



TETRA TECH EC, INC.

DOCKET

11-AFC-3

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June 5, 2012

Eric Solorio, Project Manager
California Energy Commission
Docket No. 11-AFC-3
1516 9th St.
Sacramento, CA 95814

Cogentrix Quail Brush Generation Project - Docket Number 11-AFC-3, Response to Dorian Houser's Intervenor Data Requests, 1 through 27

Docket Clerk:

Pursuant to the provisions of Title 20, California Code of Regulations, and on behalf of Quail Brush Genco, LLC, a wholly owned subsidiary of Cogentrix Energy, LLC, Tetra Tech hereby submits the Response to Dorian Houser's Intervenor Data Requests, 1 through 27. The Quail Brush generation Project is a 100 megawatt natural gas fired electric generation peaking facility to be located in the City of San Diego, California.

The topics addressed in this letter include the following:

- Air Quality
- Noise
- Biological Resources

If you have any questions regarding this submittal, please contact Rick Neff at (704) 525-3800 or me at (303) 980.3653.

Sincerely,

Constance E. Farmer
Project Manager/Tetra Tech

cc: Lori Ziebart, Cogentrix
John Collins, Cogentrix
Rick Neff, Cogentrix
Proof of Service List

TETRA TECH EC, INC.



**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 5/14/2012)**

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DECLARATION OF SERVICE

I, Constance Farmer, declare that on June 5, 2012, I served and filed a copy of the Quail Brush Generation Project (11-AFC-03) Response to Dorian Houser's Intervenor Data Requests, 1 through 27. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at:

[\[http://www.energy.ca.gov/sitingcases/quailbrush/index.html\]](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:

(Check all that Apply)

For service to all other parties:

- ☒ Served electronically to all e-mail addresses on the Proof of Service list;
- ☒ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

- ☒ by sending an electronic copy to the e-mail address below (preferred method); **OR**
- ☐ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512 docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

- ☐ 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
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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.

Constance C. Farmer

Air Quality

4. Data Request: Please provide details on how the calculation of 3-, 8-, and 24-hour averages were derived from the relevant Gaussian plume-dispersion models for periods where wind speeds were below instrument detection limits.

Response:

The U.S. Environmental Protection Agency (USEPA) Gaussian based models calculates averages by totaling the total number of hourly concentrations in the period and dividing by the number of hours (minus calm hours). This is referred to as calms processing and follows USEPA calm processing policy which is a requirement for regulatory modeling applications. It should be noted that concentrations calculated using Gaussian dispersion models are inversely proportional to the mean wind speed, and thus, the calculated concentrations approach infinity as the mean wind speed approaches zero (calm).

A calm hour is defined as an hour of meteorological data during which the average wind speed is less than 1m/s or less than the starting wind speed threshold of the instrumentation. During these conditions, the measurement precision of wind speed and wind direction is unacceptable and the meteorological preprocessor sets the wind speed equal to 0.0 m/s. Therefore, the calms processing routine sets concentrations to zero for calm hours, and short term averages are calculated according to the USEPA's calms policy where. For example, if five hours of data are run for a pollutant concentration, in which hour 2 is a calm hour, a simple average would result in a lower concentration due to the inclusion of the calm hour's zero value. However, calms processing, excludes zero concentration from the calm hour yielding a more reasonable result, as shown on the table below.

Hours	Concentration ($\mu\text{g}/\text{m}^3$)
1	0.76733
2	0
3	0.70298
4	0.65836
5	0.73312
Simple Average	0.57236
Calms Processing	0.71545

So, for each averaging period, the sum of non-calm hour concentrations are divided by the number of non calm hours in the period. The denominator (number of non-calm hours in the period) is limited to the minimum value of 2, 6 and 18 hours for the 3, 8 and 24 hour averaging periods, respectively.

5. Data Request: Please describe how calm conditions were handled when analyses were conducted with CTSCREEN.

Response:

As described in Response 4, a Gaussian model will not calculate a concentration during a calm hour when the wind speed is less than 1 m/s, as specified by the USEPA calms policy. Thus, CTSCREEN will not calculate concentrations for wind speeds less than 1 m/s.

Noise

7. Data Request: Please provide updated and corrected definitions for sound in the noise section of the AFC.

Response:

As requested, the definitions provided in Section 4.3.1 have been clarified. Specifically, the sound definitions for from 3 dBA, 5 dBA, 10 dBA and L_{eq} have been revised and Table 4.3-2 has been corrected. The revised Section 4.3.1 of the AFC is included as Attachment 1.

