SLO COUNTY apcd | Air Pollution Control District
San Luis Obispo County

January 27, 2015

Justin Buhr, Coastal Planner
Central Coast District Office
California Coastal Commission
725 Front Street, Suite 300
Santa Cruz, CA 95060

SUBJECT: Response to January 12, 2015 letter requesting information

Dear Mr. Buhr:

In your attached letter dated January 12, 2015, you have asked for data regarding all exceedances of the state and federal PM_{10} standards recorded at our CDF monitoring station since 2008. The CDF monitor records the highest level of PM_{10} and $PM_{2.5}$ from all the monitors located throughout SLO County. This monitoring site was not established until 2010, however, so data is only available from that point forward, as shown in the following table:

Year	PM_{10}			$PM_{2.5}$		Notes
	Federal 24-hr Exceedences	State 24-hr Exceedences	Annual Average (ug/m3)	Federal 24-hr Exceedences	Annual Average (ug/m3)	
2014	2	83	38.6	1	12.3	Unofficial, includes preliminary data.
2013	2	93	39.9	3	12.5	
2012	3	70	33.6	3	9.6	
2011	0	63	34.4	0	11.9	
2010	1	53	32.4	0	9.5	Partial year-site only operated 10 months.

- Federal PM_{10} 24-hr standard is 150 ug/m3; State PM_{10} 24-hr Standard is 50 ug/m3
- State Standard for PM_{10} annual average is 20 ug/m3. (There is no federal standard for the PM_{10} annual average.)
- Federal $PM_{2.5}$ 24-hr standard is 35 ug/m3. (There is no state standard for 24-hr $PM_{2.5}$.)

State and federal standards for $PM_{2.5}$ annual average are both 12 ug/m3

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You have also asked for our opinions on the following questions:

1. Whether or not OHV use contributes to dust emissions;
2. Where the most emissive parts of the ODSVRA are; and
3. What the SLOAPCD believes would be the most efficient and cost effective measures to reduce dust emissions to be in compliance with Rule 1001.

Fortunately, the data speaks for itself on questions 1 and 2 so no opinion is necessary. For question No. 3, there is also a substantive body of data from various studies performed at the ODSVRA and elsewhere regarding the most effective controls for reducing dust, but cost-effectiveness has many associated variables that require a more subjective interpretation. Our response to each of the questions is below.

1. Does OHV use contribute to dust emissions?

The San Luis Obispo County Air Pollution Control District (SLOAPCD) determined several years ago that off-highway vehicle use (OHV) at the Oceano Dunes State Vehicular Recreation Area (ODSVRA) was a significant contributor to dust levels measured on the Nipomo Mesa. This determination was reached after performing comprehensive air monitoring studies and extensive data analyses evaluating PM_{10} levels downwind of the riding areas and comparable nonriding areas at the ODSVRA. Those studies showed that PM_{10} concentrations downwind of the riding areas are significantly higher than those measured downwind of nonriding areas. As shown below in Figure 3.54 from the SLOAPCD *South County Phase 2 Particulate Study* (February 2010), average PM_{10} levels measured at both the CDF and Mesa2 monitoring sites downwind of the riding areas were more than twice as high as those measured at the Oso site downwind of a nonriding area. These differences were measured despite the Oso site being considerably closer to shore and subject to much stronger winds than either the CDF or Mesa2 sites.

