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STATE OF CALIFORNIA
State Energy Resources
Conservation and Development Commission

In the matter of:	)	
	)	DOCKET NO: ***01-AFC-24***
	)	
Palomar Energy, LLC	)	PRE-HEARING
Application for Certification of	)	CONFERENCE STATEMENT
Palomar Energy Power Plant	)	
	)	

I. Introduction

The Border Power Plant Working Group (BPPWG) is a 501(c)(3) tax exempt organization formed in 2001 to advocate for environmentally sustainable gas fired combined-cycle power plants in the U.S. – Mexico border region. The BPPWG defines sustainable as: 1) net zero air emissions, 2) dry cooling, and 3) zero liquid discharge. Virtually all U.S. – Mexico border cities are in non-attainment for one or more criteria pollutants such as particulate less than 10 microns in diameter (PM_{10}), ozone and carbon monoxide (CO). The border region is also a desert area where water is often in critically short supply. At the time the BPPWG was formed, approximately fifteen (15) large combined-cycle power projects were in some stage of development in the border region between San Diego – Tijuana and El Paso – Ciudad Juarez. No large (> 300 MW) power projects had ever been constructed in this region of the border prior to the recent "boom." The BPPWG developed the simple set of sustainable design criteria for combined cycle power plants outlined above to ensure that the border region could absorb so many power projects without suffering unnecessary environmental degradation.

Mexico is a world leader in the use of dry cooling in combined-cycle power plants. Eight dry-cooled plants, totally 3,500 MW, are operational in the country. Seven of these plants are within 150 miles of the U.S. border. In contrast, California has only two dry cooled plants, Crockett Cogen and Sutter, totally 740 MW. However, the only large inland project ever permitted by the CEC in San Diego County, the 540 MW Otay Mesa Project (2001), is proposed as a dry-cooled plant.

The CEC has encouraged the use of reclaimed water without reservation as a power plant cooling medium since the 1970s, principally to protect California's freshwater resources. This approach was entirely appropriate in an era when there was no viable option to water as a power plant cooling medium, and few uses had been developed for reclaimed water. Since the mid-1990s, two developments have occurred that warrant taking a fresh look at a policy of blanket endorsement of reclaimed water as a power plant cooling medium: 1) the advent of dry cooling as a mainstream option to wet cooling towers in power plants, 2) the overriding need to use

reclaimed water to reduce pressure on overdrawn existing freshwater resources, such as the Colorado River, in certain regions of California. There are a number of reclaimed water uses that are of greater strategic importance than evaporating this water in a power plant cooling system, or converting it to brine in the same system.

The advisability of using reclaimed water in a power plant appears to be very site-specific. In the case of the Metcalf Project, the region was under order from the Regional Board to reduce wastewater flows into San Francisco Bay. There are apparently very limited potential uses for reclaimed water in the local area, and no issues related to periodic, severe droughts. The project site is located in an unpopulated area with only one or two ranch houses located within a one-mile radius of the site. The project developer purchased 131 acres around the proposed project as a nature preserve/ greenbelt. In addition to the $3,000,000 value of the land, the developer provided a $1,300,000 land management endowment. Evaporation of reclaimed water in the Metcalf Project cooling towers may be a reasonable response to local conditions.

The CEC is currently recommending the use of reclaimed water in a once-through cooling system for the El Segundo Project. This appears to be a truly creative and excellent use of reclaimed water, as it provides power plant cooling and is still available for other uses should they be developed over time. In this case, the El Segundo plant is located in close proximity to one of the largest wastewater treatment plants in the nation (Hyperion), with a reclaimed water production capacity approaching 500 million gallons per day (Mgd). This tremendous reclaimed water production capacity means Hyperion can meet the power plant's need for up to 300 Mgd of once-through cooling water. This is probably not possible at any other site in California.