11. Data Request: Please provide information on the HDD equipment that might be used for gas pipeline construction. Please include source levels and time frames for operation.

Response:

Directional boring, commonly called horizontal directional drilling or HDD, is a method of installing underground pipes along a prescribed bore path from the surface with minimal impact to the surrounding area. The HDD process is commonly used for installing various types of underground utilities including natural gas lines.

As with all underground pipe installations, every project begins with thoughtful planning. Ground conditions are determined, surrounding utilities positively located, bore profile is surveyed and plotted, safety and environmental issues are considered before the work commences.

The process begins when a HDD machine pushes a bore head connected to hollow pipe into the ground at an angle. As each joint of drill pipe is pushed into the ground, a new one is added behind it. The process is continued until the bore head comes out of the ground at the end of the bore.

The bore head contains a transmitter which tells HDD machine operator at grade where the tip of the pipe is located. With this information, the HDD machine operator is then able to adjust the path of the bore head.

From the drill head flows a high-pressure jet of drilling fluid, which is generally a mixture of bentonite clay and water. Boring is accomplished through the cutting action of the jet of fluid and/or a rotating drill bit. The drill fluid cuts soil, suspends and carries the cuttings out of the bore hole, seals the bore hole, lubricates and cools the pipe.

Upon reaching the exit point, the bit is detached and the end of the drill pipe is attached to a reamer. The reamer is pulled back while rotating the drill pipe with as many passes as required to open up the correct diameter of hole to allow the pipe to be installed.

Once the bore hole is the correct size for the pipe to be installed, it is attached to the end of the reamer and pulled through the hole. Throughout this process, bore fluid is being continually pumped into the hole to ensure that the hole is sealed with no voids being left between the pipe and the native soil.

Directional boring can be used in a wide variety of conditions but is not the optimal method for all conditions. The most difficult ground formation for any method is un-consolidated soils (cobble). Directional boring has evolved steadily over the last 20 years and is now a well proven method for underground pipe installation. HDD machines are diesel engine driven and typically the size of a ¾ ton pickup truck.

As described in Section 2.3.13.2 of the AFC docketed August 25, 2011, construction activities will be scheduled to occur between 7 a.m. and 7 p.m., Monday through Friday. Occasionally, additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. During some construction periods and during the startup phase of the Project, some activities will continue 24 hours per day, 7 days per week. The gas line installation is scheduled to occur during weeks 3 to 7. (AFC Table 2.3-4). The installation of the gas line is primarily a trenching project. (See response to CEC Data Request #9 docketed with the responses to CEC Data Requests Set 1 on March 8, 2012). The gas line will be constructed by SDG&E and not the applicant.

The sound levels associated with the primary equipment which would be utilized for HDD are described in section 4.3.2 of the AFC. (AFC 4.3-10 to 4.3-11). The estimated unmuted sound power level of HDD equipment operating at the entry and exit points ranges from approximately 110 to 121 dBA, depending on the horsepower and equipment configuration. With implementation of mitigation measures such as temporary noise barriers, enhanced mufflers, or equipment enclosures, a 10 dBA reduction can be reasonably obtained. Assuming standard attenuation, this would result in a net sound pressure of level range of 70 to 90 dBA at a reference distance of 15 m (50 feet) from the source.

Biological Resources

20. Data Request: Please correctly associate mitigation measures with the appropriate species for which they are proposed in AFC 4.12.

Response:

It appears that some of the cross references in the AFC did contain some inaccuracies due to renumbering of mitigation measures during the finalization of the application. The table below provides the correct mitigation measures by species or special status habitats.

Page	Potential Impact (Species, etc.)	Cross-referenced mitigation measure
4.12-39	Native vegetation and habitat	BIO-1 and BIO-2
4.12-39	San Diego Barrel Cactus	BIO-3

Data Request Responses to Intervenor Houser Set 1

4.12-39	Variegated Dudleya	BIO-3
4.12-40	White-Tailed Kite	BIO-5
4.12-41	Quino checkerspot butterfly	BIO-4
4.12-41	Coronado Island Skink	BIO-4
4.12-41	Southern California Rufous-Crowned Sparrow	BIO-5
4.12-42	Nesting Birds	BIO-5
4.12-44	Noise	BIO-5

