation and care • Make sure clinic has a protocol for evaluation, follow-up, and treatment of Valley Fever Make sure in-house physician is aware of work in Valley Fever endemic areas.

D-196

More recently, the California legislature has passed Assembly Bill No. 203 (AB 203),[154] which requires construction employers in counties where Valley Fever is highly

[152] Laws et al., p. 934.

[153] CDPH, Preventing Work-Related Coccidioidomycosis (Valley Fever); https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf.

43

D-196 cont.

endemic to provide effective awareness training on Valley Fever to all employees annually and before an employee begins work that is reasonably anticipated to cause substantial dust disturbance. Section 6709(a) of this Act applies to construction employers with employees working at worksites in counties where Valley Fever is "highly endemic," which include San Luis Obispo County. The DEIR is silent on this rule. It should be recognized and included as a Project mitigation measure. AB 203 is a step in the right direction but is not adequate mitigation for the Project's Valley Fever construction impacts, which are highly significant as awareness training does not mitigate the impact.

3.4. The DEIR's Fugitive Dust Mitigation Program Will Not Control Valley Fever Spores

D-197

The DEIR's fugitive dust control measures proposed in APM AIR-3[155] do not include any of the mitigation measures identified in Comment 3.3 designed to control worker exposure to tiny Valley Fever spores. The only fugitive dust control measures required in the DEIR are:[156]

APM AIR-3. Minimize Fugitive Dust.

Reduce the amount of the disturbed area where possible.

- Use water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site.
- All dirt stockpile areas should be sprayed daily as needed.
- All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by San Luis Obispo Air Pollution Control District (SLOCAPCD).
- Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface.

[154] Assembly Bill No. 203, Chapter 712, Occupational Safety and Health: Valley Fever: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB203.

[155] DEIR, Appendix F, pp. F-16/17.

[156] DEIR, Appendix F, p. F-17/18.

D-197 cont.

- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114.
- Sweep streets at the end of each day if visible soil material extending over 50 feet is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where possible.

These are all standard construction fugitive dust (PM10) mitigation measures, required when Valley Fever is not anticipated. They include some of the mitigation measures in the EIS for the Topaz Solar Farm, where a major Valley Fever outbreak occurred.[157] However, the Topaz EIS contained even more conventional fugitive dust measures plus some mitigation measures directed specially at Valley Fever.[158] In spite of the Topaz measures, a major outbreak still occurred, indicating the requirement for more aggressive measures and on-site oversight to assure that they are implemented. As discussed below, none of the dust control mitigation measures in the DEIR are adequate to control fugitive dust or to address tiny Valley Fever spores as discussed below.

None of the mitigation measures in APM AIR-3 will significantly control Valley Fever spores,[159,160] which are orders of magnitude smaller than conventional construction dust. Thus, conventional dust control measures are not effective. Compliance with fugitive dust regulations developed by air districts where Valley Fever is an acknowledged issue is a far more effective method to control Valley Fever spores than the control measures in the DEIR. These regulations include Maricopa County Rule 310,[161] SCAQMD Rule 403,[162,163] and SJVAPCD Rule 8021.[164] However,

[157] Department of Energy, Final Environmental Impact Statement, DOE Loan Guarantee for the Topaz Solar Farm, August 2011, Table 2-10, Conditions of Approval, MM AQ-1.3, pp. 2-64-65; https://www.energy.gov/sites/prod/files/Topaz-FEIS-Volume-I-PDF-Version.pdf.

[158] Table 2-10, MM AQ-1.3; https://www.energy.gov/sites/prod/files/Topaz-FEIS-Volume-I-PDF-Version.pdf.

[159] South Coast Air Quality Management District (SCAQMD), Fugitive Dust, Fugitive Dust Table XI-A; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust.

[160] Western Governors' Association, WRAP Fugitive Dust Handbook, September 7, 2006 (WRAP Handbook); https://www.wrapair.org/forums/dejf/fdh/. Exhibit 10.

[161] Maricopa County Rule 310, Fugitive Dust from Dust-Generating Operations; https://www.maricopa.gov/DocumentCenter/View/5354/Rule-310---Fugitive-Dust-from-Dust-Generating-Operations-PDF?bidId=.

[162] SCAQMD Rule 403; http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf.

45

D-197 cont. even these rules do not go far enough. I recommend the following additional measures, discussed below.

3.4.1. Reduce Disturbed Area

D-198 The DEIR requires that the amount of disturbed area should be reduced "where possible." Valley Fever can only be controlled by eliminating disturbed areas. This is clearly not feasible at an active construction site. Instead, dust suppressants, such as polymer emulsions, should be applied to disturbed areas upon completion of disturbance (e.g., demolition).[165] Further, groundcover should be replaced "as quickly as possible" in disturbed areas.[166]

3.4.2. Water Trucks/Sprinkler Systems

D-199 This measure requires the use of "water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site." This is too general to be implemented and enforced. It would allow water trucks to drive along roads once a day or less frequently without accessing off-road areas where soil is being disturbed. At a minimum, water should be applied every 4 hours within 100 feet of a structure being demolished, every 3 hours to disturbed areas and to disturbed soils after demolition is completed, and at the end of each day of cleanup.[167] Soil should be wet both before and while digging and workers should stay upwind of digging, when feasible.[168] Sprinkler systems should be specified for areas inaccessible by water trucks. Further, watering frequency should be increased when wind speeds exceed levels known to raise dust in the local area,[169] typically around 15 mph at the Project site. An on-site wind measuring station should be required to monitor wind speed.

