ATTACHMENT A.1
APCD LETTER

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AIR POLLUTION CONTROL DISTRICT
COUNTY OF SAN DIEGO

Air Pollution Control Board

Greg Cox	District 1
Dianne Jacob	District 2
Pam Slater-Price	District 3
Ron Roberts	District 4
Bill Horn	District 5

October 4, 2011

RICHARD GRAY
QUAIL BRUSH GENCO, LLC
9405 ARROWPOINT BLVD.
CHARLOTTE, NC 28273

Mr. Gray:

Reference is made to your application for Authority to Construct/Permit to Operate a peaker plant consisting of eleven 9.3-MW natural gas engines and one emergency diesel engine (Application Nos. APCD2011-APP-001822 through 001833) to be located on Sycamore Canyon Road in Santee. Please be advised that your application has been deemed incomplete and that the following additional information is necessary to complete the processing of this application.

1. Please specify the toxic emission factors and the source the emission factors used to estimate the air toxic emissions listed in Table 4.8-5 of the Application for Certification (AFC). Please include any supporting information including source test data.

2. In section 3.5.1.2 of the AFC, it was mentioned that the use of one LMS100 gas turbine or two LM6000 gas turbines would not provide the flexibility needed for this project and the efficiency of these boilers decreases at reduced loads. Please provide an analysis of using several smaller conventional simple-cycle combustion turbines (on the order of 9.3 MW each) as to whether they would be feasible for this project.

3. Please note that lack of commercial availability does not eliminate equipment from BACT consideration. It must be shown that the equipment is either not technologically feasible or not cost effective for this project. Therefore, please provide a revised analysis of the advanced combustion turbine processes, especially in relation to the use of smaller combustion turbines as specified in Item 2 of this letter.

4. Please confirm that Quail Brush Genco, LLC, its parent companies, or any of its subsidiaries are not associated with the Sycamore Canyon Landfill or any other companies operating at the Sycamore Canyon Landfill.

Please submit this information by 30 days of the date of this letter.

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Please be advised that operation of this equipment without written authorization is a misdemeanor subject to fines or penalties up to $10,000 a day. This is not a Permit to Operate. If you have any question regarding this letter, please call me at (858) 586-2741.

Sincerely,

Arthur Carbonell
Air Pollution Control Engineer

AC

ATTACHMENT A.2
RESPONSES TO APCD COMMENTS

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ATTACHMENT A.2
RESPONSES TO APCD COMMENTS

The following paragraphs provide the substance of the Applicant's response to the APCD's October 4, 2011 completeness letter on the Quail Brush Project. It is noted that the exact language of the response may change based on meeting between the Applicant and the APCD regarding completeness.

1. The toxic emissions factors used for the Wartsila power cycle engines, the fuel gas and warm start heaters were provided in Appendix F.1 of the Application. The Wartsila engine factors are presented in Table F.1-3, the fuel gas heater emissions factors are presented in Table F.1-5, and the warm start heater emissions factors are presented in Table F.1-7. Each of these tables contain the references for the factors, which are re-iterated here for your review.

   Wartsila power cycle engine toxic emissions factor references:

   a. CARB/CATEF database for natural gas ICE, SCC20200202, 4 stroke, lean burn, uncontrolled factors (mean values).

   b. Humboldt Bay Generating Station, Final Determination of Compliance, North Coast Unified AQMD, Table 6, 4-8-08.

   c. EPA AP-42, Section 3.2, Table 3.2-2, 7/2000.

   Fuel gas and warm start heaters toxic emissions factor references:

   a. CARB/CATEF database for natural gas fired heaters, mean values,10-1-97.

   b. San Diego APCD Toxics EF database, Table B17. Natural gas boilers, low NOx burners, <100 mmbtu/hr, updated 6-8-01, D. Byrnes.

   c. EPA AP-42, Section 1.4, Table 1.4-3, 7/1998.

   d. South Coast AQMD, http://www.aqmd.gov/prdas/pdf/COMBEM2001.pdf.

   With respect to the inclusion of source test data, no specific source data was relied upon in establishing the air toxics emissions estimates in the Application, but we would note that a large majority of the factors noted in the references above are based on source testing, and that these references and emissions factors have been used in numerous CEC documents for similar sources, most notably the East Shore Power Project (06-AFC-06) and the Humboldt Bay Generating Station project (06-AFC-07).

2. With respect to the reference in Section 3.5.1.2 of the Application, please note the following:

   a. CEQA requires consideration of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" [14 CCR, 15126.6(a)].

b. The CEQA Guidelines further provide that "among the factors that may be used to eliminate alternatives from detailed consideration in an Environmental Impact Report (EIR) are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts".

c. Section 3.5 of the Application (AFC) discusses alternative technologies to the proposed Project. These alternative technologies have to be discussed in relationship to the project objectives which were delineated in Section 3.1, as follows:

- Respond to the SDG&E 2009 solicitation for conventional generation sources that will operate under a tolling agreement (i.e., utilizing natural gas provided by SDG&E) and will provide reliable and efficient peaking and load-shaping power to meet needs of SDG&E service area and facilitate integration of variable renewable sources to the grid;
- Use a site location within SDG&E's service territory that has infrastructure with available capacity and ability to reliably support Project electric transmission, fuel supply, and water needs with minimal impact on existing infrastructure systems or required new construction;
- Use a site that is commercially available, including control for reasonable access and linear facility rights-of-way; and
- Develop a site that has compatible zoning, compatible adjacent land uses, and is located away from sensitive receptors.