Attachments

Attachment 1. Revised AFC Section 4.3.1

ATTACHMENT 1. REVISED AFC SECTION 4.3.1

4.3.1#Acoustic Terminology and Metrics

Airborne sound is described as the rapid fluctuation or oscillation of air pressure above and below atmospheric pressure, creating a sound wave. Sound is characterized by properties of the sound waves, which are frequency, wavelength, period, amplitude, and velocity. Noise is further defined as unwanted sound and is measured in the same way. A sound source is defined by a sound power level (L_w), which is independent of any external factors. The acoustic sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts (W). Sound energy travels in the form of a wave, a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure. A sound pressure level (L_p) is a measure of this fluctuation and can be directly determined with a microphone or calculated from information about the source sound power level and the surrounding environment through predictive acoustic modeling. While the sound power of a source is strictly a function of the total amount of acoustic energy being radiated by the source, the sound pressure levels produced by a source are a function of the distance from the source and the effective radiating area or physical size of the source. . In general, the ostensible magnitude of a source sound power level is always considerably higher than the received sound pressure level near a source due to the area term.

Sound levels are presented on a logarithmic scale to account for the large pressure response range of the human ear, and are expressed in units of decibels (dB). A decibel is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing, defined as 20 micropascals (μPa). Conversely, sound power is commonly referenced to 1 picowatt (pW), which is one trillionth of a watt. Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum is completed to determine tonal characteristics. The unit of frequency is Hertz (Hz), which corresponds to the rate in cycles per second that sound pressure waves are generated., Typically, a sound frequency analysis examines 11 octave (or 33 1/3 octave) bands ranging from 16 Hz (low) to 16,000 Hz (high). This range encompasses the entire human audible frequency range. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system. Sound exposure in acoustic assessments are commonly measured and calculated as A-weighted decibels (dBA). Unweighted sound levels are referred to as linear. Linear decibels are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise. Sound levels that are linear are presented as dBL.

An inherent property of the logarithmic decibel scale is that the sound pressure levels of two separate sources are not directly additive. For example, if a sound of 50 dBA is added to another sound of 50 dBA, the result is a 3-decibel increase (or 53 dBA), not an arithmetic doubling to 100 dBA. With respect to how the human ear perceives changes in sound pressure level relative to changes in "loudness", scientific research demonstrates that the following general relationships hold between sound level and human perception for two sound levels with the same or very similar frequency characteristics:

- 1 dBA is the practical limit of accuracy for sound measurement systems and corresponds to an approximate 10 percent variation in the sound pressure level. A 1 dBA increase or decrease is a non-perceptible change in sound.

- 3 dBA increase or decrease is a doubling (or halving) of acoustic energy and it corresponds to the threshold of change in loudness perceptible in a laboratory environment. In practice, the average person is not able to distinguish a 3 dBA difference in environmental sound outdoors.
- 5 dBA increase or decrease is described as a perceptible change in sound level and is a discernable change in an outdoor environment.
- 10 dBA increase or decrease is a tenfold increase or decrease in acoustic energy but is perceived as a doubling or halving in loudness (i.e., the average person will judge a 10 dBA change in sound level to be twice or half as loud).

Sound levels can be measured, modeled and presented in various formats. The sound metrics that were employed in the following noise assessment have the following definitions:

- **L_{eq}**: Conventionally expressed in dBA, the L_{eq} is the energy-averaged, A-weighted sound level for the complete time period. It is defined as the steady, continuous sound level over a specified time, which has the same acoustic energy as the actual varying sound levels over the specified period.
- **L_{max}**: The maximum A-weighted sound level as determined during a specified measurement period. It can also be described as the maximum instantaneous sound pressure level generated by a piece of equipment.
- **L_n**: This descriptor identifies the sound level that is exceeded “n” percent of the time over a measurement period (e.g., L₉₀ = sound level exceeded 90 percent of the time). The sound level exceeded for a small percent of the time, L₁₀, closely corresponds to short-term, higher-level, intrusive noises (such as vehicle pass-by noise near a roadway). The sound level exceeded for a large percent of the time, L₉₀, closely corresponds to continuous, lower-level background noise (such as continuous noise from a distant industrial facility). L₅₀ is the level exceed 50 percent of the time and is typically referred to the median sound level over a given period.
- **L_{dn}**: The L_{dn} measures the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (USEPA) for developing criteria for the evaluation of community noise exposure. The L_{dn} is calculated by averaging the 24-hour hourly L_{eq} levels at a given location after adding 10 dB to the nighttime period (10:00 p.m. - 7:00 a.m.) to account for the increased sensitivity of people to noises that occur at night.
- **CNEL**: Community Noise Equivalent Level (CNEL) is another average A-weighted L_{eq} sound level measured over a 24-hour period; however, this noise scale is adjusted to account for some individuals’ increased sensitivity to noise levels during the evening and nighttime hours. A CNEL noise measurement is obtained after adding 5 dB to sound levels occurring during evening hours (7:00 p.m. to 10:00 p.m.) and 10 dB to sound levels occurring during nighttime hours (10:00 p.m. to 7:00 a.m.).

