CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

July 17, 2012

Mr. Eric Naslund
Chairperson
City of San Diego Planning Commission
1222 First Avenue, 4th Floor
San Diego, CA 92101

Subject: **Application to Initiate Community Plan Amendment, Quail Brush Generation Project**

Dear Chairman Naslund and Members of the Planning Commission:

Thank you for allowing myself and staff counsel for the California Energy Commission, Stephen Adams, to provide information about the Energy Commission's power plant siting program during the Planning Commission's June 28, 2012 hearing. We appreciated the opportunity to answer your questions related to consideration of the Quail Brush Generation Project's application to initiate a Community Plan Amendment. However, I regret not being fully prepared to provide detailed answers to technical questions asked by the Planning Commission. Those two questions were:

1. What is the difference between a "peaker" and an "intermediate peaker"; and
2. Would the Quail Brush Generation Project likely displace generation from higher-polluting facilities or produce fewer pollutants than an alternative facility?

As part of my initial response to these two questions, I stated that the Energy Commission has technical experts that were better suited than I am to articulate more detailed responses. Therefore, as a follow up to these important questions, I have asked one of our experts on the subjects, David Vidaver, to supplement my initial response by providing detailed answers in the attached memorandum.

We hope this supplemental information is helpful to the Planning Commission. Mr. Adams, Mr. Vidaver and I will be present at the Planning Commission's July 19, 2012 hearing and available to answer additional questions regarding this letter and the attached memo. In the interim, please don't hesitate to contact me at (916) 651-0966 to discuss this matter. Thank you.

Sincerely,

Eric Solorio, Project Manager
Siting, Transmission and Environmental Protection Division

PROOF OF SERVICE (REVISED 7/18/12) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 7/27/12
DLS

CC: Vice Chairperson Tim Golba
Commissioner Robert Griswold
Commissioner Stephen Haase
Commissioner Mary Lydon
Commissioner Susan Peerson
Commissioner Michael Smiley

Attachment (1): California Energy Commission Staff Memorandum from David Vidaver to Eric Solorio

State Of California | Natural Resources Agency

Memorandum

Date: July 17, 2012
Telephone: (916) 654-4656

To: California Energy Commission – Eric Solorio
Siting, Transmission and Environmental Protection Division
Project Manager
1516 Ninth Street
Sacramento, CA 95814-5512

From: California Energy Commission – David Vidaver
Electricity Analysis Office
Senior Electric Generation System Specialist
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **QUAIL BRUSH GENERATION PROJECT (11-AFC-3), Supplemental Responses to the City of San Diego Planning Commission Questions**

Eric,
This memorandum is submitted in response to your request that I address two questions the City of San Diego's Planning Commission had asked you during their June 28, 2012 hearing on the Quail Brush Generation Project ("Quail Brush"). Those two questions are:

1. What is the difference between a "peaker" and an "intermediate peaker"; and
2. Would Quail Brush displace generation from higher-polluting facilities or produce fewer pollutants than an alternative facility?

First, as a background, I have been employed by the California Energy Commission for 14 years, and am currently a Senior Electric Generation Specialist in the Commission's Electricity Analysis Office. In this capacity, I am one of the staff liaisons to the California Public Utilities Commission's Long-term Procurement Planning Proceeding and am responsible for advising the Energy Commission regarding procurement policy and the adequacy of the electricity system for providing reliable service. My responsibilities with the Energy Commission also include providing testimony in power plant siting cases regarding the impact of plant licensing and development on the operation of the electricity system, including changes in plant output, natural gas use, green-house gas emissions and system reliability. My responsibilities have previously included supervising the Procurement and Resource Adequacy Unit of the Electricity Analysis Office, and evaluating the state's energy policies using simulation models of the electricity system of the Western United States.

Regarding the specific questions by the Planning Commission:

1. What is the difference between a "peaker" and an intermediate peaker?
Meeting electricity demand in a cost-effective fashion requires a portfolio of different generation resources. Electricity demand in California is highest during the summer

than in other seasons, largely due to residential and commercial cooling (i.e., air conditioning) needs. During the summer, demand peaks at roughly 4:00 in the afternoon, at levels roughly double those that occur in the middle of the night. During winter, consumption is higher at 7:00 PM than at 4:00 PM as industrial and commercial demand has fallen somewhat, while residential heating and lighting needs have increased. Winter consumption is well below that of the summer during the day, and slightly lower at night.

