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Comment Received From: Todd McNamee
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P3 Incompatible with Oxnard Airport

Additional submitted attachment is included below.

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September 15, 2016

California Energy Commission
Dockets Unit, MS-4
1516 9th Street
Sacramento, CA 95814-5512

RE: Comments on California Energy Commission (CEC) Preliminary Staff Assessment (PSA) for Puente Power Project (P3) Dated June 20, 2016

Dear Commissioners:

Thank you for the opportunity to comment on the California Energy Commission (CEC) Preliminary Staff Assessment (PSA) for the Puente Power Project (P3) dated June 20, 2016.

Page 1-9 of the PSA Executive Summary states, *"Conditions of Certification **TRANS-6** and **TRANS-7** would mitigate potentially significant impacts to aviation from the thermal plumes that P3 would generate from the combustion turbine generator (CTG) stack. Condition of Certification **TRANS-6** would require obstruction marking and lighting of the CTG stack to alert pilots of the location of the plumes at night. Condition of Certification **TRANS-7** would require the project owner to work with the Federal Aviation Administration (FAA) and the Oxnard Airport Manager to notify all pilots using the Oxnard Airport and airspace above the P3 site of potential thermal plume hazards."*

The proposed location of P3 creates a hazard to aviation that does not currently exist due to the projected high velocity thermal plume, and is not compatible with Oxnard Airport operations. The proposed mitigation **TRANS-7** does not adequately mitigate the hazard and restricts access to and from the Oxnard Airport.

DOA staff, along with others, met with CEC staff on June 8, 2016 regarding P3 and the proposed Mission Rock Power Plant, and has been communicating with CEC staff since the publication of the P3 PSA later in June. On September 7, 2016, the DOA held a conference call with CEC staff and consultants working on behalf of the CEC. Essentially all of the discussion was about the thermal plume and the potential impact to aviation safety.

Section **Thermal Plumes** begins on Page 4.11-21 of the PSA, and it states in part, *"Light aircraft flying through thermal plumes exceeding 4.3 meters/second (m/s)2 in* *vertical velocity may experience moderate to significant turbulence, which could compromise pilot control and aircraft stability."* It further states, *"Air Quality staff found that thermal plume vertical velocity exceeded 4.3 m/s up to an altitude of approximately 4,260 feet AGL. At altitudes higher than approximately 4,260 feet AGL, thermal plume velocity was below the critical 4.3 m/s threshold for endangering aircraft."*

The DOA interprets this to mean that the plume velocity of 4.3 m/s at 4,260 feet and below could compromise pilot control and aircraft stability, and endanger aircraft. If the hazard is the turbulence caused by the plume velocity of 4.3 m/s and overflight should be avoided, then the CEC is essentially allowing a 4,260 foot tall invisible tower to be located 1.8 miles from the departure end of runway 25 at Oxnard Airport. This is of concern because aircraft departing and arriving to Oxnard Airport are likely to be between 1,000 feet and 3,000 feet as they ascend or descend to airport pattern altitude of approximately 1,000 feet. The Traffic and Transportation – Figure 4 of the PSA depicts aircraft overflight of the P3 site currently. In the two month period used, 85 aircraft overflew the site. Extrapolating this would result in approximately 510 aircraft overflights per year. Of these depicted in Figure 4 for the two month period, 14 were between 2,001-3,000 feet, 60 were between 1,001-2,000 feet and 11 were below 1,000 feet (see modified Figure 4 attached). If only one aircraft overflies the site and encounters loss of control at these low altitudes which results in injury or death, is that one too many?