This measure fails to specify the minimum soil moisture that will be maintained by water trucks. The SCAQMD and WRAP Handbooks recommend a minimum soil

---

[163] SCAQMD Rule 403 Implementation Handbook; http://www.aqmd.gov/docs/default-source/compliance/rule-403-dust-control-forms/rule-403-fugitive-dust-implementation-handbook-0120km-arc.pdf?sfvrsn=6.

[164] SJVAPCD Rule 8031, Bulk Materials; https://www.valleyair.org/rules/currntrules/r8031.pdf.

[165] SCAQMD, Table XI-A.

[166] SCAQMD, Table XI-A.

[167] SCAQMD, Table XI-A and WRAP Handbook, Table 3-7.

[168] CDPH, Preventing Valley Fever in Construction Workers, March 2020, pdf 44; https://www.safetybayarea.com/media/2020-3A.pdf.

[169] SCAQMD, Table XI-A.

D-199 cont.

moisture of 12% for earthmoving, achieved using a movable sprinkler system or a water truck and verification of moisture content by lab sample or a moisture probe.[170]

This measure does not specify a method to verify that the use of water trucks prevents airborne dust from leaving the site. Real time monitoring for tiny Valley Fever spores should be required at all construction site boundaries.

This measure also fails to address ground areas that are planned to be reworked at dates more than one month after initial grading. These areas should be sown with a fast-germinating, noninvasive grass seed and watered until vegetation is established. All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil binders, jute netting, or other methods.

D-200

3.4.3. Stockpile Areas (AIR-3)

This measure requires daily spraying of stockpile areas "as needed." The measure does not identify the spraying agent—for example, water is not efficient for tiny Valley Fever spores. The measure also does not require increased spraying frequency or covering during high wind events. Finally, no guidance is provided for when increased spraying is needed. This is not adequate.

Maricopa Rule 305.5, for example, requires open storage piles to be covered with a tarp, plastic, or other material, or to maintain a soil moisture content of at least 12% or to maintain a visible crust. The SCAQMD recommends five mitigation measures for storage piles, as follows:[171]

[170] SCAQMD, Table XI-A and WRAP Handbook, Table 3-7.

[171] SCAQMD, Table XI-E. Mitigation Measure Examples: Fugitive Dust from Storage Piles; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust.

47

D-200 cont.

Table 4: Storage Pile Fugitive Dust Mitigation Measures

Source Activity	Mitigation Measure[1]
Storage pile wind erosion	Require construction of 3-sided enclosures with 50% porosity.
Storage pile wind erosion	Water the storage pile by hand or apply cover when wind events are declared.
Windblown dust from inactive areas[3]	Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).
Windblown dust from disturbed areas[4]	Plant tree windbreaks on the windward perimeter of construction projects if adjacent to open land.
Windblown dust from disturbed areas[4]	Plant vegetative ground cover in disturbed areas as soon as possible.

In addition, the SCAQMD recommends requiring 3-sided enclosures with 50% porosity for storage piles and watering by hand at a rate of 1.4 gallons/hour-yard or covering when wind events occur.[172] All of these measures are feasible and should be required for the Project.

D-201

3.4.4. Vehicle Speed (AIR-3)

This measure limits construction vehicle speed to 15 miles per hour but fails to include off-site trucks delivering materials to the site. It also fails to include enforcement of the speed limit. The SCAQMD recommends enforcement of this limit by radar,[173] which should be required for the Project.

D-202

3.4.5. Cover Trucks (AIR-3)

This measure requires that trucks hauling dirt, sand, soil, or other loose material be covered **or** maintain at least 2 feet of freeboard. This is not adequate. Trucks should be tarped with a fabric cover **and** maintain a freeboard height of 12 inches to prevent Valley Fever spore blowoff.[174] Freeboard does not prevent blowoff of tiny Valley Fever spores, especially on windy days that are common in the area. Valley Fever spores can also be present on truck wheels and bodies, which are commonly required to be

[172] SCAQMD, Table XI-B, Mitigation Measure Examples: Fugitive Dust from Materials Handling; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust.

[173] SCAQMD, Table XI-A.

[174] SCAQMD, Table XI-A.

48

D-202 cont.

thoroughly cleaned before leaving the worksite. Further, open-bodied haul trucks should be kept in good repair to prevent spillage from beds, sidewalls, and tailgates.[175] The DEIR does not require vehicle cleaning and/or washing before leaving the site. AIR-3 should be expanded to include this measure.

D-203

3.4.6. Sweep Streets (AIR-3)

Sweeping generates fugitive dust that may contain Valley Fever spores that are not visible, so trackout should be limited to the maximum extent feasible. This measure fails to require methods to minimize trackout. The DEIR only requires water street sweeping at the end of each day only if visible soil material extending over 50 feet is carried onto adjacent paved roads. Valley Fever spores are not "visible," so this measure is worthless for controlling Valley Fever.

