

**SUBJECT: WIND ENERGY ZONING ORDINANCE AMENDMENT AND GENERAL PLAN AMENDMENT TO THE MOUNTAIN EMPIRE SUBREGIONAL PLAN (BOULEVARD SUBREGIONAL PLANNING AREA) AND BORREGO SPRINGS COMMUNITY PLAN TO ALLOW WIND ENERGY DEVELOPMENT, POD 10-007 (DISTRICTS: ALL)**

The following information is included in the record for this project:

- A. Letter to Samuel Milham, M.D., M.P.H. from County Public Health Officer Wilma J. Wooten, M.D., M.P.H. dated May 7, 2013.
- B. Analysis prepared by Jim Bennett, Groundwater Geologist, Planning and Development Services in response to the report Cumulative Impacts on Water Resources of Large-Scale Energy Projects in Boulevard and Surrounding Communities, San Diego County, California, by Victor M. Ponce dated April 30, 2013.

**This analysis was prepared by Jim Bennett, Groundwater Geologist in the County Department of Planning and Development Services on May 7, 2013.**

## **Groundwater General Comments**

The County has approved one wind energy project with large wind turbines, the Tule Wind project. The County approved the Tule Wind project in August 2012. This project provides a good example of groundwater demand for wind energy projects. The portion of the Tule Wind project in the County's land use jurisdiction includes five large wind turbines. The project will require up to 56 acre feet of groundwater, mostly for dust suppression during construction of all 62 wind turbines over a nine month period. Once the project becomes operational, the groundwater demand drops significantly. The project would need approximately 2,500 gallons per business day (about two acre feet per year) for the operations and maintenance building and support staff. This amount can be furnished by one groundwater well pumping at a rate of about two gallons per minute. The Major Use Permit for the Tule Wind Project was conditioned to include a Groundwater Monitoring and Management Plan (GMMP) that requires a maximum amount of groundwater that can be pumped from each well and includes a water level threshold at which groundwater production would be required to cease.

Future wind projects will each require a relatively large amount of water for the construction phase of the project. This water would come from one or more of the following sources: (1) on-site groundwater resources, (2) imported water from nearby groundwater-dependent water entities, or (3) imported recycled water from a CWA member agency if the member agency will allow the trucking and use of water outside its boundaries. The use of on-site groundwater resources would require a groundwater investigation and likely a groundwater monitoring and management plan (GMMP) to ensure that impacts to groundwater resources would remain less than significant as a result of the project. With the required groundwater investigation and GMMP, if needed, impacts to on-site groundwater resources from future wind energy projects would be less than significant. Additionally, for some projects, on-site groundwater resources may not be adequate for construction water demand. These projects would rely on a mixed portfolio of on-site groundwater and/or imported water from other sources.

It is also important to note that projects requiring a Major Use Permit must prepare a groundwater investigation pursuant to the County Groundwater Ordinance, County Code section 67.222.B . For projects proposing to use greater than 20 acre-feet of groundwater per year, the purpose of the groundwater investigation is to ensure that there is sufficient groundwater to serve the proposed use, as well as buildout of the General Plan in that particular water basin. Consequently, the groundwater investigation serves to preclude these types of projects from causing significant impacts to groundwater resources. Pursuant to the County Zoning Ordinance, large wind turbine projects require a Major Use Permit. The construction phase of these projects is likely to exceed 20-acre feet of groundwater per year, and thus would trigger the need

to prepare a groundwater investigation that addresses cumulative impacts to the project's groundwater basin at maximum buildout of the General Plan.

**This informal response is provided to address the report titled Cumulative Impacts on Water Resources of Large-Scale Energy Projects in Boulevard and Surrounding Communities, San Diego County, California, by Victor M. Ponce dated April 30, 2013 and provided to the County on May 3, 2013.**

Water Sustainability: The report indicates that the County's approach to evaluating sustainability has been widely discredited over the past 15 years and cites several studies. The report states that enlightened water resources management now seeks to determine sustainable yield as a suitable fraction of recharge. The report makes several references to exploiting groundwater resources that would dry up all groundwater and surface water resources if groundwater resources are used at rates up to the average annual groundwater recharge rate for a given basin.