The CEC used the Spillane Approach to model the plume which resulted in the 4.3 m/s up to 4,260 feet calculation as shown in the PSA. During the conference call CEC staff informed the DOA that this number has been challenged by the proponents of power plants as not being a valid number to declare a hazard to aviation safety. CEC staff then conducted additional research and concluded that an average velocity of 5.3 m/s is the appropriate velocity, and the modeling for P3 will be adjusted to reflect this (see attached Plume Threshold Background from CEC staff). The DOA questions adjusting the velocity used to determine a hazard to aviation for P3 at this time as it does not appear to have been used for any proposed power plant previously. With that in mind, CEC staff stated it is still possible that the velocity to determine an aviation hazard, using the higher average velocity of 5.3 m/s, will rise to an altitude of approximately 2,350 feet. This would still create a potential hazard to the greatest number of aircraft that overfly the site as depicted in Traffic and Transportation – Figure 4.

Discussion of the MITRE Plume Exhaust Analyzer begins on page 4.11-44 of the PSA and in part states, *"On September 24, 2015, the Federal Aviation Administration (FAA) released a guidance memorandum (FAA 2015) recommending that thermal plumes be evaluated for air traffic safety. FAA determined that the overall risk associated with thermal plumes in causing a disruption of flight is low. However, it determined that such plumes in the vicinity of airports may pose a unique hazard to aircraft in critical phases of flight (such as take-off and landing). In this memorandum a new computer model, different than the analysis technique used by staff and identified above as the Spillane Approach, is used to evaluate vertical plumes for hazards to light aircraft. It* *was prepared under FAA funding and available for use in evaluating exhaust plume impacts.*

This new model, the MITRE Corporation's Exhaust Plume Analyzer (MITRE 2012), was identified by the FAA as a potentially effective tool to assess the impact that exhaust plumes may impose on flight operations in the vicinity of airports (FAA 2015)."

CEC staff conducted a preliminary evaluation using the MITRE model for the P3 plume, but does not believe the MITRE model can be used in this case because the FAA's guidance is not fully developed, and there are limitations to the vertical axis calculations. The result is CEC staff does not include in the PSA, nor does it consider, the data derived from the MITRE model.

The MITRE model results provided by CEC staff via email on September 14, shows severe turbulence will likely be encountered by light general aviation (GA) aircraft at altitudes exceeding 3,000 feet, but with higher probability at lower altitudes. The DOA requests that a more thorough analysis of the plume be conducted, incorporating the MITRE model, prior to approval of the project.

The issue of operating times for P3 was also raised. The PSA states on page 4.11-54, *"P3 is designed as a simple-cycle, peaking turbine facility. It is proposed to be limited to operate no more than 2,453 hours per year. Actual operation is likely to be considerably less, perhaps no more than 500 to 1,000 hours per year depending on electrical system load needs."*

If P3 operates to the upward limitation of 2,453 hours per year, that is more than a full-time equivalent position working 5 days a week from 8:00 am to 5:00 pm and should not be considered inconsequential when determining the probability of aircraft overflight while the P3 is operating and generating thermal plumes.

Lastly, **TRANS-7**, while possible to implement, will not likely result in all overflight being avoided all together. The DOA currently provides recommended patterns to avoid overflight of the existing power plant in a published Pilot Guide, yet Figure 4 in the Traffic and Transportation section clearly depicts overflight of the site currently occurring. Further, if it did result in overflight being avoided, it results in restricting access to the Oxnard Airport in a manner that does not currently exist. This is of concern for the existing aircraft utilizing Oxnard Airport, and could negatively impact the DOA's efforts to restore commercial airline service to Oxnard Airport.

As previously stated, the proposed location of P3 creates a hazard to aviation that does not currently exist due to the projected high velocity thermal plume, and is not compatible with Oxnard Airport operations. The proposed mitigation **TRANS-7** does not adequately mitigate the hazard and restricts access to and from the Oxnard Airport.

Thank you again for the opportunity to comment. Please call me at 805-388-4200 should you have any questions.

Sincerely,

TODD L. McNAMEE, AAE
Director of Airports

c: Steve DeGeorge, VCTC
AAC/OAA Packets

Enclosures: Oxnard Airport Departure Path
Traffic and Transportation Figure 4, modified to show overflight count below 3,000 feet
MITRE Model – Light GA Severe Turbulence Diagram
Plume Threshold Background

Oxnard Airport Pilot Guide

Typical Departure could result in aircraft overflight of P3 at altitudes much less than 4,260 feet.

