



February 4, 2011

California Energy Commission
ATTN: Docket No. 08-AFC-9
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DOCKET

08-AFC-9

DATE FEB 04 2011

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In the Matter of: APPLICATION FOR CERTIFICATION FOR THE PALMDALE
HYBRID POWER PROJECT

Pursuant to the Commission's January 31, 2011 Second Revised Notice of Prehearing Conference and Evidentiary Hearing and Order Granting Intervenor's Motion to Continue Hearing Dates and Other Deadlines, Intervenor Center for Biological Diversity submits the enclosed Testimony of Gregory Tholen in response to staff testimony filed January 21, 2011.

I have also provided the enclosed document to the attached service list by electronic mail and/or U.S. Mail.

Sincerely,

John Buse
Senior Attorney
Center for Biological Diversity

Enclosure

**Testimony of Gregory Tholen
Autumn Wind Associates, Inc.**

**Palmdale Hybrid Power Project
Docket 08-AFC-9**

Re: Road Paving Offsets

On January 21, 2011, in response to opening testimony submitted by the Center for Biological Diversity (“CBD”) (“CBD Opening Testimony”), the California Energy Commission (“CEC”) Staff released rebuttal testimony (“Staff’s Rebuttal Testimony”)¹ analyzing potential environmental impacts of the Applicant’s proposal to pave several road segments to satisfy offset requirements for emissions of particulate matter smaller than or equal to 10 micrometers (“PM10”) from the Project. My testimony herein provides a response to Staff’s Rebuttal Testimony.

QUALIFICATIONS

My qualifications include more than 20 years employment with two local California air quality management districts. I was the project manager for the development, revision, and adoption of California Environmental Quality Act (CEQA) guidelines for air quality impacts for two air quality management districts: the Sacramento Metropolitan Air Quality Management District (SMAQMD, 2002) and the Bay Area Air Quality Management District (BAAQMD, 2010).

STATEMENT

Staff’s Rebuttal Testimony provided environmental analysis in the areas of Biological Resources; Cultural Resources; Hazardous Materials Management; Public Health and Safety; Land Use; Socioeconomics; Soil and Water Resources; Traffic and Transportation; Waste Management; and Geology, Paleontology, and Minerals. Staff’s Rebuttal Testimony failed to address the bulk of the comments

¹ California Energy Commission, Energy Commission Staff’s Rebuttal Testimony, In the Matter of: Application for Certification for the Palmdale Hybrid Power Project, Docket No. 08-AFC-9, January 21, 2011.

included in the Center for Biological Diversity's (CBD) Opening Testimony; specifically, it failed to address any of the potentially significant air quality impacts anticipated to result from the construction and use of the roads to be paved by the applicant to satisfy mitigation requirements, and it has ignored the stated concern that PM10 emission reduction credits (ERC) generated by paving roads cannot be considered effective to offset or mitigate the power plant's significant annual PM2.5 emissions. In addition, nowhere in the record has Staff addressed potentially significant impacts to air quality previously identified and raised by CBD (see letter of Phyllis Fox, Ph.D., submitted July 22, 2010).

As Dr. Fox's comments pointed out in detail, PM10 emission reduction credits (ERC) generated by road paving are not qualitatively interchangeable for the purpose of offsetting those PM2.5 particulate emissions that will predominate the particulate fraction of emissions from combustion of natural gas during power plant operation. In fact, the great majority of operational plant particulate emissions will be ultrafine, or below .1 micrometers in diameter; these ultrafine emissions are far more likely to cause exceedances of PM2.5 federal and state air quality standards and cause serious health risks to breathers since the smaller fractions are far more apt to evade the body's physiological defense mechanisms that have evolved over the eons to respond to naturally occurring larger-aerodynamic dust (and not combustion ultrafines). As has been pointed out in previous comments on the record, CEC staff's intent to permit use of PM10 ERCs to offset PM2.5 plant emissions will actually increase PM2.5 emissions (from vehicle operations on project-related paved roads, for example), since only about 10% of PERCs are at or below the critical PM2.5 size cut.