Objective one (first bullet item above) is most likely the most important item with respect to the alternative technology assessment. It must be noted that the RFO prepared by San Diego Gas and Electric Company, was responded to by numerous parties, with each respondent proposing a technology or mix of technologies that they believed would meet the needs of the RFO. Simple cycle turbine technology was most assuredly proposed, but rejected by SDG&E as not adequate to meet its power demands for providing flexible, and efficient peaking and load-shaping power. The reference to two of the most efficient models of simple cycle turbines, i.e., the LM6000 and the LMS100 was not intended to pre-empt the field.

There are other simple-cycle turbines with smaller power ratings that potentially could be used. Examples of such turbines would be the GE-10, a 10.2 MW unit, rated at 12,730 btu/kWh at full load, and costing approximately $5 million per unit, or a Solar Mars 10-T15000 units rated at 9.8 MW, with a full load heat rating of 12,060 btu/kWh, and costing approximately $5.1 million per unit. To produce the required ~103 MW at the QBPP site, would require the purchase and siting of approximately 10 of the GE-10 units, and 11 of the Solar Mars 10-T15000 units.

The Applicant notes that these examples, and other units in this size range, have heat rates (in terms of btu/kWh) that are significantly higher than the proposed engines. This results in more fuel being consumed per kWh, more air emission being produced per kWH generated, and thus the use of these smaller turbines would frustrate one or more of the fundamental project objectives, i.e., efficient fuel use per kWh of production. Secondly, it is uncertain if these small turbine units can be efficiently operated at loads comparable to the operational load flexibility of the

proposed engines, i.e., as low as 50%. Typically, turbines do not operate efficiently at these low loads, and the fuel heat rates (in terms of btu/kWh) are usually higher than the full load heat rates. For these basic reasons, the use of smaller turbines such as the GE-10 or the Solar Mars 10 units were not considered as technically feasible to meet several of the project objectives, i.e., flexibility in operations versus power production, and efficient use of fuel per kWh.

Lastly, the Applicant notes that the site is constrained with respect to useable space, and considerable site engineering was performed to configure the site for the proposed engines. The Applicant is unsure at this time if the site can be re-engineered to provide the necessary space requirements to site 10 combustion turbines and the required support systems.

3. Notwithstanding the analysis prepared by SDG&E during its consideration of the RFO responses, the Applicant conducted a summary analysis of alternative technologies as presented in Section 3.5. As noted in Section 3.5.1.12, Table 3.5-1, only a few of the alternative technologies were deemed “not commercially available”. Secondly, we agree with APCD statement that “lack of commercial availability does not eliminate equipment from BACT consideration” [based on Rule 20.1(c)(11)(B and C)], while noting the confusion that Rule creates when viewed in the context of the EPA BACT guidance. EPA BACT guidance defines “availability” and delineates the four (4) step process for bringing a technology to commercial availability, i.e., (1) concept stage, (2) research and patenting, (3) bench scale or laboratory testing, and (4) pilot scale testing. EPA BACT guidance also includes the statement that “commercial availability by itself, however, is <u>not</u> necessarily sufficient basis for concluding a technology to be applicable and therefore technically feasible”. As such, we concluded that while a technology that cannot be commercially acquired must be considered in the initial portions of the BACT analysis, the inherent nature of commercial unavailability is a significant obstacle to it being present at the end.

   Section 3.5.1.5 states, “There are a number of efforts to enhance the thermal efficiency of combustion turbines by injecting steam or staged firing. These include the steam-injected gas turbine (STIG), the intercooled steam-recuperated gas turbine (ISRGT), the chemically-recuperated gas turbine (CRGT), and the humid air turbine (HAT) cycle. The STIG and HAT processes use the moisture from the steam or humid air to cool the gas turbine blades. However, due to the extra compression effort required in the front end of the turbine combustion chamber, these processes are less efficient than other technologies, and both use large amounts of treated, high quality water. The ISRGT, CRGT, and HAT technologies are not commercially available. Consequently, all of these technologies were eliminated from consideration.”

   With respect to the advanced turbine technologies noted in Section 5.3.1.5, note the following:

   a. STIG, ISRGT, CRGT, and HAT technologies require the addition of a HRSG to the process,

   b. These technologies result in increased water demand, and wastewater discharges,

c. Staged firing, as developed for the Brayton cycle turbine is, based on information available to the Applicant, only available via the Alstom GT-24 turbine rated at 190 MW, which does not meet the power objectives of the RFO,

d. STIG units suffer from some of the same problems as water injected units, i.e., detrimental effects on efficiency and increased maintenance costs,

e. Data on intercooled recuperative turbines is limited, and seems to indicate that the present applications are marine based (such as the WR-21 which was a marine based unit from conception), and that the turbines involved are rated in excess of 20-25 MW, which would not afford the desired operational flexibility as proposed by the Applicant and accepted by SDG&E.

f. Rolls Royce is apparently researching IR technology for its RB211 and Trent turbine models, but these units are rated at 27-42 and 52-58 MW respectively, which would not allow the operational flexibility comparable to the proposed IC engine configuration.

Thus, for all the reasons noted above, use of the hybrid or alternative turbine technologies were not considered as feasible for the project in light of the RFO objectives.

4. Neither Quail Brush Genco, LLC, nor its parent companies or subsidiaries are associated with the Sycamore Canyon Landfill or any operating entity at the Sycamore Canyon Landfill.