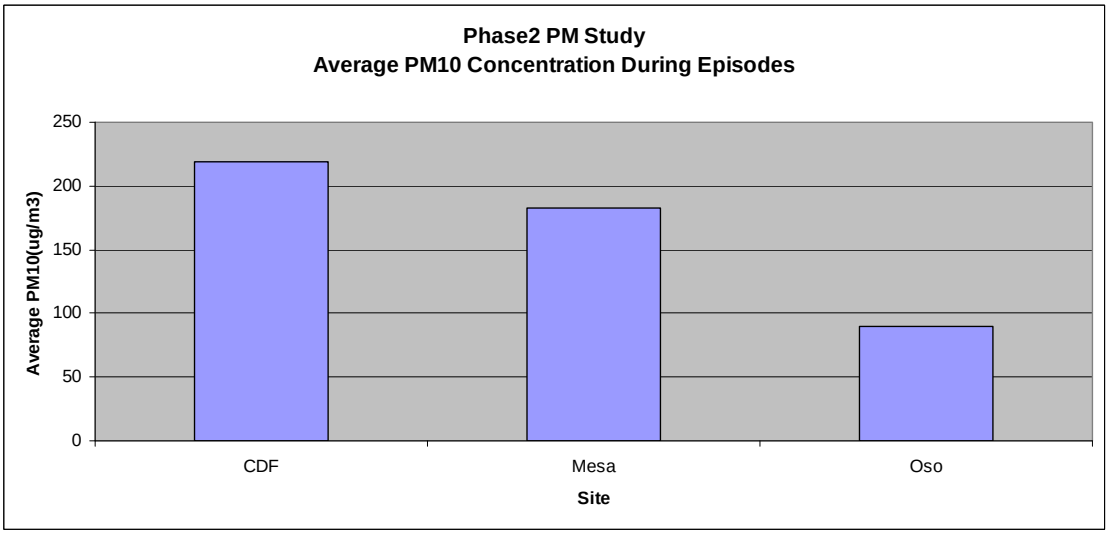


Figure 3.54 – Comparison of Average Downwind PM10 Concentration During Episodes

More recently, the OHV Division of State Parks measured very similar results after performing extensive air monitoring studies in the Spring and Summer of 2013, the results of which are documented in the report prepared by their consultant, Desert Research Institute (DRI), titled: *Wind and PM10 Characteristics at the ODSVRA from the 2013 Assessment Monitoring Network* (September 2014). They installed monitoring equipment along 4 different transects in the ODSVRA in the direction of the prevailing northwest winds. Transect 1 was located in the Nature Preserve at the north end of the SVRA; Transect 2 was located within the LeGrande Tract riding area; Transect 3 was located within the larger riding area south of the LeGrande tract; and Transect 4 was located in the nonriding area southeast of Oso Flaco Lake. As shown in Figure 47 from that report (below), PM_{10} levels measured at site 2C in the LeGrande tract riding area were far higher than all other sites, with PM_{10} levels measured at site 3C in the more southerly riding area being next highest. PM_{10} levels measured at sites 4B and 1C in the southerly and northerly nonriding areas were considerably lower than those measured in the riding areas, as shown in the figure below.