Contrary to what the report asserts, the County evaluates sustainable yield in the manner that Dr. Ponce suggests is in accordance with what he terms enlightened water resources management. When the County originally prepared the County Guidelines for Determining Significance – Groundwater Resources in 2007 (Groundwater Guidelines), which contain the methodology for how the County evaluates sustainable yield for projects, Professor Ponce provided comments very similar to the April 30, 2013 report. The County along with four individuals on the County Groundwater Technical Advisory Committee provided responses to Dr. Ponce's comments. Those comments and responses are attached to this analysis for reference. In conclusion, the limitation of sustainable yield that the County applies is exactly what Dr. Ponce suggests for enlightened water resources management, i.e., "a fraction of the 'recharge' amount, the fraction to be established after detailed conjunctive surface-water and ground-water studies."

Section 3.1 Existing Water Demand: The report overestimates the amount of existing groundwater demand for the Boulevard Border Patrol Station and the McCain Valley Conservation Camp by utilizing an unsubstantiated estimate of 250 gallons per day per person for these uses. The United States Environmental Protection Agency Onsite Wastewater Treatment Systems Manual (EPA Manual) dated February 2002 contains typical wastewater flow rates from commercial, institutional, and recreational facilities. For the Boulevard Border Patrol Station, which is an office use, the EPA Manual estimates a wastewater flow rate of 6 to 16 gallons per employee with a typical amount of 13 gallons per day per employee. For the McCain Conservation Camp, the EPA Manual estimates a wastewater flow rate of 80 to 150 gallons per day per prisoner with a typical amount of 120 gallons per day per prisoner.

For the Golden Acorn Casino, the Groundwater Supply Evaluation: Campo Kumeyaay Nation, Proposed Golden Acorn Hotel and Amenities Project dated March 28, 2007 and revised May 27, 2008 prepared by Environmental Navigation Services, indicates the Golden Acorn Casino has an existing water demand of approximately 22.4 acre-feet per

year. This amount is substantially lower than the 168 acre-feet per year in the report based on the size of the on-site wastewater treatment system.

Section 3.2 Cumulative Water Demand of Energy Projects: For the cumulative water demand, the report includes only construction water demand for each of the projects. Construction water demand is a temporary use, which in some cases may be up to 18 months in duration, but then the demand for water for on-going operations drops significantly because a relatively limited amount of water is needed for ongoing operations. In Table 4 of the report, the construction water demand for the future energy projects is labeled as future water demand and is added to the existing water use in the Boulevard area. If read at face value, the table would indicate that groundwater demand in the study area will effectively double as a result of the future energy projects. What the report does not disclose is the reality that once the construction phase of these projects is over, the ongoing water use associated with each project will be less than 5% of the construction water demand. This significant decrease in water demand is shown on the table below. The table is a list of energy projects with the estimated water demand for construction and the estimated water demand for ongoing operations.

<b>Construction Water</b>	<b>Ongoing Water</b>
Tule Wind: 56 Acre-feet in 9 months	2 acre-feet per year
Soitec Rugged Solar: 90.7 acre-feet in 12 months	5.33 acre-feet per year
Soitec Tierra Del Sol Solar: 79.7 acre-feet in 11 months	3.9 acre-feet per year
Soitec LanWest Solar: 12.84 acre-feet in 6 months	0.23 acre-feet per year
Total: 239 acre-feet	Total: 11.5

Therefore, assuming that Table 4 in the report showing construction water demand of 509.6 acre-feet applies to all potential renewable energy projects in the study area, it is reasonable to assume that water demand for ongoing operations after construction would be roughly 5% of this value, or about 26 acre-feet per year. Given the fact that these projects are spread over various sub-basins in the region and are on relatively large plots of land, the cumulative impacts from the water demand for ongoing operations are very likely to be less than significant.