As discussed in CBD's Opening Testimony, the generation and use of paving emission reduction credits ("PERCs") to offset combustion emissions will have a number of adverse impacts on air quality that have not been properly reviewed, identified, or mitigated by CEC staff, including:

- Impacts resulting from the construction and changes in the use of the roads paved to satisfy mitigation requirements. Paved roads are likely to attract more traffic than the previously unpaved roads and may induce growth in outlying, rural areas. Construction-generated ultrafine emissions from diesel equipment operation will also contribute to the net increase in PM2.5 emissions to the air basin, with project development.
- Impacts resulting from mitigating PM2.5 impacts with PM10 emission reductions. The major difference between entrained road dust and combustion emissions is the composition of the particles. PHPP's combustion particulate emissions will be comprised almost entirely of

PM2.5, and the great majority will be at or below 0.1 microns in diameter; ample evidence from CARB and EPA health-based studies and referenced by Dr. Fox has clearly associated increased mortality and morbidity with increases in ambient air pollution, and ultrafine particulate is inherently more dangerous since the smallest particles are able to penetrate deep into the lungs where they are readily dissolved and absorbed. Road dust particulate matter – PM10-- consists mostly of sand and soil, and due to its larger aerodynamic size is far less able to penetrate deep into bronchi or lungs. Moreover, ultrafines generated by combustion can greatly increase health risks due to their carrying toxic components deep into lung tissue. Any emission reduction credits used for offsets must have the same qualitative health impacts as the actual emissions. Due to essential size and composition differences between PM10 and PM2.5, with proportionally greater risks to human health and attainment challenges associated with PM2.5 emissions increases, reductions in PM10 from paving roads cannot be expected to effectively mitigate or offset PHPP's PM2.5 emissions.

In sum, paving of existing unpaved public roads to generate PERCs would actually impede progress toward reducing PM2.5 in the area surrounding the proposed power plant and in the broader air basin, increase risks to and endanger the health of the region's residents, and impair their ability to enjoy the outdoor environment. These issues are significant environmental impacts that must be analyzed under the California Environmental Quality Act ("CEQA").

I. Impacts resulting from the construction and changes in the use of the roads paved to satisfy mitigation requirements

I.A Road Paving May Increase Traffic and Particulate Matter Emissions

Paved roads are likely to attract more traffic than the previously unpaved roads; traffic speeds would increase, entrained road dust would increase with the number of vehicles on the road and their possibly increasing weight as more trucks will use the road. Paved roads may also attract development, which would drastically change the vehicle pattern and weight distribution. Thus, the actual reduction in PM10 emissions would be lower than assumed in the PERC calculations. CEC staff analysis for the PHPP project does not appear to include review of this potential environmental effect, and their rebuttal testimony dated January 21, 2011 fails to respond to the matter raised in testimony submitted by CBD previously.

I.B Construction Emissions of Criteria Air Pollutants Associated with Road Paving Are Significant

As was pointed out by Dr. Fox in her letter to CBD dated July 19, 2010 the methodology to calculate PERCs based on the MDAQMD's Rule 1406 (after which the AVAQMD would model its PERCs) simply determines entrained road dust from vehicle travel before and after paving of an unpaved road. The methodology fails to account for emissions associated with the paving of existing unpaved roads and with the periodic maintenance of the paved road. Emissions during the construction phase of road paving include asphalt fumes, fugitive dust, and combustion emissions from vehicles and construction equipment. These emissions are considerable, may result in significant impacts, and should have been subtracted from any PERCs derived from them.

Fugitive dust emissions during road paving for city and county roads result predominantly from site preparation work which may include scraping, grading, loading, digging, compacting, light-duty vehicle travel, and other operations. In addition, trucks and construction worker commuter vehicles to and from the construction site would generate additional entrained road dust emissions. Fugitive dust PM10 emissions associated with road paving would result in a potentially significant impact on air quality on both a daily and an annual basis during the year the road is paved. Construction- and worker-related fugitive and PM2.5 emissions should have been estimated and evaluated, with allowance for subtraction from project-related PERCs.