Trackout should be removed "immediately" out to 50 feet and nightly cleanup of the rest, not controlled after the fact. Access to unprotected routes should be limited and construction roadways should be paved.[176] Grizzly[177]/wheel wash systems should be installed adjacent to entrances to control carryout and trackout. Gravel pads,[178] 30 ft x 50 ft, 6 inches deep should be installed at access points and traffic routed over track-out control devices. Track-out control devices should be installed at all access points to public roads and mud/dirt should be removed from interior paved roads with sufficient frequency. Access must be limited to unprotected areas.[179] The SCAQMD recommends installing pipe-grid trackout-control devices to reduce mud/dirt trackout from unpaved truck exit routes.[180] These measures should be required for the Project.

Any trackout that remains after installing control devices should be immediately cleaned up on deposit to 50 feet and nightly cleanup of the rest. The SCAQMD

---

[175] Maricopa Rule 205.12.

[176] WRAP Handbook, Table 3-8.

[177] A grizzly is a device (i.e., rails, pipes, or grates) used to dislodge mud, dirt, and/or debris from the tires and undercarriage of motor vehicles and/or haul trucks prior to leaving the worksite. See Maricopa Rule 310, Section 218, https://www.maricopa.gov/DocumentCenter/View/5354/Rule-310---Fugitive-Dust-from-Dust-Generating-Operations-PDF?bidId.

[178] A gravel pad is a layer of washed gravel, rock, or crushed rock that is at least one inch or larger in diameter that is located at the point of intersection of an area accessible to the public and a work site exit to dislodge mud, dirt, and/or debris from the tires of motor vehicles and/or haul trucks, prior to leaving the work site. These should conform to Maricopa Rule 310, Section 217.

[179] Maricopa County Rule 310.

[180] SCAQMD, Table XI-C, Mitigation Measure Examples: Fugitive Dust from Paved Roads; http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust.

D-203 cont.

recommends the following trackout measures, which are all feasible and should be required for the Project:[181]

Table 5: SCAQMD Mud/Dirt Trackout Control Measures

Mud/dirt trackout	Install pipe-grid trackout-control device to reduce mud/dirt trackout from unpaved truck exit routes.
Mud/dirt trackout	Install gravel bed trackout apron (3 inches deep, 25 feet long, 12 feet wide per lane and edged by rock berm or row of stakes) to reduce mud/dirt trackout from unpaved truck exit routes.
Mud/dirt trackout	Require paved interior roads to be 100 feet long, 12 feet wide per lane and edged by rock berm or row of stakes, or add 4 foot shoulder for paved roads.

D-204

3.5. Omitted Fugitive Dust Mitigation Measures

Many mitigation measures essential to control Valley Fever spores are omitted from the DEIR mitigation plan in APM AIR-3. The engineering firm of Bechtel was retained to develop methods to control Valley Fever at the San Luis Obispo County Solar Ranch Project.[182,183] Bechtel's recommendations and those of other agencies include the following additional mitigation measures that should be required for the Project. All of the measures discussed below shall be shown on grading and building plans. Further, the dust control plan should be available on site in an easily accessible location.

D-205

First, APM AIR-3 does not address active disturbance of soils when heavy equipment or vehicles are working an area. The CDPH recommends that "[w]hen soil will be disturbed by heavy equipment or vehicles, wet the soil before disturbing it and continuously wet it while digging to keep dust levels down."[184]

D-206

Second, the DEIR's mitigation measures fail to define "airborne dust." Valley Fever spores are orders of magnitude smaller than conventional construction "airborne dust," which is PM2.5 and PM10. Due to their size, Valley Fever spores cannot be effectively controlled using watering trucks. Further, watering trucks themselves generate fugitive dust, which in an endemic area may contain Valley Fever spores. Thus, wetting methods must be used that do not themselves raise dust. Analysis of the

[181] Ibid.

[182] Bechtel, California Valley Solar Ranch Project, Valley Fever in San Luis Obispo County, 2011; https://slideplayer.com/slide/4441907/#.YATgxeOJBDE.gmail.

[183] Bechtel, Bechtel Environmental, Safety, and Health (BESH), VALLEY FEVER in San Luis Obispo County California Valley Solar Ranch Project 2011, Slide 13; https://slideplayer.com/slide/4441907/.

[184] CDPH, Preventing Work-Related Coccidioidomycosis (Valley Fever), pdf 4.

50

D-206 cont. outbreaks at the San Luis Obispo solar farms concluded, for example, that "frequent wetting of soil before soil-disruptive activities was protective…"[185] The control of "airborne dust" does not assure that Valley Fever spores would be controlled.

D-207 Third, planned paving for roadway, driveway, sidewalks, and so forth, shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

D-208 Fourth, trucks and equipment leaving the site shall be washed and wheel washers shall be installed where vehicles enter or exit unpaved roads from or onto a street. Bechtel, for example, recommends "[e]quipment, vehicles and other items will be thoroughly cleaned to remove soil particles before they are moved offsite."[186]

D-209 Fifth, wherever possible, grading and trenching work should be phased so that earth-moving equipment is working well ahead or downwind of workers on the ground.[187]

D-210 Sixth, half-faced respirators equipped with N-100 or P-100 filters should be worn by those digging, grading, trenching, or performing other work involving soil disturbance.[188] Analysis of the outbreaks at the San Luis Obispo solar farms concluded, for example, that "frequently performing soil-disruptive work was a risk factor only for employees who did not frequently use respiratory protection…"[189] The DEIR does not require any respiratory protection.

D-211 Seventh, MM AQ-1 should clearly state that all of the fugitive dust mitigation measures apply to the helicopter landing/unloading areas.