Meeting "baseload need" - the share of demand that is present 24/7/365 - is most cost-effectively done with "expensive to build, but cheap to operate" resources such as nuclear and coal-fired generation, as well as newer, efficient natural gas-fired facilities known as combined cycles (e.g., the Palomar and Otay Mesa plants in San Diego County). Historically, these facilities have had annual capacity factors of 85% - 95%, although increasing amounts of renewable energy are lowering the capacity factors for the gas-fired plants to 50% - 70%.[1] At the other end of the spectrum, the "peak demand" that only occurs on the three or four hottest days of the year is best met with demand response programs (paying parties to curtail consumption upon request) and gas-fired (pure) peaking units, which are inexpensive to build but costly to operate, consuming more than double the fuel per unit of electricity generated than a new combined cycle.[2] These plants have annual capacity factors of 1% - 5%. In between baseload facilities and pure peakers are "load following resources" and "intermediate peakers."

Load following facilities generate during the day anywhere from year round to summer weekdays, increasing output in the morning as demand increases and ramping down as demand decreases in the evening. During the past ten to fifteen years, the power plants that have served this role are aging steam turbines that provided baseload energy when they were state of the art in the 1960's and 1970's and will be (or have recently been) forced into retirement in large quantities by the State Water Resource Control Board (SWRCB) policy on water use (e.g., the Encina and South Bay plants). As newer combined cycles have been built in large numbers and come on line in the past ten years, these aging steam turbine plants have been largely reduced to generating only during the summer. With higher levels of solar and wind resources, many of the newer combined cycles will increasingly move from baseload to load following service, with expected capacity factors in the 25% – 40% range.

"Intermediate peakers" are largely a phenomenon of the higher penetration of solar and wind resources and advances in gas-fired generation technology. They are intended to run primarily during the summer, but to also play a more active role than traditional pure peakers in managing changes in load over the day and the variability in solar (and wind) output as the weather changes. The aging steam turbines and newer combined cycles are not designed to turn off every evening when not needed; they must run at minimum output levels (20 – 50% of full output) overnight and are thus inefficient resources to use for the component of load following needs that has only a slight chance of materializing

[1] A power plant's capacity factor is its output expressed as a share of potential output (what it would produce if operated at maximum output every hour of the year).
[2] Renewable resources are not listed here as they are "must take" resources; energy from them is used whenever it is generated. Hydroelectric energy is either baseload (when not storable behind a dam) or load-following (when water is released from reservoirs to propel electric turbines as increased demand/prices require).

the next day. Both demand and solar output "ramp up" in the morning and down in the evening, with load-following resources changing output accordingly. On those occasions that demand is higher than expected and solar output is less than expected, e.g., due to an erroneous weather forecast, intermediate peakers can be started almost instantaneously, obviating the need to keep additional load-following units (e.g., one or more of those at the Encina plant) on overnight to guard against this contingency. Intermediate peakers are expected to have capacity factors in range of 15% – 20%. For Quail Brush, this value will vary as a result of numerous factors, including hydroelectric conditions across the state and improvements in the ability to forecast short-term output of solar and wind resources. As Quail Brush is largely needed to meet the San Diego area local capacity requirement (see below), however, its output will frequently displace energy from higher-emission facilities in the region.

2. Would Quail Brush displace generation from higher-polluting facilities or produce fewer pollutants than an alternative facility?

San Diego lies in a transmission-constrained area (the "San Diego-Imperial Valley Local Reliability Area") within the California Independent System Operator (ISO) balancing authority area. The city lies within a sub-area of this larger area (the "San Diego area"). Transmission-constrained areas (and sub-areas) consume more electricity during peak hours on hot summer days than can be imported into them, requiring a threshold amount of local electric generating capacity (the "local capacity requirement" or "LCR"). The 2013 LCR for the San Diego area is 2,570 MW.[3] Current generation capacity totals 3,069 MW, but this includes the generation at Kearney (136 MW) and Miramar (36 MW) that is expected to be removed from service by 2014, as well as the 950-MW Encina facility, which is expected to be unable to comply with the State SWRCB policy requiring for the reduced use of cooling water,[4] and thus forced to retire by the end of 2017.