Escondido and San Diego County are in a very different situation than the two cases cited above. San Diego County is a desert region, with inconsequential local water supplies relative to the population. The region is subject to chronic drought. Calendar year 2002 was the driest year in San Diego history. Virtually all water in the County is imported from the Colorado River or Northern California. California is currently overdrawing from the Colorado River, and it is clear that additional withdrawals are not an option. A new dam is currently being constructed near Escondido to increase freshwater storage capacity in the County, and other dam sites are being carefully studied. High value uses exist for the reclaimed water being produced in Escondido at the Hale Avenue Resource Recovery Facility (HARRF). These uses are aquifer re-injection to produce potable water and agricultural irrigation.

The City of San Diego has plans to inject a major portion of HARRF's reclaimed water into the San Pasqual Valley aquifer to produce up to 8,000 acre-ft/yr (2.6 billion gallons per year) of potable water. The U.S. Bureau of Reclamation provided over $360,000 for project planning studies. The use of reclaimed water in avocado groves is already underway in the local area. The town of Ramona, adjacent to Escondido, is providing reclaimed water to a major local avocado grower who is using it successfully. Ramona is currently evaluating the best path to continued expansion of reclaimed water use in local groves.

The Palomar Energy Project is a merchant power plant that will use 3.6 Mgd of HARRF reclaimed water, or 40 percent of total production. Allocating 3.6 Mgd of HARRF reclaimed water to Palomar essentially eliminates any possibility of using this water in more strategically valuable applications for the 50-year lifespan of the power plant. During this 50-year period the pressure on water resources in San Diego County will undoubtedly become much more severe.

The reclaimed water produced by the HARRF is highly subsidized. The 9 Mgd HARRF reclaimed water facility was built with a $17 million Bureau of Reclamation grant and $53 million in State Water Resources Control Board (SWRCB) zero interest loans. This is a taxpayer subsidy of approximately $1.5 million/year compared to a $70 million commercial loan at 7 percent interest over 30 years. The Metropolitan Water District of Southern California also provides a "demand reduction" subsidy of $250/acre-ft for each acre-ft of reclaimed water delivered to a customer. County Water Resources provides an additional "demand reduction" subsidy of $100/acre-ft for each acre-ft of reclaimed water delivered to a customer. The applicant is proposing to build a merchant power plant operating in a competitive, deregulated market. Would the applicant have chosen to use reclaimed water if the applicant was responsible for building and financing the reclaimed water infrastructure, and delivering the necessary volumes of reclaimed water, without major subsidies at every level of the process? Or is this highly subsidized reclaimed water serving as a magnet to attract industries such as the Palomar for whom water use is optional, but preferable when the water can be obtained at artificially low rates?

The ultimate objective of all these subsidies is to displace potable water uses with reclaimed water where possible and thereby reduce pressure on potable water imports. SWRCB Policy 75-58 essentially prohibits power plants from using fresh surface water for cooling. There are no sizable groundwater resources in the area. As a result, sending 3.6 Mgd of reclaimed water to the proposed plant will not displace one gallon of potable water imports and will undermine the intent of the highly subsidized HARRF reclaimed water program. The reclaimed water is so highly subsidized that it is in fact encouraging merchant power plant developers to locate their facilities, which can be designed to use almost no water, to locate near reclaimed water facilities and use huge quantities of reclaimed water in a "water optional" application.

This is an important policy question that will have ramifications in future citing decisions. Will the CEC look at reclaimed water use in cooling towers as one of two options, the other being dry cooling, and determine the relative merits of these two options based on the site-specific environment? For the site-specific case of the Palomar Energy Project, dry cooling is a superior cooling approach from a strategic resources standpoint. Use of dry cooling will result in little or no change in the cost of electricity produced. Other merchant power plants, specifically the Otay Mesa Project, will compete in the same deregulated market and will use dry cooling. Dry cooling will emit no primary or secondary PM_{10}, eliminate issues related to visible cooling tower plumes, eliminate the possibility that existing nearby residents would be exposed to Legionella bacteria contained in cooling tower drift, have minimal negative impact on the energy efficiency of the power plant, and leave the highly subsidized HARRF reclaimed water available for uses that actually displace potable water imports (agriculture, aquifer reinjection).

At this time BPPWG anticipates that Cory Briggs, Esq. will serve to call witnesses and cross-examine on BPPWG's behalf.