D-212 Eighth, the contractor shall designate a person or persons to monitor the fugitive dust emissions to assure compliance and to enhance them as necessary to minimize dust and prevent transport of dust offsite. The names and telephone numbers of such persons shall be provided to the SLOCAPCD prior to the start of any grading, earthwork or demolition.

This dust control coordinator shall be present on site during all dust-generating operations, with the authority to stop any operations that create excessive dust. A dust

[185] De Perio et al, p. S43.

[186] Bechtel, Fugitive Dust Reduction Measures, Slide 13; https://images.slideplayer.com/14/4441907/slides/slide_13.jpg.

[187] Ibid.

[188] Bechtel, Fugitive Dust Reduction Measures, Slide 14; https://images.slideplayer.com/14/4441907/slides/slide_14.jpg.

[189] De Perio et al, p. S43.

51

D-212 cont.

control coordinator must always be on site during dust-generating operations for any site that disturbs 5 acres or more.[190]

Ninth, in addition, the following standard measures recommended by public agencies must be added to the DEIR specifically to control Valley Fever spores:

D-213

- Suspend work during heavy wind or dust storms.[191] San Luis Obispo Health Agency specifically recommends:[192]
  - skip windy days,
  - postpone activities until wind calms down,
  - do activity in early morning hours when there is less wind,
    - wet down roadways and dampen soil to reduce blowing dust, especially when other workers are present,
    - if other workers are nearby or downwind, delay the activity until they move,
    - use equipment with an enclosed cab and air filtration system,
    - remove and bag coveralls and other dusty clothing when you leave the work site, so you don't bring dust into your car or home.
- Minimize the amount of soil disturbed.
- Require that water trucks and construction equipment have enclosed, air-conditioned cabs equipped with high-efficiency particulate air filters and two-way radios to facilitate communication when windows are closed.[193]
- Position workers upwind when digging trenches or fire lines or performing other soil-disturbing tasks.
- Locate overnight camps away from sources of dust.

---

[190] Maricopa County Rule 310; Maricopa County Air Quality Department, Rule 310 Dust Permit, Dust Control Permit Help Sheet; https://www.maricopa.gov/DocumentCenter/View/41942/Rule-310-Dust-Control-Permit-Help-Sheet-PDF.

[191] De Perio et al., p. S43, for example, found that for San Luis Obispo County solar farm workers, "frequently being in a dust storm or dust cloud was associated with increased risk of having clinically compatible coccidioidomycosis, while frequent wetting of soil before soil-disruptive activities was protective…"

[192] County of San Luis Obispo Health Agency, Public Health Department, "For Activities That Stir Up Dirt or Dust"; https://www.slocounty.ca.gov/getattachment/f25735bf-7bcd-42d7-8fcd-de843ce071cc/Brochure-English-Valley-Fever-Building.aspx.

[193] Bechtel, Fugitive Dust Reduction Measure, Slide 14; https://images.slideplayer.com/14/4441907/slides/slide_14.jpg.

52

D-213 cont.

- When dust exposure is unavoidable, provide NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA.[194]
- The WRAP Handbook similarly recommends a gravel apron, 30 ft x 50 ft by 6 inches deep to reduce mud/dirt trackout from unpaved truck exit routes.
- Minimize digging by hand, instead use heavy equipment with enclosed, air-conditioned, HEPA-filtered cabs.
- Use a dust control method that does not raise dust. Calcium chloride or the salt crust process, for example, achieve better control than water alone. Further, fine atomized sprays or mist sprays with droplet diameters of 60 µg, produced by swirl-type pressure nozzles or pneumatic atomizers, should be used on the watering trucks.[195]
- When digging in soil is required, train workers to reduce the amount of dust by staying upwind.

D-214

Tenth, basic dust control training should be required for all water truck drivers, all water pull drivers, and superintendents on sites larger than 1 acre.

D-215

In addition, the CDPH specifically recommends the following measures to prevent the transport of Valley Fever spores off-site:[196]

- Clean tools, equipment, and vehicles with water to remove soil before transporting offsite.
- Provide workers with coveralls or disposable Tyvek daily.
- Keep street clothes and work clothes separate by providing separate lockers or other storage areas.
- Encourage workers to shower and wash their hair at the workplace or as soon as they get home.
- Provide boot cleaning stations.
- Wet-clean tools and equipment.

---

[194] Preventing Work-Related Coccidioidomycosis (Valley Fever), p. 5, item 9: "When exposure to dust is unavoidable, provide NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA"; https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf.

[195] Amar Solanki, Dust Suppression System, p. 15-19, 25; https://www.slideshare.net/abhi24mining/prevention-suppression-of-dust.

[196] CDPH, Preventing Valley Fever in Construction Workers, pdf 53 and CDPH, Preventing Work-Related Coccidioidomycosis (Valley Fever), June 2013, p. 6; https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/HESIS/CDPH%20Document%20Library/CocciFact.pdf.

53

Finally, a review of outbreaks in San Luis Obispo County, including interviews with affected workers, concluded that the following administrative controls should be required:[197]

D-216

> Administrative controls that promote safer work practice standards might include (1) ensuring that the worksite injury and illness prevention plan recognizes the risk of coccidioidomycosis and has criteria for temporarily suspending work when there is excessive dust or wind; (2) having onsite monitoring personnel who, when inadequate dust control is identified, have the ability to implement additional control measures or stop work; (3) training workers and supervisors about the risks and symptoms of coccidioidomycosis; and (4) encouraging ill workers to report their symptoms to supervisors (examples

D-217

In sum, construction mitigation measures in the DEIR are not adequate to control Valley Fever spores raised during Project construction and conventional fugitive PM10 dust. Projects that have implemented similar conventional PM10 dust control measures have experienced fugitive dust issues and reported cases of Valley Fever.[198,199,200] The above-discussed mitigation measures should be required for the Project.

