TETRA TECH EC, INC.

October 17, 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, Cumulative Impacts Analysis for the Quail Brush Power Project and Sycamore Landfill

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 Cumulative Impacts Analysis for the Quail Brush Power Project and Sycamore Landfill (11-AFC-3). This submittal is pursuant to the California Energy Commission (CEC) staff and Quail Brush Power Project technical conference call on 8-30-12, and related to CEC Data Requests 77, 78, 83, 84 and 85. 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.

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

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 10/16/2012)

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DECLARATION OF SERVICE

I, Constance Farmer, declare that on October 17, 2012, I served and filed copies of the attached Cumulative Impacts Analysis for the Quail Brush Power Project and Sycamore Landfill, dated October 17, 2012. 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.

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:

__x__ Served electronically to all e-mail addresses on the Proof of Service list;

__x__ 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 marked *"hard copy required" or where no e-mail address is provided.

AND

For filing with the Docket Unit at the Energy Commission:

__x__ 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-03
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
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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:

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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.

To: Gerry Bemis, CEC
Joseph Hughes, CEC

From: Richard Booth, AEROWEST
Gregory Darvin, Atmospheric Dynamics, Inc.

Date: October 17, 2012

Re: Cumulative Impacts Analysis for QBPP and Sycamore Landfill

Pursuant to the CEC staff and QBPP team conference call on 8-30-12, and related to CEC Data Requests 77, 78, 83, 84 and 85, the cumulative analysis of the QBPP and Sycamore Landfill emissions sources is presented below.

A cumulative (multisource) modeling analysis was performed that included the QBPP with the emissions sources at the Sycamore Landfill, which is located just north of the Project. These landfill sources were modeled with the Project Emissions for all applicable National and California state ambient air quality standards (NAAQS/CAAQS). It was determined that the existing landfill sources are already represented by the background concentrations included in the impact analyses presented in the application, thus, background was NOT included in this cumulative analyses.

The landfill consists of a number of sources, primarily turbines and flares, which are fueled primarily by landfill gas. There is a single diesel fueled engine which powers a tub grinder that only operates up to 10 hours per day. Emissions and source locations were provided by the San Diego Air Pollution Control District and are included at the end of this analysis. The stack characteristics for these sources are shown below and were used in the cumulative analysis.

Equipment/ Input Data	Stack Parameters				Emission Rates (g/s)[a]			
	Stack Height (m)	Stack Diameter (m)	Stack Temp. (deg K)	Exhaust Velocity meters per second (m/s)	NO_X	SO_2	CO	PM10/2.5
Averaging Period: 1-hour, 3-hours, and 8-hours								
Centaur 40 Turbine	12.192	1.0058	722.0	46.488	0.5796	0.2646	1.8522	n/a
GSC 1200R #1	12.192	1.0058	569.3	6.376	0.5040	0.0892	0.3780	n/a
GSC 1200R #2	12.192	1.0058	569.3	6.376	0.5040	0.0892	0.3780	n/a
Flare #1	9.144	2.4384	1088.7	3.578	0.5796	0.3717	0.6842	n/a
Flare #2	12.192	2.4384	1088.7	3.274	0.5292	0.3402	0.6262	n/a
Tub Grinder Diesel Engine	4.572	0.2042	744.3	108.324	1.4994	0.0018	0.8669	n/a
Averaging Period: 24-hours								
Centaur 40 Turbine	12.192	1.0058	722.0	46.488	n/a	0.2646	n/a	0.0277
GSC 1200R #1	12.192	1.0058	569.3	6.376	n/a	0.0892	n/a	0.0126
GSC 1200R #2	12.192	1.0058	569.3	6.376	n/a	0.0892	n/a	0.0126
Flare #1	9.144	2.4384	1088.7	3.578	n/a	0.3717	n/a	0.2231
Flare #2	12.192	2.4384	1088.7	3.274	n/a	0.3402	n/a	0.2042
Tub Grinder Diesel Engine	4.572	0.2042	744.3	108.324	n/a	0.0007	n/a	0.0210