Section 6 Analysis: Using a capture-to-recharge percentage, the report evaluates impacts from the water demand for the proposed renewable energy projects in the Boulevard area. It takes the construction water demand for all of the potential renewable energy projects and concludes that the capture-to-recharge percentage would increase from an existing value of 13.96% to 29.31%. The report then compares this result to a capture-to-recharge average for the continental United States. Based on a brief review of the report, this analysis misses several important factors that would be necessary to evaluate impacts to groundwater resources accurately. The following is a list of the deficiencies with the analysis in the report.

1. The future water demand that is evaluated in the study is only the temporary construction water demand that will last on the order of 6 to 18 months. Because this demand would be temporary, there would not be an effective doubling of ongoing groundwater use in Boulevard.
2. The future construction water demand for these projects is temporary and will not occur all at the same time, and combining the construction water demand for all future projects into one demand and then evaluating potential impacts is not accurate because all of these projects will not be approved at the same time or constructed at the same time.
3. The water demand was lumped into a single groundwater demand and impacts were evaluated over a single study area defined by political boundaries (the Boulevard Community Planning Area). However, groundwater demand will be spread over various sub-basins within the Planning Area, and evaluation of sustainable yield utilizing political boundaries is inappropriate because groundwater basins do not follow political boundaries on the surface. Therefore, the boundaries for cumulative projects would more appropriately be drawn to conform to the various sub-basins from which each project would withdraw groundwater.
4. The future demand for ongoing operations is not discussed. As indicated above, water demand for ongoing operations for all potential renewable energy projects, if all were approved, would be roughly 5% of the construction water demand. Therefore, once the projects have been constructed, they would likely use less than 30 acre-feet per year from groundwater wells spread over multiple project sites in separate sub-basins.
5. The methodology employed does not provide thresholds for determining a potentially significant impact to groundwater resources.
6. Using continental and global averages to compare to localized impacts to groundwater resources is not appropriate because each individual water basin contains unique parameters that must be evaluated on a local basis to obtain meaningful results.

Section 8 & 9 Conclusions and Recommendations: The conclusions indicate the following:

1. *Intensive development in a desert region such as Boulevard poses significant challenges in sustainability due to increased water demands, while the supply remains essentially unchanged.*

The County wholeheartedly agrees and is requiring each project in its jurisdiction to perform site-specific hydrogeologic investigations to evaluate potential impacts to groundwater resources and to propose mitigation measures as needed to avoid potentially significant impacts.

2. *Existing water demand in Boulevard and surrounding communities is calculated at 14% of the recharge, a value that is nearly double the Continental United States value of 8.7%. The report does not explain the relevance of this comparison, particularly given that fact that the continental United States has widely varying conditions including large tracts of undeveloped open land. See also item 6 above.*
3. *With the implementation of the proposed energy projects, future water demand is likely to increase to 29%. Effectively, the future water demand will more than double the existing water demand. As previously discussed, this statement is incorrect because construction water demand is a one-time, temporary water use and construction demand will be staggered occurring at different locations and different times given the fact that all future renewable energy projects in the Boulevard area will not be approved or constructed at the same time. The construction phase of groundwater demand for each project is anticipated to last up to 18 months, and the water demand for ongoing operations following construction is anticipated to be roughly 5% of construction water demand.*

The study concludes with a recommendation to import water into Boulevard from other areas so that the recharge-to-capture percentage remains within reasonable bounds. In response, the County has a comprehensive process for evaluating potential impacts to groundwater resources contained within the County Guidelines for Determining Significance – Groundwater Resources and the County Groundwater Ordinance. As previously discussed, the County will evaluate the potential impacts to groundwater resources through site-specific groundwater investigations. It is particularly important that the temporary impacts from construction water demand at the front end of each of these projects be thoroughly analyzed. Groundwater monitoring and management plans will be required in most cases and will include a maximum amount of groundwater that can be pumped from individual wells and also water level thresholds at which groundwater extraction would have to cease to ensure impacts to off-site groundwater users remain less than significant. Imported water from several sources will be required to provide construction water to augment local groundwater supply for some of the projects. Any imported water sources utilizing groundwater resources will also be analyzed to evaluate potential impacts to off-site groundwater resources.