3.6. Monitoring Should Be Required for Valley Fever Spores

D-218

Finally, as the proposed Project construction sites have the potential to contain Coccidioidomycosis spores and it is well known that they can easily become airborne when soil is disturbed,[201] the Project construction sites should be tested well in advance of construction to determine if spores are present. Accurate test methods have been developed and used in similar applications.[202,203] A study conducted in the Antelope

---

[197] De Perio et al. 2019, p. S43.

[198] Herman K. Trabish, Green Tech Media, Construction Halted at First Solar's 230 MW Antelope Valley Site, April 22, 2013; http://www.greentechmedia.com/articles/read/Construction-Halted-At-First-Solars-230-MW-Antelope-Valley-Site.

[199] Julie Cart, 28 Solar Workers Sickened by Valley Fever in San Luis Obispo County, *Los Angeles Times*, May 1, 2013; http://articles.latimes.com/2013/may/01/local/la-me-ln-valley-fever-solar-sites-20130501.

[200] Topaz EIS, August 2011, Table 2-10, Conditions of Approval.

[201] Colson et al. 2017, p. 451, Exhibit 10 ("A correlation between soil disturbances due to large-scale renewable energy construction projects, agricultural management practices and PM10 fugitive dust emission with increased incidence of coccidioidomycosis was clearly indicated by results of this study."), p. 456 ("One such danger is *Coccidioides spp.* arthroconidia becoming airborne when soil is disturbed and dust mitigation measures are inefficient or absent.").

[202] J. R. Bowers et al., Direct Detection of Coccidioides from Arizona Soils Using CocciENV, a Highly Sensitive and Specific Real-time PCR Assay, *Medical Mycology*, 2018 (Exhibit 11); and Proceedings of the

D-218 cont.

Valley, slated for six solar ranches of varying sizes, concluded that soil analyses should be conducted before soil disturbance in endemic areas, noting: "Based on the findings of this study, we recommend that EIRs include soil analyses for *Coccidioides spp.* on land destined for construction of any type in endemic areas of the pathogen."[204] An Environmental Assessment for a solar project has required soil testing.[205]

D-219

In sum, all of the above health-protective measures recommended by the San Luis Obispo County Public Health Department, Monterey County Health Department, the California Department of Public Health, and others are feasible for the Project and must be required in a dust control plan included in the EIR that evaluates and mitigates the risk to construction workers, off-site workers at nearby vineyards and farms, nearby residents, school children, and passengers in vehicles on public roads from contacting Valley Fever. Many of these measures have been required by the County of Monterey in other EIRs.[206] They are also required in the EIR for the California High-Speed Train.[207] Even if all of the above measures are adopted, the DEIR must analyze whether these measures are adequate to reduce this significant impact to a level below significance. Further, soils at all of the sites proposed to be disturbed should be tested in advance of construction.

D-220

4. BATTERY ENERGY STORAGE SYSTEM (BESS) IMPACTS

The DEIR superficially evaluated two BESS alternatives, BS-2 and BS-3, to reduce peak loads during periods when energy use is higher during the summer to relieve pressure on substations and feeders.[208] Alternative BS-2 is a front-of-the-meter (FTM) site and alternative BS-3 is a third party, behind-the-meter solar and battery storage

---

60th Annual Coccidioidomycosis Study Group Meeting, April 8–9, 2016, Fresno, CA; http://coccistudygroup.com/wp-content/uploads/2016/10/CSG-60th-Annual.pdf.

[203] Colson et al. 2017, pp. 439–458.

[204] Colson et al. 2017, p. 456.

[205] Final Environmental Assessment for Construction, Operation, and Decommissioning of a Solar Photovoltaic System at Marine Air Ground Task Force Training Command Marine Corps Air Ground Combat Center, Twentynine Palms, California, November 2015, Table ES-1, AQ-17; https://www.29palms.marines.mil/Portals/56/Docs/G4/NREA/Environmental%20Assessment%20Construction%20and%20Operation%20of%20Solar%20Photovoltaic%20System%20at%20MAGTFTC,%20MCAGCC%20(Final)%20November%202015.pdf.

[206] County of Monterey, California Flats Solar Project Final Environmental Impact Report, December 2014; https://www.co.monterey.ca.us/home/showdocument?id=48244.

[207] California High-Speed Rail Authority and U.S. Department of Transportation, California High-Speed Train Project Environmental Impact Report/Environmental Impact Statement, Fresno to Bakersfield, Mitigation Monitoring and Enforcement Program Amendments, September 2015.

[208] DEIR, p. ES-13, pdf 37. See Also Appendix B.

55

D-220 cont.

facility.[209] Both of these alternatives assume the BESSs would use lithium-ion batteries because they are the most space-efficient and cost-effective technology currently available.[210] The DEIR is full of unsupported excuses for failing to analyze the most significant impacts of these two alternatives—risk of upset, worker and public health impacts, and increases in emissions due to battery charging. Instead, it analyzes impacts that are not significant—aesthetic impacts and external fires.