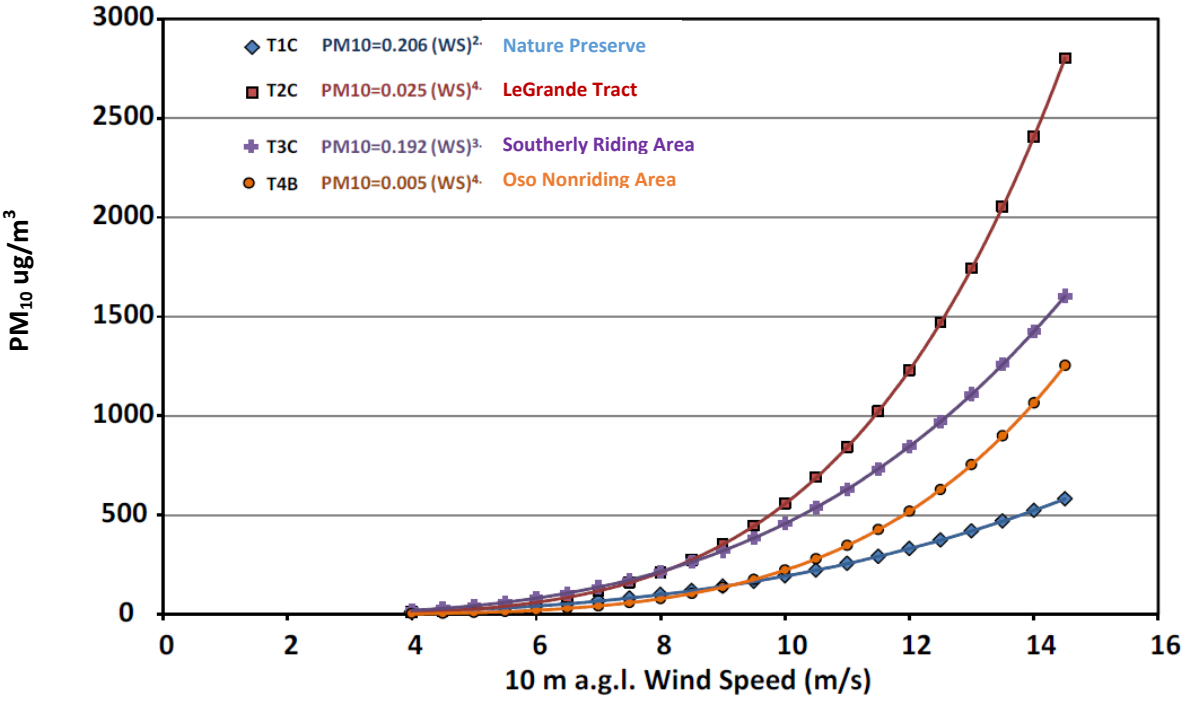
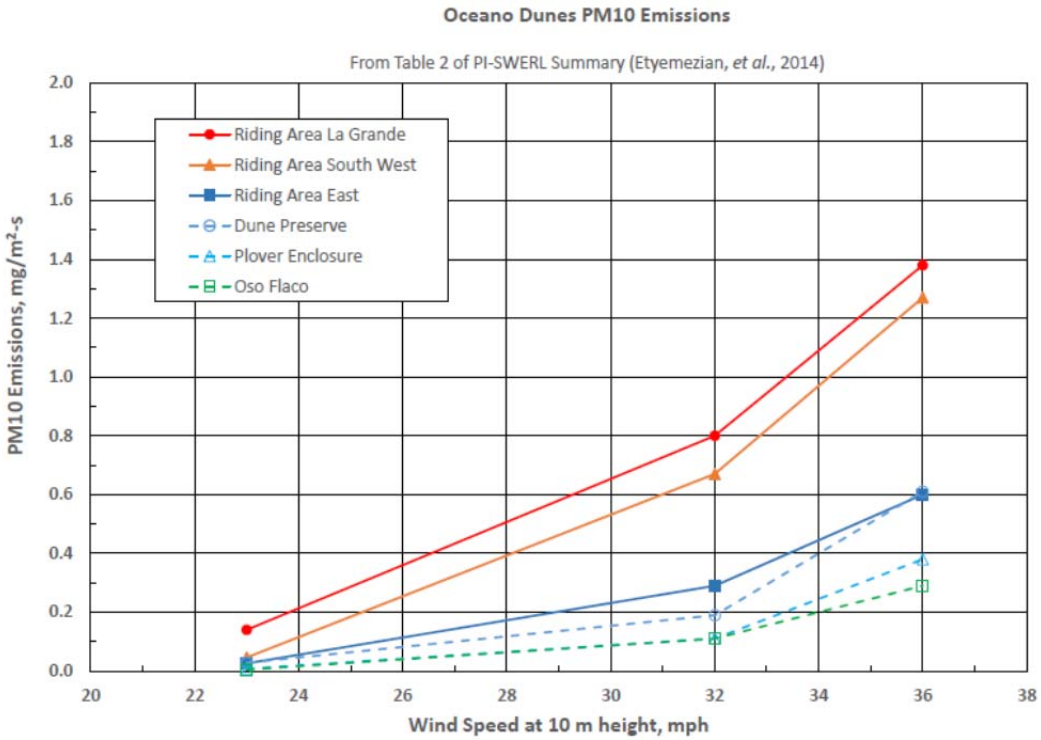


Figure 47. Relationships between mean 10 m hourly wind speed and PM_{10} for the four e-Bam measurement positions for the 292° winds (NB: no 10 m wind speed measured at position T3B).

2. Where are the most emissive areas of the ODSVRA?

During the 2013 monitoring study referenced above, DRI scientists also performed extensive analyses of soil emissivity throughout the ODSVRA using their patented PiSwerl measurement device. Over 350 measurements were performed to evaluate the relative emissivity of the riding areas and nonriding areas in the park. Their preliminary report, titled *2013 Intensive Wind Erodibility Measurements at and Near the Oceano Dunes State Vehicular Recreation Area: Preliminary Report of*

Findings (July 2014), clearly shows the riding areas to be substantially more emissive than the nonriding areas, with the LeGrande tract riding area up to 30 times more emissive than the Oso nonriding area, and up to 8 times more emissive than all nonriding areas combined. The figure below is a graph of the data presented in Table 2 of that report.