Equipment/ Input Data	Stack Parameters				Emission Rates (g/s)[a]			
	Stack Height (m)	Stack Diameter (m)	Stack Temp. (deg K)	Exhaust Velocity meters per second (m/s)	NO_X	SO_2	CO	PM10/2.5
Averaging Period: Annual								
Centaur 40 Turbine	12.192	1.0058	722.0	46.488	0.5796	0.2646	n/a	0.0277
GSC 1200R #1	12.192	1.0058	569.3	6.376	0.5040	0.0892	n/a	0.0126
GSC 1200R #2	12.192	1.0058	569.3	6.376	0.5040	0.0892	n/a	0.0126
Flare #1	9.144	2.4384	1088.7	3.578	0.5796	0.3717	n/a	0.2231
Flare #2	12.192	2.4384	1088.7	3.274	0.5292	0.3402	n/a	0.2042
Tub Grinder Diesel Engine	4.572	0.2042	744.3	108.324	0.3768	0.0004	n/a	0.0127

Notes: Modeled emission rates based on estimated hours of operation. The tub grinder operation at 10 hours per day was assumed to occur during the hours of 8:00 AM and 6:00 PM, 2022 hours per year.

These landfill sources were modeled with the QBPP sources using AERMOD for both normal operations and startup/shutdown conditions for the pollutants and averaging times described above. For 1-hour NO_2 impacts, the same methods were used as in the Project modeling analyses with the exception that the NO_2/NOx ratio for the engines at QBPP were revised to 18.5% for use in the Plume Volume Molar Ratio Method (PVMRM). For the landfill sources, NO_2/NOx in-stack ratios of 10% for the turbines, 50% for the flares, and 20% for the diesel engine were used for the short-term NO_2 modeling analyses. An Ambient Ratio Method (ARM) factor of 75% (national default) was used for the annual NO_2 modeling analyses. The same property fence-line cartesian receptor grids as used in the Project modeling analyses were initially analyzed, even though a considerable number of QBPP receptors would occupy locations inside the landfill complex fenceline/property boundary and would not typically qualify as ambient air for the landfill sources. The AERMOD modeled impacts are presented below for the landfill sources only, the QBPP Project sources only, and total cumulative (QBPP+landfill) impacts.

Pollutant/Avg.Time/ Form of Impact/Standard	Sycamore Landfill AERMOD Maxima ($\mu g/m^3$)	QBPP Project AERMOD Maxima ($\mu g/m^3$)	Cumulative AERMOD Maxima ($\mu g/m^3$)
NORMAL QBPP OPERATIONS:			
NO_2 1-hour Maximum (CAAQS)	275	191	275
NO_2 1-hour 5-year Avg.98th% (NAAQS)	154	83	154
NO_2 Annual Maximum (CAAQS/NAAQS)	12.1	1.2	12.2
CO 1-hour Maximum (CAAQS/NAAQS):	405	131	405
CO 8-hour Maximum (CAAQS/NAAQS):	172	40	172
SO_2 1-hour Maximum (CAAQS)	132	20	132
SO_2 1-hour 5-year Avg.99th% (NAAQS)	81	11	81
SO_2 3-hour Maximum (NAAQS)	92	10	92
SO_2 24-hour Maximum (CAAQS/NAAQS)	54	3	54
SO_2 Annual Maximum (NAAQS)	6.2	0.2	6.2
PM10 24-hr Maximum (CAAQS)	27.1	17.1	27.1
PM10 24-hr 6th High/5-years (NAAQS)	13.2	13.3	15.0
PM10 Annual Maximum (CAAQS)	2.8	1.3	2.9

PM2.5 24-hr 5-yr Avg.98th% (NAAQS)	7.8	8.9	9.9
PM2.5 Annual Maximum (CAAQS)	2.8	1.3	2.9
PM2.5 Annual 5-yr Avg. (NAAQS)	2.4	0.9	2.5
STARTUP/SHUTDOWN QBPP CONDITIONS:			
NO_2 1-hour Maximum (CAAQS)	275	252	311
NO_2 1-hour 5-year Avg.98th% (NAAQS)	154	116	157
CO 1-hour Maximum (CAAQS/NAAQS):	405	1125	1126
CO 8-hour Maximum (CAAQS/NAAQS):	172	81	172
SO_2 1-hour Maximum (CAAQS)	132	27	132
SO_2 1-hour 5-year Avg.99th% (NAAQS)	81	14	81
SO_2 3-hour Maximum (NAAQS)	92	10	92

1-hour NO2 impacts are based on the Ozone Limiting Method (OLM) with concurrent ozone background concentrations from Kearney Mesa (San Diego Overland Ave) monitoring site. Annual NO_2 impacts use the USEPA-default ARM factor of 75%.