These two alternatives have two significant environmental impacts that were not analyzed or even acknowledged in the DEIR: (1) accidents leading to significant on-site (to third party in-home hosts in BS-3) and off-site public health and off-site property damage (Comment 5) and (2) increases in criteria pollutant and greenhouse gas (GHG) emissions (Comment 6).

D-221

Rather than disclose the significant risk of upset and resulting significant off-site public health impacts of an accident involving lithium-ion batteries, which are proposed for the BESS alternatives (Comment 5), the DEIR makes the following excuses for declining to analyze these impacts:

- BESS sites "were selected as illustrative examples for the purposes of this CEQA analysis. Need for the reasonably foreseeable distribution components may not occur for up to 15 years… It is not possible to identify with certainty FTM BESS sites that could be selected by PG&E in the future. In addition, energy storage and other distributed alternatives are 15 years out and BESS technology is expected to advance within this timeframe."[211]

D-222

- "Because the specific characteristics of Alternatives BS-2 and BS-3 are unknown, these alternatives are evaluated for illustrative purposes in the DEIR. Consistent with CEQA Guidelines section 15145, no significance conclusions are provided for Alternative BS-2 and BS-3 impact discussions."[212] The DEIR also incorrectly asserts that "A full analysis of hypothetical DIDF (Distribution Infrastructure Deferral Framework) outcomes and types of DER (Distributed Energy Resources) solutions would be speculative and outside of the scope of this CEQA analysis."[213]

[209] DEIR, Figure ES-3, pdf 43.

[210] See, e.g., DEIR, Table 3-18, pdf 321; p. 3-126, pdf 322; p. 3-112, pdf 308.

[211] DEIR, pdf 308.

[212] DEIR, p. 4-3, pdf 339.

[213] DEIR, p. 3-131, pdf 327.

56

D-223

- "Because FTM BESS sites were selected for illustrative purposes only, BESS installations have not been designed and technologies have not been selected, and the specifics of Alternative BS-2 are unknown, project-level determinations cannot be made as impacts are speculative. Therefore, consistent with CEQA Guidelines section 15145, no significance conclusion is provided for any of the significance criteria." [214]

D-224

- It is not possible to identify with certainty FTM BESS sites that could be selected by PG&E in the future. In addition, energy storage and other distributed energy resources (DER) technologies (e.g., demand response and energy efficiency) are expected to advance within this timeframe. These technological changes are likely to alter siting requirements. Because site-specific analyses are speculative at this time, this DEIR uses the illustrative sites to demonstrate the feasibility of this alternative, and the relatively small footprint these facilities would occupy throughout the project area."[215]

D-225

These excuses for failing to analyze the significant impacts of BESS alternatives are speculative and wrong. The analyses in the DEIR for "illustrative purposes" fail to identify the well-known significant environmental impacts of BESS facilities: accidents causing off-site public health and property damage impacts and increases in criteria pollutant and GHG emissions from BESS charging. Instead, the DEIR only discusses impacts of the BESS alternatives that are not significant—aesthetic impacts[216] and external wildfire impacts,[217] ignoring highly significant on-site and resulting off-site impacts caused by accidents involving the batteries themselves.

D-226

The DEIR, for example, only discloses the "potentially elevated fire hazard risk [of lithium-ion batteries] in comparison to other technologies."[218] However, it fails to extend its discussion of fires to on-site and off-site impacts, such as property damage and worker and public health impacts due to the release of hazardous air pollutants (HAPs).

The impacts of the proposed BESS facilities, based on experience with operating BESS facilities, are well known and should have been disclosed. The DEIR itself

[214] DEIR, p. 4.1-53, pdf 393.

[215] DEIR, 3-112, pdf 308.

[216] DEIR, pdf 392 (Alternative BS-2) to 394 (Alternative BS-3).

[217] DEIR, Section 4.20 Wildfire.

[218] DEIR, 3-126, pdf 322.

57

D-226 cont. proposes lithium-ion batteries at all FTM sites and additionally flow batteries at site #6.[219]

D-227 Finally, if it is not possible to analyze the impacts of BESS alternatives, a future EIR is required to analyze these impacts, if and when advances have been made in battery technology.

4.1. Impacts of Operating BESS Facilities Using Lithium-Ion Batteries

D-228 The starting point for any analysis is a review of the current state of knowledge regarding BESS impacts. The DEIR is silent on the history of BESS accidents, besides a brief mention of accidents involving batteries in electric vehicles and a fire at a 2 MW BESS in Arizona in 2019.[220] Instead, the DEIR asserts with no support that flow battery technology, which could be used at FTM Site 6, "would have reduced fire risk because the electrolyte material is not flammable."[221] However, reduced risk does not mean the risk is not significant.

D-229 Further, the use of flow batteries is severely limited at the available sites due to the large size of these batteries and the limited available space. Thus, the DEIR assumes the use of lithium-ion batteries at all of the potential BESS sites. Regardless, the electrolytes used in any storage battery may have impacts that were not disclosed. Finally, "reduced fire risk" does not mean the impact would not be significant.

The National Fire Protection Association (NFPA) recently published a brochure with the following title:[222]

D-230 ENERGY STORAGE SYSTEMS: IS YOUR COMMUNITY READY?