The California ISO's 2011/12 Transmission Plan[5] provided the operator's estimates of the LCR for the San Diego area in 2021 and associated requirements for new generation capacity. If Encina is retired, the California ISO estimates that 650 MW of replacement capacity will need to be built at Encina or an "electrically-equivalent site." The new facilities associated with contracts entered into by the San Diego Gas & Electric Company (SDG&E), including Quail Brush and two other proposed facilities, would provide a total 450 MW of new generation. If all three facilities are built,[6] the LCR with high development of local renewable resources would fall to 231 MW.

On June 17, 2012, the 2021 LCR estimates were revised, with the amount of capacity needed depending not only on the construction of the facilities contracted with by SDG&E, but the assumptions made regarding the development of renewable generation

[3] 2013 LCR reference
[4] State Water Resource Control Board
[5] California ISO, 2011-2012 Transmission Plan, March 23, 2012
[6] Quail Brush Power, the Pio Pico Energy Center, and the Escondido Energy Center. These contracts are awaiting approval by the California Public Utilities Commission. Approval of the contract with the Escondido Energy center would lead to the repowering of an existing 45-MW facility

resources in the San Diego area during the next nine years.[7] In the scenario in which the largest amount of local renewable generation was constructed, the San Diego area would require 300 MW of new generation capacity by 2021 in the absence of the construction of the facilities with which SDG&E has contracted.

The preceding paragraph highlights the fact that absent Quail Brush and the other proposed plants under SDG&E contract, the San Diego area would require either (a) at least 300 MW of new generation or (b) the continued operation of units at Encina,[8] Quail Brush would be an as clean or cleaner resource than either alternative for the purpose of providing intermediate peaking services. A less efficient (e.g., higher emission) pure peaker of 100 MW would (a) require dispatch to 50-100 MW of output whenever needed and combust fuel at a rate of or greater than 10,000 Btu/kilo-watt hour. Quail Brush could be dispatched in 9-MW increments at 9,500 Btu/kWh. A new, state-of-the art combined cycle facility capable of cycling on and off daily would generate energy more efficiently, at perhaps 7,500 to 8,000 Btu/kWh, but would have to start in advance of being needed (and thus would frequently require start-up on the chance that it might be needed later in the day) and operate at 50 MW or more; offsetting the fuel combustion efficiency gain. Quail Brush, in contrast can be started up minutes before being needed. Continuing to operate Units 4 and 5 at Encina (the units large enough to provide the 300 MW of capacity needed absent Quail Brush and other new facilities) would mean around-the-clock operation at least on summer days, with an efficiency of 13,300 - 13,900 Btu/kWh. Environmentally, this is the least palatable solution of all.

It should be noted that it is generally acceded that no party will be willing to build a fossil-fueled power plant in California absent a guarantee of cost recovery, e.g., a long-term contract with a utility. No fossil-fueled plant has been built in California "on speculation" since 2003, and this was a very unique set of circumstances not present here. Moreover, the plant was a baseload plant; peaking plants are far riskier propositions as recovering costs in energy markets requires very high prices in often as few as 100 – 200 operating hours per year.

Questions regarding the above can be directed to me at (196) 654-4656 or David.Vidaver@energy.ca.gov.

[7] Robert Sparks, California ISO, *San Diego Local Capacity Needs*, presentation at the California Public Utilities Commission workshop on Application of SDG&E for Authority to Enter into Purchase Power Tolling Agreements with Escondido Energy Center, Pio Pico Energy Center, and Quail Brush Power, April 17, 2012

[8] The SWRCB allows Encina to operate past its Dec 2017 policy compliance date if the State's energy agencies deem it necessary to maintain reliable service. This would likely be the case if the 300 MW were deemed necessary to maintain reliability in the San Diego area in the absence of new generating facilities.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *QUAIL BRUSH GENERATION PROJECT*

DOCKET NO. 11-AFC-03
PROOF OF SERVICE
(Revised 7/18/2012)

APPLICANT
Cogentrix Energy, LLC
C. Richard "Rick" Neff, Vice President
Environmental, Health & Safety
9405 Arrowpoint Boulevard
Charlotte, NC 28273
rickneff@cogentrix.com

Cogentrix Energy, LLC
John Collins, VP Development
Lori Ziebart, Project Manager
Quail Brush Generation Project
9405 Arrowpoint Blvd.
Charlotte, NC 28273
e-mail service preferred
johncollins@cogentrix.com
loriziebart@cogentrix.com

APPLICANT'S CONSULTANTS
Tetra Tech EC, Inc.
Connie Farmer
Sr. Environmental Project Manager
143 Union Boulevard, Suite 1010
Lakewood, CO 80228
connie.farmer@tetratech.com