The use of asphalt for paving of roads also results in considerable emissions of volatile organic compounds ("VOCs") at the asphalt plant and at the construction site. Emissions from asphalt paving occur when asphalt mixtures are applied and as they cure. Construction equipment and vehicles used to transport asphalt from the asphalt plant, road base from aggregate processing plants, and workers to the construction site would generate exhaust emissions from combustion of diesel and gasoline. Particularly, emissions of the ozone precursors nitrogen oxides ("NOx") and VOCs have the potential to exceed the AVAQMD's daily CEQA significance thresholds for these pollutants and further exacerbate the District's state and federal ozone non-attainment status. Emissions from construction and from maintenance of paved roads must therefore be evaluated and adequately mitigated.

II. Impacts Resulting From Mitigating PM2.5 Impacts With PM10 Emission Reductions

The Applicant and the AVAQMD propose to offset PM₁₀ emissions from the PHPP's operational and combustion emissions by reducing entrained dust

PM10 emissions in the District through paving of existing unpaved public roads. These PERCs would be acceptable to CEC for offsetting PM10 emissions anywhere in the District, regardless of the location of the source, the location of the unpaved road, or the type of PM10 emissions. This leads to a number of problems affecting the air quality in the AVAQMD and MDAB and the health of their residents.

II.A PM10 and PM2.5 Size Fractions in Entrained Road Dust and Combustion Emissions

Particulate matter ("PM") is a collective term for very small solid or liquid particles suspended in the atmosphere. Particulate matter can be classified according to physical (size, mode of formation, settling properties and optical qualities), chemical (organic or inorganic composition), and biological (bacteria, viruses, spores, pollens etc.) characteristics. Among the most common categorizations imposed on particulate matter are those with respect to size, referred to as fractions. The size of the particles is very important because it determines the ability of the particles to penetrate into the lungs, thus determining health impacts.

The notation PM10 is used to describe particles 10 micrometers or less in aerodynamic diameter (thoracic fraction) and the notation PM2.5 represents particles of 2.5 micrometers or less in aerodynamic diameter, so-called fine particles. The notation PM0.1 represents ultrafine particles with an aerodynamic diameter of 0.1 micrometers or less. Thus, the smaller size fractions are contained within the larger size fractions, *i.e.* the PM2.5 fraction of emissions is contained within the PM10 fraction of emissions. The remaining fraction of PM10, *i.e.* the size fraction of 2.5 to 10 micrometers is termed coarse particulate matter or PM2.5-10. The U.S. EPA and the State of California have promulgated separate ambient air quality standards for PM10 and PM2.5 based on mass concentrations in ambient air.

Numerous studies have shown that fugitive dust PM10 consists of about 90 percent coarse particulate matter, *i.e.* PM2.5-10, and only about 10 percent PM2.5 or fine particulate matter.² In contrast, combustion emissions from fossil fuel-fired sources are almost entirely composed of very small particulates. Figure 1 illustrates the fraction of PM2.5 contained in the PM10 emissions from entrained road dust from unpaved roads and combustion emissions from a gas-fired stationary internal combustion engine.

² Western Governors' Association, Western Regional Air Partnership (WRAP), Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors, MRI Project No. 110397, Finalized November 1, 2006, p. 5; <http://snipurl.com/4idkp> or <http://www.epa.gov/ttn/chief/ap42/ch13/bgdocs/b13s02.pdf>.