The answer for the communities and/or homes that will host a BESS under this Project is a resounding NO, because the DEIR has failed to disclose the risks or mitigate them.

D-231 The NFPA identified the follow impacts of energy storage systems, none of which are disclosed in the DEIR:[223]

[219] DEIR, Table 3-18, pdf 321.

[220] DEIR, p. 4.9-39.

[221] DEIR, pdf 655.

[222] NFPA, Fire & Life Safety Policy Institute, Safety Through Better Public Policy, August 2019; https://www.nfpa.org/News-and-Research/Resources/Emergency-Responders/High-risk-hazards/Energy-Storage-Systems.

[223] NFPA, Energy Storage Systems Safety Fact Sheet, June 2020. Exhibit 18.

58

D-231 cont.

- Thermal runaway (rapid uncontrolled release of heat energy, resulting in fire or explosion);
- Shock hazard from stranded energy;
- Release of toxic and flammable gases;
- Deep-seated fires within metal or plastic casing, blocking firefighting agents;
- Mechanical abuse;
- Thermal abuse from exposure to external heat source;
- Electrical abuse from overcharging; and
- Environmental impacts including rodent damage to wiring, extreme heat, and floods.

D-232

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

The NFPA brochure starts with this warning:[224]

> An explosion at a 4 megawatt battery energy storage systems (BESS) facility in April of 2019 is a reminder that this rapidly proliferating technology introduces new hazards into the community. The serious injury of several Arizona firefighters in that explosion highlights the pressing need to educate local officials and first responders on BESS.

The DEIR is silent on the serious risks of the proposed BESS facilities. Instead, it argues battery technologies will improve in the future and declines to evaluate the risks. Thus, a future EIR is required, as discussed below.

D-233

Fires at existing battery storage facilities demonstrate the severe risk that lithium-ion battery fires pose to human health and the environment. Fires have occurred at many battery storage facilities around the world, including in the European Union (e.g., Belgium).[225,226] Fires have also occurred at 23 battery storage facilities in South Korea, caused by faulty temperature control, negligence during construction, operational negligence, failure to separate the PCS system and batteries, faulty battery

[224] Ibid.

[225] Jason Deign, Engie Investigates Source of Belgian Battery Blaze, December 18, 2017; https://www.greentechmedia.com/articles/read/engie-investigates-source-of-belgian-battery-blaze#gs.y25569.

[226] Patrice Nigon and others, Battery Storage, IMIA Working Group Paper 112 (19), pdf 55, 58; https://www.imia.com/wp-content/uploads/2020/01/IMIA-WGP-112-19-Battery-Storage.pdf.

59

D-233 cont.

management, system control, or battery protection systems.[227] The largest fire loss in Korea was reported at a 47 MW BESS facility, estimated at US $18 million.[228] Figure 14.

Figure 14: Fire Damage at Korean BESS Facilities[229]

Several battery fires have occurred in Hawaii and Arizona. These fires resulted in significant impacts that are not addressed in the DEIR, including significant worker and public health impacts from hazardous air pollutants (HAPs) and damage to the adjacent facilities.

Two fires occurred at First Wind's 30 MW Kahuku project in Hawaii in 2012. The first fire broke out in March 2011. The second fire, on August 3, 2012, was so fierce that firefighters could not enter the building for several hours. They used dry chemicals, which failed. This fire resulted in a $30 million battery loss that closed the wind farm.[230]

In describing firefighting challenges at the Hawaiian 10-MW battery storage system, the Honolulu Fire Department reported: [231,232]

---

[227] Andy Colthorpe, Korea's ESS Fires: Batteries Not to Blame But Industry Takes Hit Anyway, *PVTech*, June 19, 2019; https://www.energy-storage.news/news/koreas-ess-fires-batteries-not-to-blame-but-industry-takes-hit-anyway.

[228] Nigon and others, pdf 60.

[229] Ibid.

[230] Nigon and others, pdf 55.

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

[232] 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/.

D-233 cont.

"The risks from scalding heat, poisonous fumes, a collapsing structure and the potential for battery explosions kept firefighters outside the warehouse."[233] Firefighters at this site faced thick smoke, toxic fumes, and other hazards.[234,235] "The August … fire, the third since opening in March 2011, was so fierce that firefighters could not enter the building for seven hours."[236] Other fire departments have reported: "Basically you need to overwhelm it with more water than you think you need."[237]

D-234

The typical layout of battery storage facilities consists of rows of batteries with narrow separating aisles. The DEIR contains no information on the layout of batteries in any of the alternatives and thus fails as an informational document under CEQA. The DEIR 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.

D-235

The fire stations that would respond to the fires are not nearby.[238] In the case of the Hawaii fires discussed above, a recent 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."[239] It also explained: "One important lesson is to have fire response resources on-site, like dry chemicals and deployment systems." Further,

---

[233] Umair Irfan, Battery Fires Pose New Risks to Firefighters, Scientific American, February 27, 2015; available at: https://www.scientificamerican.com/article/battery-fires-pose-new-risks-to-firefighters/.

[234] Ibid.

[235] Ibid.

[236] Ros Davidson, Analysis: First Wind Project Avoids Storage After $30m Fire, *Wind Power*, March 6, 2014; 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; https://www.greentechmedia.com/articles/read/battery-room-fire-at-kahuku-wind-energy-storage-farm#gs.xdxv6h and Nigon and others, 2019, pdf 55.