3. What does the SLOAPCD believe would be the most efficient and cost effective measures to reduce dust emissions to be in compliance with Rule 1001?
As mentioned above, there are a number of variables associated with answering this question, so I asked our consultant, Mel Zeldin, to provide his professional recommendations (attached). While Mr. Zeldin identified eliminating riding upwind of the affected populated areas as the most effective strategy, that action is not endorsed nor recommended by the SLOAPCD. We firmly believe effective dust control strategies are available to reduce emissions to a level that complies with Rule 1001 while continuing to allow recreational riding in the park, provided such measures are applied appropriately in the most emissive areas. We do, however, agree with and support his recommendation that replanting of vegetation is the most effective long-term strategy currently available.

In our opinion, reestablishing vegetated foredunes in the areas where they have been destroyed by vehicle activity would appear to be the most effective strategy, followed by establishing additional vegetation islands in the inland riding areas. Studies performed by DRI as described in their *Oceano Dunes Pilot Projects* report (July 2011) show vegetated areas to be nearly 100% effective in reducing sand movement and would provide year-round, permanent reductions; wind fencing is less than

half as effective at best, and provides only a temporary solution. Regarding the need to reestablish vegetated foredunes, that recommendation is provided in a substantive study commissioned by State Parks and performed by the California Geologic Survey. Their report, titled *Review of Vegetation Islands, Oceano Dunes SVRA* (August 2007), documents the historical and current vegetation coverage at the ODSVRA and the nearly complete loss of vegetated foredunes in the riding area between 1970 and 1992 due to OHV activity. In that report, the authors identify the need to reestablish vegetated foredunes along the coast to the west and northwest of all areas where inland vegetation is desired due to their ability to substantially reduce wind force and sand movement that will otherwise bury newly planted inland vegetation without that protection.

We believe the use of soil binders and sand fencing, as is currently proposed by State Parks for 2015 dust control, will provide immediate help in dust reduction, but are not adequate without significant revegetation to achieve compliance with Rule 1001. Nonetheless, soil binders have the potential to be far more effective than sand fencing in terms of dust reduction and cost and, if proven feasible for use at the ODSVRA, may be the best interim control measure before revegetation efforts are fully established. Thus, adequate testing of soil binders is essential to determining their potential effectiveness.

Summary

As documented in the studies described in our responses to questions 1 and 2 above, OHV use at the ODVSRA is clearly the major contributor to dust emissions generated there, and the Le Grande tract riding area is the most emissive area at that facility. In our opinion, reestablishing vegetated foredunes near shore and additional vegetation islands further inland, together with seasonal use of soil binders and/or sand fencing in the high emissive back dune areas, represents the most effective approach capable of meeting the requirements of Rule 1001, and for achieving the overall objective to reduce emissions in the riding areas to natural background levels while retaining offroad vehicle activity.

I hope these responses adequately answer the questions you posed. All studies referenced above are available on the SLOAPCD website at http://slocleanair.org/air/pmstudydata.php. Please feel free to contact me at (805) 781-5912 if you have any questions or need additional clarification on the issues addressed in this letter.

Sincerely,

Larry R. Allen
Air Pollution Control Officer

Cc: Christopher Conlin, OHV Division, State Parks
Kurt Karperos, California Air Resources Board

Enclosure(s)

Attachment 1

MELVIN D. ZELDIN
Environmental Consultant
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775-530-9548

January 21, 2015

Mr. Larry Allen, APCO
San Luis Obispo County APCD
3433 Roberto Ct.
San Luis Obispo, CA 93401

RE: Evaluation of Efficiency and Cost-Effectiveness of ODSVRA Mitigation Measures

Dear Mr. Allen:

This letter is in response to your e-mail of January 20, 2015.

Just as a quick background for the Coastal Commission, in the 1990's I was with the South Coast AQMD and was responsible for the initial PM10 State Implementation Plan for the Coachella Valley -- an area with substantial winds (and associated wind farms) plus annually replenished coarse sand, the combination of which caused considerable exceedances of the federal PM10 standards. The conditions there are reasonably similar to those occurring in the Oceano Dunes area. Having been involved with numerous studies trying to determine the best and most cost-effective ways of reducing PM10 caused by winds acting on coarse sand, I have a very relevant background and firsthand knowledge of appropriate mitigations.

This response is based primarily on my scientific knowledge and experience, because an in-depth analysis of comparative cost-effectiveness will take some time to prepare.