Tetra Tech EC, Inc.
Barry McDonald
VP Solar Energy Development
17885 Von Karmen Avenue, Ste. 500
Irvine, CA 92614-6213
e-mail service preferred
barry.mcdonald@tetratech.com

COUNSEL FOR APPLICANT
Bingham McCutchen LLP
Ella Foley Gannon
Camarin Madigan
Three Embarcadero Center
San Francisco, CA 94111-4067
e-mail service preferred
ella.gannon@bingham.com
camarin.madigan@bingham.com

*indicates change

INTERVENORS
Roslind Varghese
9360 Leticia Drive
Santee, CA 92071
roslindv@gmail.com

Rudy Reyes
8527 Graves Avenue, #120
Santee, CA 92071
rreyes2777@hotmail.com

Dorian S. Houser
7951 Shantung Drive
Santee, CA 92071
e-mail service preferred
dhouser@cox.net

Kevin Brewster
8502 Mesa Heights Road
Santee, CA 92071
lzpup@yahoo.com

Phillip M. Connor
Sunset Greens Home Owners Association
8752 Wahl Street
Santee, CA 92071
connorphil48@yahoo.com

HomeFed Fanita Rancho, LLC
Jeffrey A. Chine
Heather S. Riley
Allen Matkins Leck Gamble Mallory & Natsis LLP
501 West Broadway, 15th Floor
San Diego, CA 92101
jchine@allenmatkins.com
hriley@allenmatkins.com
jkaup@allenmatkins.com

Preserve Wild Santee
Van Collinsworth
9222 Lake Canyon Road
Santee, CA 92071
savefanita@cox.net

*Center for Biological Diversity
John Buse
Aruna Prabhala
351 California Street, Suite 600
San Francisco, CA 94104
jbuse@biologicaldiversity.org
aprabhala@biologicaldiversity.org

INTERESTED AGENCIES
California ISO
e-mail service preferred
e-recipient@caiso.com

City of Santee
Department of Development Services
Melanie Kush
Director of Planning
10601 Magnolia Avenue, Bldg. 4
Santee, CA 92071
mkush@ci.santee.ca.us

Morris E. Dye
Development Services Dept.
City of San Diego
1222 First Avenue, MS 501
San Diego, CA 92101
mdye@sandiego.gov

Mindy Fogg
Land Use Environmental Planner
Advance Planning
County of San Diego
Department of Planning & Land Use
5201 Ruffin Road, Suite B
San Diego, CA 92123
e-mail service preferred
Mindy.Fogg@sdcounty.ca.gov

ENERGY COMMISSION – DECISIONMAKERS
KAREN DOUGLAS
Commissioner and
Presiding Member
e-mail service preferred
karen.douglas@energy.ca.gov

ANDREW McALLISTER
Commissioner and
Associate Member
e-mail service preferred
andrew.mcallister@energy.ca.gov

Raoul Renaud
Hearing Adviser
e-mail service preferred
raoul.renaud@energy.ca.gov

Galen Lemei
Presiding Member's Advisor
e-mail service preferred
galen.lemei@energy.ca.gov

David Hungerford
Associate Member's Advisor
e-mail service preferred
david.hungerford@energy.ca.gov

ENERGY COMMISSION STAFF
Eric Solorio
Project Manager
e-mail service preferred
eric.solorio@energy.ca.gov

Stephen Adams
Staff Counsel
e-mail service preferred
stephen.adams@energy.ca.gov

Eileen Allen
Commissioners' Technical
Adviser for Facility Siting
e-mail service preferred
eileen.allen@energy.ca.gov

ENERGY COMMISSION – PUBLIC ADVISER
Jennifer Jennings
Public Adviser's Office
e-mail service preferred
publicadviser@energy.ca.gov

DECLARATION OF SERVICE

I, Diane L. Scott, declare that on July 27, 2012, I served and filed copies of the attached Staff's Supplemental Response to City of San Diego Planning Commission, dated July 17, 2012. This document is accomplished by the most Proof of Service list, located on the web page for this project at: http://www.energy.ca.gov/sitingcases/quailbrush/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

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___ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
michael.levy@energy.ca.gov

I declare under penalty of perjury under the laws of the State of California 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.

Originally signed by:
Diane L. Scott
Siting, Transmission and Environmental Protection Division