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

[238] DEIR, Figure 4.15-1, pdf 785.

[239] Irfan 2015.

D-235 cont.

in the case of the Project, the facility would be unmanned 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.

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.[240,241]

A fire broke out at a BESS in Wisconsin in 2016. The fire began in a utility-scale energy storage system that was in a partially assembled state that was not in operation and not connected to a power source or load. The fire occurred when a technician from the battery manufacturer was working on the energy storage system and was started in one of the DC power and control compartments adjacent to a battery rack. Once started, it spread to other batteries.[242]

Another major fire in the United States 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.[243,244] An explosion in the McMicken battery system led to a fire.[245,246] This event injured eight firefighters, one critically.[247] Four firefighters

---

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

[241] *Hawaii News Now*, August 1, 2012.

[242] Nigon and others, pdf 58.

[243] Ibid.

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

[245] Arizona Public Service, Equipment Failure at McMicken Battery Facility, April 26, 2019; https://www.aps.com/en/About/Our-Company/Newsroom/Articles/Equipment-failure-at-McMicken-Battery-Facility.

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

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

62

D-235 cont.

were hospitalized for chemical inhalation burns.[248] 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.[249]

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, regardless of the specific battery technology. 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 lithium-ion batteries, is a suspected human carcinogen.[250]

The McMicken Facility fire was not the first APS battery fire. Another smaller fire has been reported at another APS system.[251] In November 2012, a 1.5-MW system at the APS Elden Substation near Flagstaff, Arizona, also caught fire.[252] 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.[253] Arizona Public Service recently shut down two other battery systems following the explosion.[254]

---

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

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

[250] Honeywell, Material Safety Data Sheet, Lithium-Ion Battery; https://honeywellaidc.force.com/supportppr/s/article/Lithium-ION-battery-specifications-MSDS-shipping-LI-ION-batteries.

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

[252] H. J. Mai, APS Storage Facility Explosion Raises Questions about Battery Safety, *Utility Dive*, April 30, 2019; https://www.utilitydive.com/news/aps-storage-facility-explosion-raises-questions-about-battery-safety/553540/. See also Eckhouse and Chediak, April 24, 2019; Nigon and others 2019, pdf 57; and Colthorpe, June 2019.

[253] 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; https://docket.images.azcc.gov/E000002248.pdf.

[254] Mai, April 30, 2019.

63

D-235 cont.

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."[255]

Other battery fires have occurred on airplanes, including in a Dreamliner 787 at Heathrow Airport,[256] in-flight on an All Nippon Airways 787 over Japan, forcing an emergency landing, and aboard a Japan Airlines 787 at Boston's Logan International Airport, resulting from the release of flammable electrolytes, heat damage, and smoke on the aircraft.[257]

D-236

My review of the limited available information in the DEIR indicates that the proposed BESS options will use batteries with similar chemistries, mostly notably chemicals that include compounds that can release hydrogen fluoride and other toxic chemicals. Tests on a range of battery compositions revealed that they all release toxic chemicals.[258] If other batteries are used, or there are advances in lithium-ion technologies, as suggested in the DEIR, a subsequent DEIR should be prepared to evaluate any new impacts.

D-237

The chemical composition of the lithium-ion batteries based on current lithium-ion technology includes cobalt oxide; manganese dioxide; nickel oxide; carbon; unidentified electrolyte; polyvinylidene fluoride; aluminum foil; copper foil; aluminum; and inert materials.[259] However, the DEIR failed to support battery composition with MSDSs from potential battery suppliers, 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":[260]

---

[255] 8/2/19 APS Report.

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

[257] Nigon and others, pdf 55.

[258] Consolidated Edison and NYSERDA, Considerations for ESS Fire Safety, February 9, 2017.

[259] Imperial County Planning and Development Services, Draft Supplemental Environmental Impact Report. Prepared by Burns McDonnell, July 15, 2019, pdf 78, Sec. 2.6.3.9; http://www.icpds.com/?pid=6973.

[260] 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

64

D-237 cont.

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.

D-238

Polyvinylidene fluoride decomposes into hydrogen fluoride gas in fires.[261] Hydrogen fluoride is an extremely poisonous gas.[262] As there are residences within 500 feet of the facility, a fire in the BESS would likely result in significant health impacts to nearby residents, as well as workers at the adjacent shopping mall in Alternative BS-3. Thus, the DEIR 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.

D-239

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 DEIR.

D-240

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:

Battery Safety/Docket No. E-01345A-19-0076, August 19, 2019; https://docket.images.azcc.gov/E000002454.pdf.

[261] Craig L. Beyler and Marcelo M. Hirschler, Thermal Decomposition of Polymers, Chapter 7, Table 1-7.1; https://pdfs.semanticscholar.org/d3fa/4a1616fd1457c02d4f477dcbdae706c9667f.pdf; Material Safety Data Sheet, Poly(vinylidene fluoride), ("Combustion products include carbon monoxide (CO), carbon dioxide (CO_2), **hydrogen fluoride**, and other pyrolysis products typical of burning organic material" (emphasis added)), pdf 3; http://datasheets.scbt.com/sc-264080.pdf.

[262] 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"; https://emergency.cdc.gov/agent/hydrofluoricacid/basics/facts.asp. See also ATSDR, Medical Guidelines for Hydrogen Fluoride; https://www.atsdr.cdc.gov/MMG/MMG.asp?id=1142&tid=250.