II. Topic Areas of Concern

Air Quality
Public Health
Visual Resources
Water Resources

Air Quality

The Air Resources Board approved a revised "annual arithmetic mean" PM_{10} standard of 20 $\mu g/m^3$ on June 20, 2002. This standard will take effect upon final approval by the Office of Administrative Law. Final approval is expected in early 2003.

The average annual arithmetic mean PM_{10} concentration at the Escondido East Valley Parkway from 1999 to 2001 is 30 $\mu g/m^3$ (see Table 4 on 4.1-11 of FSA). The Escondido East Valley Parkway monitoring station is the closest air district PM_{10} monitoring station to the proposed Palomar Energy Project (PEP). It would appear that major PM_{10} reduction measures will be necessary if Escondido is ever to approach attainment with the 20 $\mu g/m^3$ standard. One straightforward step would be eliminating PM_{10} emissions from the cooling towers by using dry cooling at the site. Dry cooling represents Lowest Achievable Emission Rate (LAER) technology for PM_{10} from the cooling system at this site. Non-attainment areas typically require LAER and offsets for non-attainment pollutants.

Particulate emissions from the wet tower will consist of directly emitted PM_{10} as drift aerosols evaporate, and secondary ammonium nitrate formation as ammonia stripped from the cooling tower combines with nitric acid in the atmosphere. As noted in the FSA, the ammonium nitrate formation reaction in the local area is essentially "ammonia limited." This means that ammonia stripped in the cooling tower is likely to contribute to additional $PM_{2.5}$ and PM_{10} burden in Escondido, especially in high humidity, cool weather conditions. Ammonium nitrate has a molecular weight nearly five times that of ammonia. Relatively small amounts of ammonia can react in the atmosphere to form relatively large amounts of ammonium nitrate. Given Escondido is non-attainment by a large margin with the 20 $\mu g/m^3$ annual PM_{10} standard, dry cooling offers a commonsense option to eliminate both the PM_{10} burden generated by cooling tower drift and ammonium nitrate formed by atmospheric reaction between nitrate and ammonia stripped from the circulating cooling water.

The significance of the state annual 20 $\mu g/m^3$ PM_{10} standard, the degree of Escondido's non-attainment relative to the new standard, cooling tower PM_{10} emissions, cooling tower ammonia emissions, and the potential for secondary PM_{10} formation as a result of cooling tower ammonia emissions will be addressed from the standpoint of ranking cooling options based on degree of air quality impact.

Witnesses: Bill Powers, Greg Morrill, Carolyn Shaputic, Dr. H. Khandan, CEC Staff
Testimony: 2 hours
Cross Examination: 1 hour
Exhibits: Ammonia stripping calculations

Public Health

Relatively large amounts of ammonia will potentially be stripped in the cooling tower. Calculations addressing the ammonia stripping rate will be presented and discussed. The FSA ignores the stripping mechanism and concentrates on the very small amount of ammonia contained in drift aerosols that eventually evaporates.

The Legionella issue will be examined in the broad context of introducing potential exposure risk when an option is available that would eliminate this risk entirely.

Witnesses: Bill Powers, CEC Staff
Testimony: 1 hour
Cross Examination: 30 minutes

Visual Resources

FSA states that cooling tower plume will be 40 feet or less in height less than 10 percent of daylight hours in cool weather conditions. Cooling tower height is 65 feet. Total height of cooling tower with plume is over 100 feet. An optimized air-cooled condenser is only 70 ft. high and has no vapor plume at any time. CEC consultant Michael Clayton verbally committed to me during the PEP workshop in Escondido in September 2002 that he would include a photo-simulation of the plume abatement tower with a 40-foot vapor plume in the FSA. No photo-simulation is included. Instead, reference is made to a modeling analysis that was conducted by staff that showed the plume would be visible less than 10 percent of the "seasonal daylight no rain/no fog" hours.

The text indicates that 10 percent is the significance threshold, and as such the project plumes will not result in significant visual impacts. No reference is given to justify this significance criterion. The potential significance of the vapor plume from the proposed cooling tower will be examined.