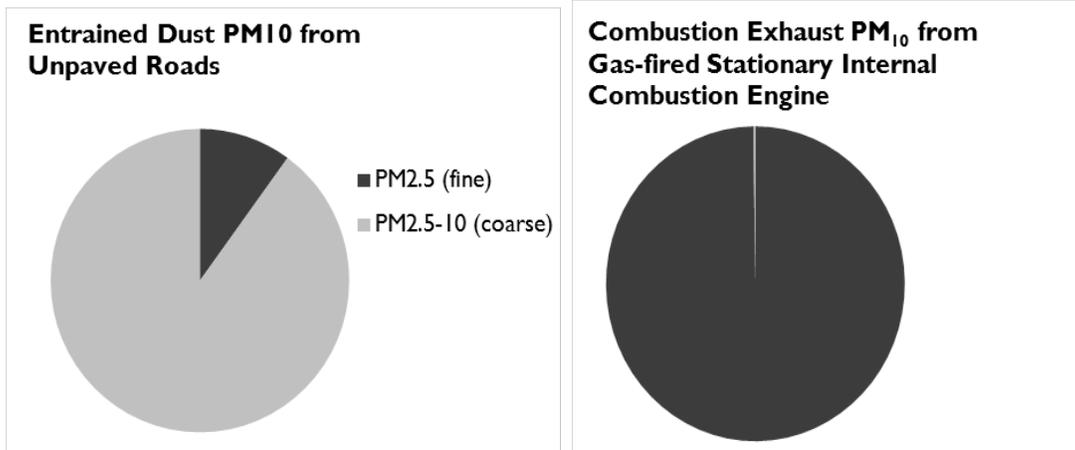


Figure 1:
Fraction of PM_{2.5} (fine) and PM_{2.5-10} (coarse) in PM₁₀ emissions contained in entrained road dust from unpaved roads (left) and combustion exhaust from gas-fired stationary internal combustion engines (right)

II.B Health Effects of PM_{2.5} and PM₁₀ and Ambient Air Quality Standards

From a health perspective, the major difference between entrained road dust and combustion emissions is the composition of the particles: combustion particles are predominantly present in the smallest particles and are readily dissolved in the lungs. Unpaved road dust PM is mostly sand and soil, which are predominantly present in the largest particles and are largely insoluble. Any emission reduction credits used for offsets must have the same qualitative health impacts as the actual emissions. Due to their essential composition differences, PM₁₀ reductions from road paving cannot be expected to effectively offset or mitigate the health impacts from primarily PM_{2.5} and smaller particulate resulting from project-related combustion sources.

II.C Use of PERCs Would Result in Increased PM_{2.5} Emissions in the District and Impede AVAQMD's Compliance with State Ambient Air Quality Standards for PM_{2.5}

Figure 2 below illustrates how offsetting PM₁₀ emissions from a natural gas-fired power plant with entrained road dust-based PERCs would increase PM_{2.5} emissions.