# County of San Diego

## HEALTH AND HUMAN SERVICES AGENCY

NICK MACCHIONE, FACHE  
DIRECTOR

WILMA J. WOOTEN, M.D., M.P.H.  
PUBLIC HEALTH OFFICER

PUBLIC HEALTH SERVICES  
HEALTH SERVICES COMPLEX  
3851 ROSECRANS STREET  
SAN DIEGO, CALIFORNIA 92110  
(619) 531-5800 FAX (619) 542-4186

Epidemiology & Immunization Services  
Emergency & Disaster Medical Services  
HIV, STD and Hepatitis  
Maternal, Child and Family Health Services  
Public Health Laboratory  
PH Nursing  
Border Health  
TB Control & Refugee Health  
Vital Records

May 7, 2013

Samuel Milham, M.D., M.P.H.  
82181 Bergman Drive  
Indio, California 92201

Dear Dr. Milham:

Thank you for your email correspondence on April 27, 2013, to the County of San Diego Board of Supervisors regarding the May 8, 2013 Board Hearing on the Revised Wind Ordinance & Plan Amendment (POD 10007 FEIR). The Health and Human Services Agency (HHSA) is actively monitoring the literature and public input on potential health effects from the use of wind turbines and your email has been carefully reviewed by our staff.

HHSA staff reviewed the article attached to your email communication by Havas and Colling<sup>1</sup> while researching the Public Health Services (PHS) Position Statement on the human health effects of wind turbines. The article contains only anecdotal information linking measurements of so-called "dirty electricity" to health effects, including electromagnetic hypersensitivity syndrome (EHS). The article contains spectra measurements from Ontario and Palm Springs "near where people were unwell," but there is not enough detail on how the measurements were made and what actual symptoms individuals exhibited. A correlation or causation between the measured findings and health cannot be inferred.

EHS is not an accepted medical diagnosis, nor is it clear that it represents a single medical problem. The World Health Organization (WHO) has concluded that:

EHS is characterized by a variety of non-specific symptoms that differ from individual to individual. The symptoms are certainly real and can vary widely in their severity. Whatever its cause, EHS can be a disabling problem for the affected individual. EHS has no clear diagnostic criteria and there is no scientific basis to link EHS symptoms to EMF exposure.<sup>2</sup>

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<sup>1</sup> Havas M, Colling D. Wind Turbines Make Waves: Why Some Residents Near Wind Turbines Become Ill. Bull Sci Tech, 2011;31:5414-426.

<sup>2</sup> WHO: <http://www.who.int/peh-emf/publications/facts/fs296/en/> Accessed May 3, 2013.

HHSA staff did not review your study on electromagnetic frequency (EMF) in a school setting prior to producing the PHS position statement because your paper does not investigate the health effects of wind turbines.<sup>3</sup> After you submitted the paper for consideration, the paper was reviewed. It does not adequately demonstrate a scientific link between EMF and cancer. A 2010 review article by DeVocht documents the flaws in the study.<sup>4</sup> In addition, the journal that published your study subsequently published a letter to the editor by an official from the California Cancer Registry who noted that your research was “biased” and contained “significant inaccuracies and objectional research practices.”<sup>5</sup> The letter highlighted your failure to have the design study reviewed by an institutional review board.

Your email communication also provided certain spectra information showing “sine waves...at 60Hz” on the Manzanita Reservation. However, the controls and methodology for collecting the spectra readings were not provided. As a result, a direct correlation between the spectra readings and neighboring wind turbine operations cannot be established or verified. Further, a link between these measurements and any health effects is not provided.