Witnesses: Bill Powers, CEC Staff
Testimony: 1 hour
Cross Examination: 30 minutes
Exhibits: Slides of plume abatement wet towers with vapor plumes

Water Resources

The ammonia concentration in the secondary treated wastewater that will serve as basestock for the tertiary reclaimed water facility consistently exceeds the 25 mg/l concentration and 1,870 lb/day standards. There is no ammonia reduction or removal step in the tertiary treatment process. These LORS violations are ignored in the FSA.

Examine the nature and rationale for the construction and operation of the HARRF reclaimed water facility. Escondido received a U.S. Bureau of Reclamation grant of $17MM and $53MM in zero interest loans from the State Water Resources Control Board (SWRCB) to build the 9 Mgd HARRF reclaimed water plant. The overall objective of the reclaimed water program is to reduce potable water imports. "Capacity reduction" operating subsidies of $250/acre-ft and $100/acre-ft are provided by the Metropolitan Water District of Southern California and County Water Resources, respectively, for delivered reclaimed water. SWRCB policy would prohibit Palomar from using potable water for cooling. As a result, supplying Palomar with reclaimed water will not provide any reduction in potable water imports. Highly subsidized reclaimed water at low cost will be provided to a merchant power plant supposedly competing in a deregulated market. Water is optional for cooling a power plant, whereas it is absolutely necessary for the potable water displacement projects that were originally anticipated for the reclaimed water. The only other merchant power plant permitted recently in San Diego County is

a dry cooling plant. Merchant power plants are not appropriate beneficiaries of subsidized reclaimed water.

Examine the impact of 0.9 Mgd of brine discharge from Palomar. Discharge of Palomar cooling tower brine in the ocean outfall will require that large holding tanks be built both beside the HARRF (brine storage) and downstream at the San Elijo JPA reclaimed water plant to avoid contaminating SEJPA reclaimed water with high TDS powerplant brine. This discharge will also restrict ocean outfall capacity by 0.9 Mgd.

Examine how diverting 3.6 Mgd of reclaimed water will do little to resolve the problem for which the HARRF received a "cease and desist" order by the Regional Board in 1996. Two major discharges of secondary treated wastewater to Escondido Creek occurred in 1993 and 1995, one of 18 Mgd and the other of 23 Mgd. Sending 3.6 Mgd of reclaimed water to a power plant slightly reduces the total flow, but not the pollution intensity, of future spills. It would actually be more beneficial to discharge the reclaimed water to the creek during spill events to dilute the secondary treated wastewater pollutant concentrations. It also increases the load on the ocean outfall by ~1 Mgd, as brine from the plant will be discharged to the outfall.

The City of Escondido indicates it can foresee no other applications for reclaimed water over the next 20 years, meaning Palomar is the only potential customer. This is despite use of reclaimed water in Ramona avocado groves and future plan to inject HARRF reclaimed water into the San Pasqual aquifer to produce potable well water. The standards of evaluation used in recent licensing proceedings by the CEC to assure that a reliable reclaimed water supply will be available for at least 30 years will be compared to the level of evaluation submitted to the record by the applicant.

A thorough counterpoint to CEC staff wet-versus-dry cooling evaluation provided in Appendix A to the Soil & Water Resources chapter will be provided. Assumptions regarding capital cost, fuel consumption, noise, size, and visual impacts in Palomar Energy submittals to the record and the FSA will be thoroughly examined.

Witnesses: Bill Powers, CEC Staff
Testimony: 4 hours
Cross Examination: 2 hours
Exhibits: 6-minute documentary of Crockett Cogen ultra-low noise fans in operation;
Slides of height-optimized air-cooled condensers (ACC);
CEC analysis of ACC fuel penalty included in Sutter Project Final Decision;
San Paqual Valley Water Resources Management Plan, City of San Diego Water Department, 1997;
Reclaimed Water Avocado Grove Demonstration Program, County Agricultural Extension, 1997;
Comments on February 2002 CEC/EPRI Cooling Alternatives Report, Powers Engineering, March 2003.

III. Resumes

Cory Briggs, Esq.
Dr. H. Khandan
Greg Morrill
Bill Powers, P.E.
Carolyn Shaputnic, R.N.