The current conditions in the Oceano Dunes area, based on a number of studies, clearly show significant PM10 levels, sometimes exceeding federal PM10 standards, and more frequently the state PM10 standards. These conditions, as measured at the CDF site indicate unhealthful exposures to the population inland of the ODSVRA. In my opinion there are three primary options to mitigate these conditions, in the decending order of overall effectiveness in reducing PM10 levels affecting the inland populated areas :

Mitigation #1) Based on all the studies I have reviewed, there is no question that the recreational vehicle activities contribute to the elevated PM10 conditions, both directly by mechanical action of sand movement which, in conjunction with stronger winds, produces direct PM10 emissions which are carried inland by the winds; and secondly, preventing the natural stabilization of the sand surface such that greater emissivity of emissions occurs during windy conditions. The most effective mitigation measure, and one that has the greatest possibility of meeting state PM10 standards and the provisions of Rule 1001, is to eliminate all off-road vehicle activity in the area most impacting the downwind residential areas of the Nipomo Mesa. While I recognize this is not likely an

option under consideration, it is my professional opinion that all the key effective mitigation alternatives at least be identified. It should also be noted that EPA will not accept any form of exceptional event where there is any indication that anthropogenic activity is a key source of a PM10 exceedance; thus any federal exceedances measured under any other mitigation alternative will not be considered by EPA to meet exceptional event criteria.

Mitigation #2) If vehicle activity must be accommodated, then the second most effective method will be to establish at least two parallel rectangular vegetative areas enclosed by fencing within the riding areas, such that the extent of the vegetation is of sufficient size to eventually act as a wind barrier, a collector of saltating particles, and a limiting area of the constantly disturbed sand in the riding areas. Under this scenario, the riding areas would be more limited and the vegetative barriers would reduce the PM10 emissions. The degree to which emissions would be reduced would depend on the extent and location of the vegetated areas. The difficulty with this approach is that it takes a number of years for the vegetation to develop and grow to sufficient size and coverage to achieve its purpose, so for several years, other mitigation methods will be needed as well. From the SLOAPCD's South County Phase 2 Particulate Study, dated February 2010, there is mention of State Parks previously initiating re-vegetation in the southern section of the ODSVRA, but what is needed is a similar approach more northward where the origins of the PM10 impacting the population are occurring.

As stated in Chapter 6 of that report:
OHV activity prevents formation of a stabilizing crust in the SVRA through continual disturbance of the sand surface.....Similarly OHV activity prevents vegetation from growing in the riding areas of the SVRA, as stated in the State Parks report "Review of ODSVRA Vegetation Islands." That study clearly shows that revegetation efforts in unfenced areas have failed.

Denuding of vegetation and the resulting increase in the aerial extent of open sand sheets from OHV activity on the SVRA is obviously a significant factor in the level of windblown sand emissions from the area.

...the complete lack of sand collected by the sandcatcher located in a vegetated area of the control site dunes provides clear demonstration of the ability of vegetation to control wind erosion.

Thus the ability to re-vegetate in the appropriate and strategically placed upwind areas of the ODSVRA can lead to significant reductions in PM10 emissions once the vegetation has matured, although it is not possible to determine if compliance with Rule 1001 would be achieved. At least, though, if indeed there are violations of the Rule, there would be fewer occurrences of such violations.

Mitigation #3) If vehicle activity is to be accommodated AND the ability to re-vegetate in strategic areas of the ODSVRA is not feasible, then other mitigations must be used. Currently, as I understand it, the State Parks is proposing the use of wind fencing covering somewhere around 30-40 acres. From tests in the Coachella Valley that I was involved in, wind fencing has limited effectiveness in controlling saltation, a source of PM10 emissions; however, once emissions are airborne upwind of the fences, their effectiveness is virtually zero. A number of studies have shown that the saltation process PM10 reduction from wind fences has a PM10 control effectiveness of about 35% in the area immediately downwind of the fencing. Considering that there would be substantial areas of PM10 emissions upwind of the fencing in the riding areas, I would

not expect such a small area to have much of an impact on any of the key parameters: federal PM10 exceedances, state PM10 exceedances, and Rule 1001 violations.

From the Coachella Valley experiences, we found that eco-friendly soil stabilizers had about twice the control effectiveness as wind fences; and the South Coast AQMD's "Dust Control in the Coachella Valley - Volume 1" lists close to 100 different soil stabilization products on the market, though very few would meet the conditions needed for the Oceano Dunes area; however, a few products would likely work well in this environment.