Almost all the maximum cumulative impacts were caused primarily by the Sycamore Landfill sources (impacts in first and third columns approximately the same). This can also be determined by examining the locations and periods of maximum impacts in the AERMOD outputs, since maximum impacts are caused primarily by the landfill sources for most pollutants and averaging times. The only maximum cumulative impacts caused primarily by the Project were 24-hour NAAQS impacts for PM10 and PM2.5 and 1-hour CO and NO_2 impacts for startup/shutdown conditions. As shown in the Project modeling analyses submitted earlier, the 24-hour PM impacts for QBPP occur in complex terrain. When this area was modeled with CTSCREEN, 24-hour PM impacts for QBPP were reduced significantly. Comparison of the cumulative modeling impacts to the AAQS are shown below.

Comparison of Cumulative Air Quality Impacts to Ambient Air Quality Standards

Pollutant	Avg. Period	Maximum Landfill Impact (µg/m^3)	Maximum QBPP Project Impact (µg/m^3)	Maximum Combined Impact (µg/m^3)	Ambient Air Quality CAAQS/NAAQS	
					(µg/m^3)	(µg/m^3)
NORMAL QBPP OPERATIONS:						
NO_2	1-hour Federal	154	83	154	-	188
	1-hour State	275	191	275	339	-
	Annual	12.1	1.2	12.2	57	100
PM_{10}	24-hour Federal	13.2	13.3	15.0	-	150
	24-hour State	27.1	17.1	27.1	50	-
	Annual	2.8	1.3	2.9	20	-
$PM_{2.5}$	24-hour Federal	7.8	8.9	9.9	-	35
	Annual Federal	2.4	0.9	2.5	-	15.0
	Annual State	2.8	1.3	2.9	12	-
CO	1-hour	405	131	405	23,000	40,000
	8-hour	172	40	172	10,000	10,000
SO_2	1-hour Federal	81	11	81	-	196
	1-hour State	132	20	132	655	-
	3-hour	92	10	92	-	1300
	24-hour	54	3	54	105	365
	Annual	6.2	0.2	6.2	-	80

Pollutant	Avg. Period	Maximum Landfill Impact ($\mu g/m^3$)	Maximum QBPP Project Impact ($\mu g/m^3$)	Maximum Combined Impact ($\mu g/m^3$)	Ambient Air Quality CAAQS/NAAQS	
					($\mu g/m^3$)	($\mu g/m^3$)
STARTUP/SHUTDOWN QBPP CONDITIONS:						
NO_2	1-hour Federal	154	116	157	-	188
	1-hour State	275	252	311	339	-
CO	1-hour	405	1125	1126	23,000	40,000
	8-hour	172	81	172	10,000	10,000
SO_2	1-hour Federal	81	14	81	-	196
	1-hour State	132	27	132	655	-
	3-hour	92	10	92	-	1300

The results of the modeling analysis demonstrate that the cumulative impacts are less than the Federal and State AAQS under all operational scenarios for QBPP.

Sycamore Landfill Facility-Stationary Source Data (Emissions data is PTE)

Source	mmbtu/hr	Stk Ht, ft	Stk Diam, ft	Stk Temp, F	Stk ACFM	**NOx, #/hr**	**CO, #/hr**	**VOC, #/hr**	**SOx, #/hr**	**PM10, #/hr**	**PM2.5, #/hr**
Centaur 40	45	40	3.3	~840	~78270	4.6	14.7	0.23	2.1	0.22	0.22
GSC 1200 R	10.8	40	3.3	~565	~10735	4	3	2	0.708	<0.1	<0.1
GSC 1200 R	10.8	40	3.3	~565	~10735	4	3	2	0.708	<0.1	<0.1
Flare 1	59	30	8	~1500	~35400	4.6	5.43	0.31	2.95	1.77	1.77
Flare 2	54	40	8	~1500	~32400	4.2	4.97	0.284	2.7	1.62	1.62
Diesel ICE	1200 HP	Est 15	0.67	~880	~7518	11.9	6.88	0.79	0.014	0.4	0.4
				Totals		*33.3*	*38*	*5.6*	*9.2*	*4.2*	*4.2*
	Max hrs/day	Max hrs/yr		**PM10/2.5 lbs/day**		**NOx, tpy**	**CO, tpy**	**VOC, tpy**	**SOX, tpy**	**PM10, tpy**	**PM2.5, tpy**
Centaur 40	24	8760		5.28		20.15	64.39	1.01	9.2	0.96	0.96
GSC 1200 R	24	8760		2.4		17.52	13.14	8.76	3.1	0.44	0.44
GSC 1200 R	24	8760		2.4		17.52	13.14	8.76	3.1	0.44	0.44
Flare 1	24	8760		42.5		20.15	23.78	1.36	12.92	7.75	7.75
Flare 2	24	8760		38.9		18.4	21.77	1.24	11.83	7.1	7.1
Diesel ICE	10	2200		4.0		13.1	7.57	0.87	0.015	0.44	0.44
		Totals		*95.5*		*106.7*	*143.8*	*22*	*40.2*	*17.1*	*17.1*