Estimates of noise sources and outdoor acoustic environments, and the comparison of relative loudness are presented in Table 4.3-1. Table 4.3-2 provides additional reference information on acoustic terminology used throughout the acoustic assessment.

Table 4.3-1 Sound Pressure Levels (L_p) and Relative Loudness of Typical Noise Sources and Acoustic Environments

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (perception of different sound levels)
Jet aircraft takeoff from carrier (50 ft)	140	Threshold of pain	64 times as loud
50-hp siren (100 ft)	130		32 times as loud
Loud rock concert near stage Jet takeoff (200 ft)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 ft)	110		8 times as loud
Jet takeoff (2,000 ft)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 ft)	90		2 times as loud
Garbage disposal Food blender (2 ft) Pneumatic drill (50 ft)	80	Loud	Reference loudness
Vacuum cleaner (10 ft)	70	Moderate	1/2 as loud
Passenger car at 65 mph (25 ft)	65		
Large store air-conditioning unit (20 ft)	60		1/4 as loud
Light auto traffic (100 ft)	50	Quiet	1/8 as loud
Quiet rural residential area with no activity	45		
Bedroom or quiet living room Bird calls	40	Faint	1/16 as loud
Typical wilderness area	35		
Quiet library, soft whisper (15 ft)	30	Very quiet	1/32 as loud
Wilderness with no wind or animal activity	25	Extremely quiet	
High-quality recording studio	20		1/64 as loud
Acoustic test chamber	10	Just audible	
	0	Threshold of hearing	

Adapted from: Kurze and Beranek (1988) and USEPA (1971)

Table 4.3-2 Acoustic Terms and Definitions

Term	Definition
Noise	Typically it is unwanted sound. This word adds the subjective response of humans to the physical phenomenon of sound. It is commonly used when negative effects on people are known to occur.
Sound Pressure Level (L_p)	Pressure fluctuations in a medium. Sound pressure is measured in decibels referenced to 20 microPascals, the approximate threshold of human perception to sound at 1,000 Hz.
Sound Power Level (L_w)	The total acoustic power of a noise source measured in decibels referenced to picowatts (one trillionth of a watt). Equipment specifications are provided by equipment manufacturers as sound power as it is independent of the environment in which it is located. A sound level meter does not directly measure sound power.
A-Weighted Decibel (dBA)	Environmental sound is typically composed of acoustic energy across all frequencies (Hz). To compensate for the auditory frequency response of the human ear, an A-weighting filter is commonly used for describing environmental sound levels. Sound levels that are A-weighted are presented as dBA in this report.
Unweighted Decibels (dBL)	Unweighted sound levels are referred to as linear. Linear decibels are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise. Sound levels that are linear are presented as dBL in this report.
Propagation and Attenuation	Attenuation describes the propagation of sound as it decreases in amplitude due to geometric spreading losses with increased distance from the source. Additional sound attenuation factors include air absorption, terrain effects, sound interaction with the ground, diffraction of sound around objects and topographical features, foliage, and meteorological conditions including wind velocity, temperature, humidity, and atmospheric conditions.
Octave Bands	The audible range of humans spans from 20 to 20,000 Hz and is typically divided into center frequencies ranging from 31 to 8,000 Hz.
Broadband Noise	Noise which covers a wide range of frequencies within the audible spectrum, i.e. 200 to 2000 Hz.
Frequency (Hz)	The rate of oscillation of a sound, measured in units of Hz or kilohertz (kHz). One hundred Hz is a rate of one hundred times (or cycles) per second. The frequency of a sound is the property perceived as pitch: a low-frequency sound (such as a bass note) oscillates at a relatively slow rate, and a high-frequency sound (such as a treble note) oscillates at a relatively high rate. For comparative purposes, the lowest note on a full range piano is approximately 32 Hz and middle C is 261 Hz.