Based on my experience and knowledge, it is my best estimate that strategically applied soil stabilizers in dual rectangular areas, with perimeter wind fences, within the primary riding areas shown to be most emissive by DRI studies, covering a total area of at least 80 acres is the best mitigation approach under condition #3. This, or a combination of this strategy then coupled with the wind fencing as proposed by State Parks, may have a reasonable possibility of reducing PM10 sufficiently to eliminate exceedances of the federal PM10 standards, and reduce, though not eliminate, the number of state standard PM10 violations. It still would not eliminate periodic violations of Rule 1001.

Further, from one of the vendors whose western operations are located in nearby Santa Maria, the application cost of an effective eco-friendly soil stabilizer is around $1200 per acre. So an 80-acre area would cost about $100k for the application, and additional costs for perimeter fencing. Such an approach is, in my opinion, more efficient and cost effective than wind fencing alone, since it is my understanding that the cost of the 15-acre wind fencing mitigation project in 2014 as implemented by State Parks was well in excess of $100k. The combination of the two would achieve greater control effectiveness than any one method alone.
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Regarding the issue of longevity, Mitigation #1 would permanently reduce the PM10 impacts caused by the ODSVRA, first by the elimination of the mechanical dust producing actions of the vehicles, and second, by restoration of a more wind resistant surface, since there is some evidence from the Snowy Plover area that once a disturbed area is fenced off preventing further disturbances by vehicles, that natural crusting can re-establish within a relatively short period of time. Mitigation #2 would be permanent once the re-vegetation process was completed and the vegetation reached its full growth potential. However, because riding activity would still be occurring, the net PM10 reductions for Mitigation #2 would not be as great as for Mitigation #1. Lastly, Mitigation #3 is the least permanent and would require likely annual reapplications of soil stabilizers and fencing, and the placements, if not strategically optimal, may need to be changed annually as to location and areal extent.
*****

While the data show seasonality to the stronger wind days, nevertheless, the same data show that strong wind conditions favorable for impacting the CDF site can occur almost any month of the year. For this reason, Mitigation #1 would be most permanently effective; Mitigation #2 would need to be permanent and the re-vegetation areas permanently restricted from vehicle activity; and for Mitigation #3, seasonal approaches to mitigation efforts are troublesome for two reasons: (1) there could be off-season wind events leading to PM10 standards and Rule 1001 violations; and (2) there is significant added costs in taking down and rebuilding the mitigations each year.

In my opinion, if it is determined that recreational vehicle activity is going to continue into the future, then Mitigation #2 is likely the best approach, provided that it is clearly understood that re-vegetation areas need to be of sufficient size and strategic placement within the riding area to achieve substantial reductions in PM10 once the vegetation has achieved its growth potential.

I hope this assessment is helpful.

Sincerely,

Melvin D. Zeldin

Attachment 2

STATE OF CALIFORNIA—NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., *GOVERNOR*

CALIFORNIA COASTAL COMMISSION
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January 12, 2015

Larry Allen
San Luis Obispo County
Air Pollution Control District
3433 Roberto Court
San Luis Obispo, CA 93401

Subject: Oceano Dunes State Vehicular Recreation Area (ODSVRA) Dust Mitigation

Dear Mr. Allen:

Currently, Coastal Commission staff is in the process of preparing a staff report for the annual condition compliance review of coastal development permit (CDP) 4-82-300-A5. This review process assesses the overall effectiveness of the Technical Review Team, created as a condition of the CDP, in managing park resources. The correlation between the use of off-highway vehicles (OHV) within the ODSVRA and increased dust emissions is of concern to the Commission and will be a part of this review process. Therefore, Commission staff would appreciate some further information from the San Luis Obispo Air Pollution Control District (SLO APCD) in regards to the air pollution problem.

Could you please provide us with number of days for which an exceedance of the federal standard for PM10 was recorded at the CDF tower since 2008, as well as the number of days for which an exceedance of the California standard for PM10 was recorded at the CDF tower since 2008? Also, Commission staff would like to know SLO APCD's opinion in regards to whether or not OHV use contributes to dust emissions, where the most emissive parts of the ODSVRA are and what the SLO APCD believes would be the most efficient and cost effective measures to reduce dust emissions to be in compliance with Rule 1001.

If you have any other information that you believe would help assist the Commission in their review of vehicular impacts from the ODSVRA and their role in the air pollution problem affecting the area, please include them. If you have any questions, please do not hesitate to contact me.

Sincerely,

Justin Buhr

Justin Buhr
Coastal Planner
Central Coast District Office