The PHS position statement relies on the consensus of the scientific community regarding exposure to low level EMF. The current WHO statement on EMF is noted here:

In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.<sup>6</sup>

The PHS Position Statement on the human health effects of wind turbines was written in July 2012 and considered available literature on the health effects of wind turbines. Your email communication referenced an article published in the journal *Noise and Health* published after the PHS position statement was written.<sup>7</sup> As part of ongoing monitoring of developing literature on the possible health effects of wind turbines, HHSA staff had already reviewed this paper. The paper does not adequately demonstrate a scientific link between wind turbines, distance, sleep quality, and health. You may be aware that this study has been criticized in detail in recently published letters to the editor of the same journal.<sup>8,9</sup>

HHSA continues to monitor the developing literature on the possible health effects of wind turbines. This includes the literature in the 2012 InterNoise Conference and articles published within the last month which indicate the possibility that symptoms correlated with the nearby presence of wind turbines may have an origin that is primarily psychological rather than due to

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<sup>3</sup> Milham S, Morgan L. A new electromagnetic exposure metric: High frequency voltage transients associated with increased cancer incidence in teachers in a California school. *Am J Ind Med*, 2008;51:579–586.

<sup>4</sup> DeVocht F. "Dirty electricity": what, where, and should we care? *J Expo Sci Environ Epidemiol*, 2010;20:399-405.

<sup>5</sup> Morgan JW. Letter to the Editor: RE: A new electromagnetic exposure metric: High frequency voltage transients associated with increased cancer incidence in teachers in a California school. *Am J Ind Med*, 2008;51:579–86.

<sup>6</sup> WHO: <http://www.who.int/peh-emf/about/WhatIsEMF/en/index1.html>. Accessed May 3, 2013.

<sup>7</sup> Nissenbaum MA, Aramini JJ, Hanning CD. Effects of industrial wind turbine noise on sleep and health. *Noise Health*, 2012;14:237-43.

<sup>8</sup> Ollson CA, Knopper LD, McCallum LC, Whitfield-Aslund ML. Letter to Editor: Are the findings of "Effects of industrial wind turbine noise on sleep and health" supported? *Noise Health*, 2013;15:148-50.

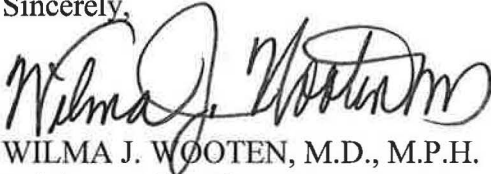
<sup>9</sup> Barnard M. Letter to Editor: Issues of wind turbine noise. *Noise Health*, 2013;15:150-2.



possible direct effects of the wind turbines.<sup>10,11</sup> There have been no new published articles that warrant a change in the July 2012 PHS Position Statement.

If you have any questions regarding this response to your email, please contact me or my deputy, Eric McDonald, M.D., M.P.H. at [eric.mcdonald@sdcounty.ca.gov](mailto:eric.mcdonald@sdcounty.ca.gov) or at 619-542-4180.

Sincerely,



WILMA J. WOOTEN, M.D., M.P.H.

Public Health Officer

Director, Public Health Services

CC: Chairman Greg Cox, Vice-Chair Dianne Jacob, Supervisor Dave Roberts, Supervisor Ron Roberts, Supervisor Bill Horn, Director Nick Macchione

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<sup>10</sup> Chapman, et al. Spatio-temporal differences in the history of health and noise complaints about Australian wind farms: evidence for the psychogenic, “communicated disease” hypothesis. Pre-Print: March 27 2013. Available at: <http://ses.library.usyd.edu.au/bitstream/2123/8977/4/Complaints%20FINAL.pdf> Accessed May 3, 2013.

<sup>11</sup> Witthoft, M, GL Rubin. Are media warnings about the adverse health effects of modern life self-fulfilling? An experimental study on idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF). J Psychosomatic Research 2013;74:206-12.