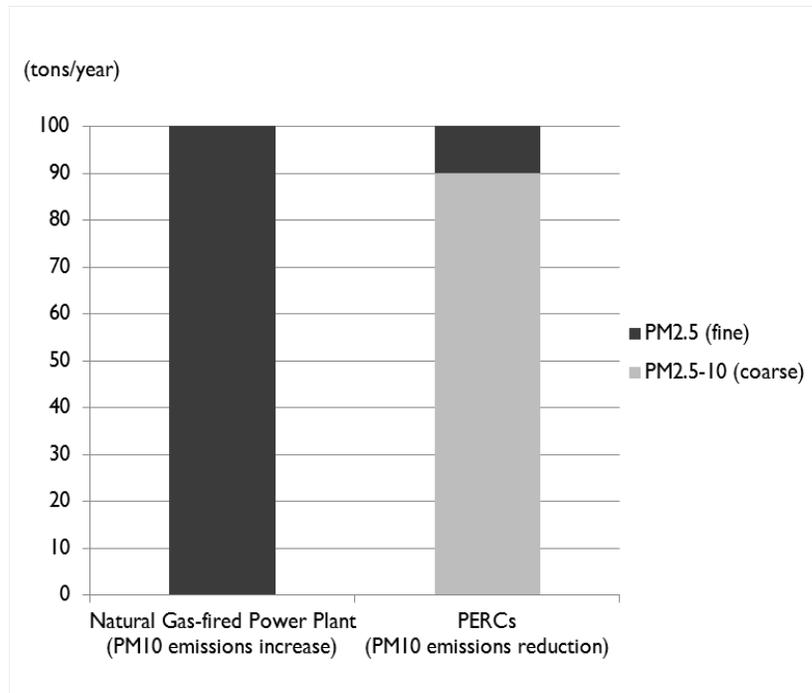


Figure 2:
Comparison of PM_{2.5} and PM_{2.5-10} size fractions in PM₁₀ combustion emissions increase from a natural gas-fired power plant and PM₁₀ entrained road dust emissions reduction from PERCs

Combustion emissions from the natural gas-fired power plant turbines are fine particulate matter, *i.e.* equal to or smaller than 2.5 micrometers. The PM₁₀ emissions reductions from paving an unpaved road consist of coarser particles with a diameter between 2.5 and 10 micrometers. Thus, when offsetting, for example, 100 tons/year of PM₁₀ combustion emissions with PERCs, 99.8 tons/year of PM_{2.5} emissions would be offset with 9.98 tons/year of entrained road dust PM_{2.5} and 89.82 tons/year of PM_{2.5-10}. Thus, the example offset scheme would result in a net increase of 89.8 ton/yr of PM_{2.5}, the fraction of particulate matter that poses the most significant health risk.

These potentially significant impacts on air quality must be evaluated and, if found significant, mitigated as required by CEQA.

III. Summary

Despite CBD and Dr. Fox having raised earlier concerns regarding the CEC's inadequate review of certain air quality factors influencing environmental impacts for the proposed PHPP project, those issues have remained unaddressed by CEC staff.

CEC staff continues to assert that PERCs composed primarily of geocrustal large-diameter (PM10) particles are acceptable to offset the plant's substantial PM emissions, of which the supermajority will be comprised of combustion-related particulate at or below 2.5 microns in diameter. Qualitatively, PM2.5 from combustion sources represents considerably greater health risks to breathers and to local and regional environments in comparison to the size and type of fugitive emissions that result from unpaved road use.

As currently proposed in CEC documentation the PHPP project will lead to a net increase in greater-risk PM2.5 particulate emissions, since road-paving PM10 contains, on average, only 10 percent PM2.5. As noted previously by Dr. Fox in her letter to John Buse of CBD, submitted to CEC on July 22, 2010, PHPP will contribute a net increase of close to 90 tpy PM2.5 – and this does not include increased PM2.5 emissions that can be expected to result from increased VMT resulting from project-paved roads.

Further, paving previously unpaved roads will generate construction emissions that have not been adequately reviewed or mitigated, and paved roads can be expected to substantially increase vehicle-miles-traveled beyond what would otherwise occur. In turn, increased VMT will lead to more combustion-generated PM2.5, including some level of diesel emissions that will contain toxic air contaminants. Finally, paving roads in the vicinity of the plant can and likely will act to induce growth in the rural area, and that growth can be expected to cause increased pressures on local and regional air quality resources.

Without additional air quality review and protections, including the specific concerns previously raised by CBD, the CEC's environmental review and proposed mitigations for the PHPP project remain inadequate.

Dated: February 4, 2011

Signed: 



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APPLICATION FOR CERTIFICATION
For the *PALMDALE HYBRID*
POWER PROJECT

Docket No. 08-AFC-9

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(Revised 1/14/2011)

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DECLARATION OF SERVICE

I, John Buse, declare that on, February 4, 2011, I served and filed copies of the attached Testimony of Gregory Tholen, dated February 4, 2011. The original document filed with the Docket Unit is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [http://www.energy.ca.gov/sitingcases/palmdale/index.html]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

- sent electronically to all email addresses on the Proof of Service list;
- by personal delivery;
- by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

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FOR FILING WITH THE ENERGY COMMISSION:

- sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (**preferred method**);

OR

- depositing in the mail an original and 12 paper copies, as follows:

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I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