A.O.P.A. NOISE AWARENESS STEPS

1. If practical, avoid noise-sensitive areas such as residential areas, open-air assemblies (e.g., sporting events and concerts), and national park areas. Make every effort to fly at or above 2,000 feet over the surface of such areas when overflight cannot be avoided.
2. Consider using a reduced power setting if flight must be low because of cloud cover or overlying controlled airspace or when approaching the airport of destination. Propellers generate more noise than engines; flying with the lowest practical rpm setting will reduce the aircraft's noise level substantially.
3. Perform stalls, spins, and other practice maneuvers over uninhabited terrain.
4. Familiarize yourself and comply with airport noise abatement procedures.
5. Work with airport managers and fixed base operators to develop procedures to reduce the impact on noise-sensitive areas.
6. To contain aircraft noise within airport boundaries, avoid performing engine run-ups at the ends of runways near housing developments. Instead, select a location for engine run-up closer to the center of the field.
7. On takeoff, gain altitude as quickly as possible without compromising safety. Begin takeoffs at the start of a runway, not at an intersection.
8. Retract the landing gear either as soon as a landing straight ahead on the runway can no longer be accomplished or as soon as the aircraft achieves a positive rate of climb. If practical, maintain best-angle-of-climb airspeed until reaching 50 feet or an altitude that provides clearance from terrain or obstacles. Then accelerate to best-rate-of-climb airspeed. If consistent with safety, make the first power reduction at 500 feet.
9. Fly a tight landing pattern to keep noise as close to the airport as possible. Practice descent to the runway at low power settings and with as few power changes as possible.
10. If a VASI or other visual approach guidance system is available, use it. These devices will indicate a safe glidepath and allow a smooth, quiet descent to the runway.
11. If possible, do not adjust the propeller control for flat pitch on the downwind leg; instead, wait until short final. This practice not only provides a quieter approach, but also reduces stress on the engine and propeller governor.
12. Avoid low-level, high-power approaches, which not only create high noise impacts, but also limit options in the event of engine failure.
13. Flying between 11 p.m. and 7 a.m. should be avoided whenever possible. (Most aircraft noise complaints are registered by residents whose sleep has been disturbed by noisy, low-flying aircraft.)

Note: These recommendations are general in nature; some may not be advisable for every aircraft in every situation. No noise reduction procedure should be allowed to compromise flight safety.