Notes:

1. Diesel ICE is Tier 2 certified, max ops is 10 hrs/day and 2200 hrs/yr. Cat C-32, TLD00120, engine family 6CPXL32.0ESK.
2. No hourly limits apply to the turbines or flares, therefore 8760 hrs/yr for PTE.
3. Data from APCD PTOs (900112-V3, 870383-V3, 971111-V2, 001203), SDAPCD EI 2008 and 2005, CARB EIS Database-2011 County request. RDEIR, Table 7-6, 2011.

Flare emissions estimates based on: *AP-42 Section 2.4, Table 2.4-4*, and *Emissions of Criteria and Hazardous Air Pollutants from Landfill Gas Flares, R. Booth, RTP Environmental Associates Inc., January 1998.*

NOx 0.078 lb/mmbtu
CO 0.092 lbs/mmbtu
PM 0.03 lbs/mmbtu
VOC 0.00526 lbs/mmbtu
SOx 0.05 lbs/mmbtu

Flare exhaust flows estimated from ref: *Common Operational Fixes for Enclosed Flares, Tim Locke, MSW Management, March/April 2006. Graph 1, page 59*. At 1500 deg F ops temp, the combustion air flow would be approximately 600 scfm/mmbtu.

Diesel engine Tier 2 EFs: NOx-4.5 g/hp-hr, CO-2.6 g/hp-hr, VOC-0.3 g/hp-hr, PM-0.15 g/hp-hr, SOx-fuel S based.
Fuel S = 0.0015% S Wt. at ~66 gals/hr = 0.014 lbs SOx/hr
See Cat C32 spec sheet, #SS-006386.pdf

LFG data:
The total mmbtu/hr handling capacity of all combustion equipment used in LFG destruction/power generation is 179.6 mmbtu/hr.
Assuming LFG at 500 btu/scf, the current equipment could handle ~359,200 scf of LFG per hour, or 5987 scfm.
Assuming LFG at statewide average btu content of 339 btu/scf (as fired), the current equipment could handle 529,794 scf of LFG per hour, or 8830 scfm.
The RDEIR states the landfill is currently (2012) producing, at 90% collection efficiency, 3339 scfm or 200,340 scfh, which means at a heat content of 500 btu/scf, the landfill combustion devices are presently capable of destroying all the collected LFG being generated. At a heat content of 339 btu/scf (statewide average), the landfill combustion devices have a greater capability of handling all the present LFG generation.
Assuming the LFG heat content (statewide average) of 339 btu/scf, and the present combustion handling capability of 179.6 mmbtu/hr, this yields a LFG flow rate or ~8830 scfm, which according to the RDEIR is not forecasted to happen until 2023-2024. Assuming the LFG heat content of 500 btu/scf, and the present combustion handling capability of 179.6 mmbtu/hr, this yields a LFG flow rate or ~5987 scfm, which according to the RDEIR is not forecasted to happen until 2018-2019.
Using the RDEIR value of existing handling capacity of 6350 scfm, would place the need for new or modified systems in the 2019 timeframe.

Stack location data (Google Earth):

Source	UTM E	UTM N	Elev, ft.
Centaur 40 Turbine	497317.83	3635532.84	459
GSC 1200 R Turbine	497299.16	3635517.24	459
GSC 1200 R Turbine	497301.36	3635515.21	459
Flare 1	497340.63	3635520.20	481
Flare 2	497328.71	3635510.29	472
Diesel ICE	497423.18	3636383.54	658