★ = overflight of Project Boundary at 3000 feet and below

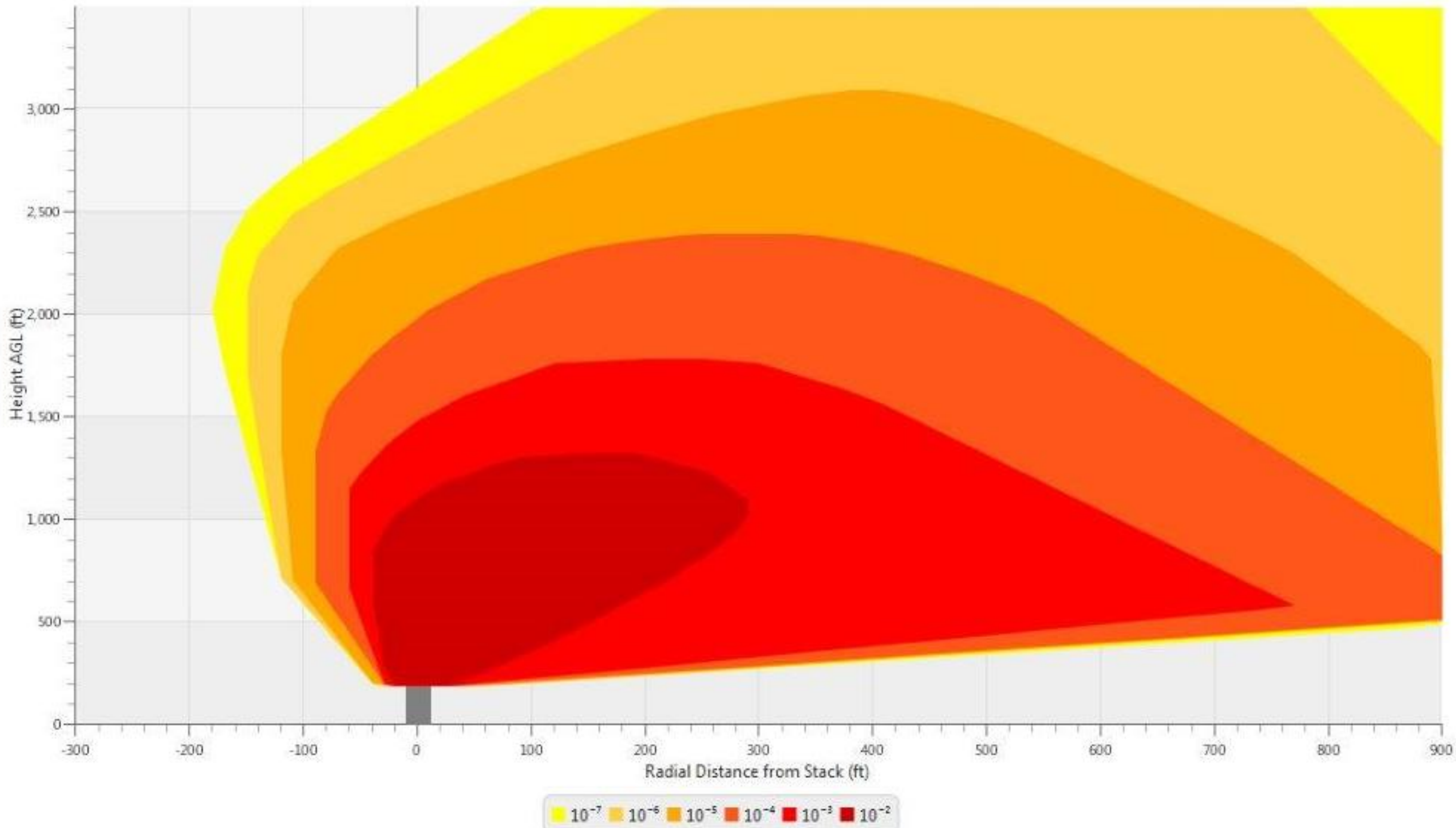
TRAFFIC AND TRANSPORTATION - FIGURE 4

Puente Power Project - Aircraft Flight Altitudes (October 1 - November 22, 2015)

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: ESRI Imagery, Federal Aviation Administration Data

Light GA - Probability of Severe Turbulence



Stack Height = 188.0 ft   Stack Diameter = 22.0 ft
Number of Stacks = 1
Efflux Velocity = 159.2 ft/s   Efflux Temperature = 900°F
Source = Lat: 34.208, Lon: -119.252, Start Date: 2011-01-01, End Date: 2013-12-30
25284 hour(s) of valid weather data processed.

Save current chart as image

Plume Threshold Background

Basis for historically used 4.3 meters per second average vertical velocity threshold

- In the past, the Energy Commission has historically used a threshold of 4.3 meters per second (m/s) average vertical plume velocity to determine whether plumes could significantly impact aviation.

- This threshold was based on a past Australian Government Civil Aviation Safety Authority (CASA) Advisory Circular, AC 139-05 (0), "Guidelines for Conducting Plume Rise Assessments", dated June 2004. The Advisory Circular stated that "Aviation authorities have established that an exhaust plume with a vertical gust in excess of 4.3 meters/second (m/s) may cause damage to an aircraft airframe, or upset an aircraft when flying at low levels."

- A January 2006 FAA publication called "Safety Risk Analysis of Aircraft Overflight of Industrial Exhaust Plumes" cited this advisory. See the following link for the FAA document, and see page 6 for the reference to the CASA Advisory Circular. http://www.ctcombustion.com/oxc/sources/20-safetyriskanalysis.pdf

Re-examination of 4.3 m/s average vertical velocity threshold

- Recently, the Energy Commission has received comments critical of the 4.3 m/s average plume vertical velocity threshold, questioning its basis. This prompted staff to review recent literature on plume thresholds.

- Commission staff has found that more recent publications do not support the use of a threshold of significance of 4.3 m/s:

    - According to page 55 of the FAA-sponsored Airport Cooperative Research Program's "Guidebook for Energy Facility Compatibility with Airports and Airspace", the origin of CASA's 4.3 m/s threshold is unknown, and CASA was unable to verify the source of the threshold.

    - On page 56, the Guidebook states: "Using the Beaufort Wind Scale, the 4.3 m/s is characterized … as a gentle breeze described as leaves and small twigs constantly moving." This does not seem to support 4.3 m/s as a good threshold.

    - According to Table 10.1 in the Australian Government Bureau of Meteorology's "Manual of Aviation Meteorology", Second Edition, dated 2007, 4.3 m/s is in the realm of light turbulence, which would result in "rhythmic bumpiness. Momentary changes in altitude and attitude." Again, this does not seem to support 4.3 m/s as a good threshold.

- Another flaw with staff's threshold of 4.3 m/s average vertical velocity is that it was just an average vertical velocity across the entire plume. The peak vertical velocity for a plume can be up to twice the average vertical velocity at a particular altitude. For example, at a particular altitude, while the average vertical velocity might be 4.3 m/s across the entire plume, the peak velocity in the middle of the plume could be up to twice that at 8.6 m/s.

- It would make sense for Energy Commission staff to characterize the plume velocity threshold in terms of a peak vertical velocity, not an average vertical velocity, as the peak vertical velocity is a worst-case velocity at a given altitude.

<u>Reasons for using 10.6 m/s peak vertical velocity as the new threshold</u>

- According to Table 10.1 in the Australian Government Bureau of Meteorology's "Manual of Aviation Meteorology", Second Edition, dated 2007, 10.67 m/s is the start of severe turbulence, which would result in "large abrupt changes in altitude and attitude. Momentary loss of control."

- A recent CASA advisory circular, AC 139-5(1), dated November 2012, also states that severe turbulence commences at a vertical wind gust velocity in excess of 10.6 m/s.

- The FAA-sponsored "Guidebook for Energy Facilities Compatibility with Airports and Airspace" refers to AC 139-5(1) and the 10.6 m/s threshold for severe turbulence on page 55.

- According to Table 10.1 in the Australian Government's "Manual of Aviation Meteorology", in terms of G-load, 1G is the start of severe turbulence and corresponds with the severe turbulence threshold of 10.67 m/s. The FAA-sponsored "Guidebook for Energy Facilities Compatibility with Airports and Airspace" supports the 1G threshold (and thus, the corresponding threshold of 10.67 m/s) as the start of severe turbulence:

    - It states on page 52 that NOAA defines severe turbulence as starting at 1G.

    - It states on page 56 a MITRE study's conclusion that an appropriate safety threshold is the potential for a plume to create more than a 1G vertical acceleration on an aircraft.

- Based on review of the recent publications discussed above, staff will use 10.6 m/s peak vertical plume velocity as the new threshold. The altitude at which a plume would have a peak vertical velocity of 10.6 m/s would be the same altitude at which a plume would have an average vertical velocity of half that, 5.3 m/s. (You can compare this to the 4.3 m/s average vertical velocity formerly used as the threshold).

Ideally, we would be able to use the MITRE model for plume analysis, but until this model is modified to accommodate our power plant projects, this seems like the next best approach.