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ENVIRONMENTAL NOISE ANALYSIS

SMUD Cosumnes Power Plant
Noise Levels Measured at 13900 Clay East Road

Sacramento County, California

BBA Project No. 07-218

Prepared For

Aspen Environmental Group
8801 Folsom Boulevard, Suite 290
Sacramento, CA 95826

May 10, 2007

Prepared By

Brown-Buntin Associates, Inc.
Fair Oaks, California

7996 California Ave., Suite A · Fair Oaks, CA 95628 · (916) 961-5822 · (916) 961-6418 Fax
319 W. School Ave. · Visalia, CA 93291 · (559) 627-4923 · (559) 627-6284 Fax

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INTRODUCTION

The SMUD Cosumnes power plant is located in Sacramento County, California. The resident at 13900 Clay East Road (Mr. Salvatore Ali) has submitted complaints to the California Energy Commission (CEC) concerning the noise produced by the power plant. Brown-Buntin Associates, Inc. (BBA) has performed an acoustical analysis to describe ambient and power plant noise levels received at the Ali residence, and to describe the power plant noise level reduction provided by the existing building facades.

CRITERIA

The CEC prepared a Decision concerning the Cosumnes Power Plant Project Application for Certification in September 2003. That decision included requirements for the conduct of certain noise surveys, and for acoustical improvements for certain affected residences where the steady-state plant noise level exceeds 36 dBA[1].

METHODS

This analysis approached the concerns of the CEC Decision with three separate methods, assessing ambient noise levels over a period of time, power plant noise source characteristics, and the acoustical performance of the existing building facades.

Ambient Noise Levels:

This analysis presents the results of continuous noise measurements at the Ali residence locations and at the south fence line of the Cosumnes Power Plant during the period of May 4-8, 2007. Figure 1 shows the noise measurement sites described in this report. Table I lists the sound level measurement equipment used for this study. Appendix B provides photographs of the noise measurement sites.

TABLE I
Sound Level Measurement Equipment Used
Cosumnes Power Plant Study
May 4-8, 2007

Location	BBA No.	Sound Level Meter	Serial No.	Preamplifier	Serial No.	Microphone	Serial No.
Plant Fence Line	13	Larson Davis 820	1419	LD PRM828	2186	B&K 4176	2419458
13900 Clay East: 15 ft high	11	Larson Davis 820	1124	LD PRM828	1539	B&K 4176	2135837
13900 Clay East: 5 ft high	12	Larson Davis 820	1126	LD PRM828	1560	PCB 377B02	102581
Frequency Analysis	--	Larson Davis 824	1162	LD PRM902	1679	LD 2541	6526

1 See Appendix A for explanations of the acoustical terms used in this report.

Figure 1
Noise Measurement Sites
Cousmnes Power Plant Project: May 4-8, 2007

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Noise Measurements at the Power Plant Fence Line

BBA performed continuous noise measurements at the south fence line of the Cosumnes Power Plant site, beginning at 10:00 a.m. on May 4, 2007, and ending at 10:00 a.m. on May 8, 2007. The purpose of these noise measurements was to describe the variations in noise levels that could be clearly attributed to power plant operation during the measurement period. These values may be compared to the noise levels measured at the residential site during the same period.

The noise measurements were conducted adjacent to a light pole outside the plant fence line. The equipment used is listed in Table I. The meter was calibrated in the field before use with a Bruel & Kjaer Type 4230 acoustical calibrator (s/n 1026368) that was certified by its manufacturer in October 2006 to be consistent with reference values maintained by the National Bureau of Standards.

The measurement microphone was set in a vertical position at a height of about 5 feet above ground level, and was fitted with a random incidence corrector and a windscreen. The sound level meter was set to measure A-weighted sound pressure levels (sound levels), in decibels (dB), using Slow meter response. The meter was set to summarize the results of continuous noise measurements in terms of hourly statistical metrics.

Figure 2 summarizes the noise measurement data in terms of the median hourly sound (or noise) level[2] (L50), which is the metric applied by the CEC. These values are also listed in Appendix C.

The noise measurement data at this location indicated that median noise levels were relatively constant when the power plant was in operation, in the range of 56 to 62 dB. The predominant noise sources at this measurement site were the cooling towers and the power generation turbines.

These noise measurement data also show that power plant noise levels were noticeably reduced from about 8 a.m. to 3 p.m. on Monday, May 7, 2007.

Noise Measurements at the Ali Residence

BBA performed continuous noise measurements at the front yard of the Ali residence, beginning at 11:00 a.m. on May 4, 2007, and ending at 10:00 a.m. on May 8, 2007. The purpose of these noise measurements was to describe the noise levels that occurring at the residence during the measurement period, with the goal of describing the noise exposure due to power plant operation.

The noise measurements were conducted at two different heights: about 5 feet above ground, and about 15 feet above ground. The higher microphone position was used to describe noise levels at the elevation of the second-floor windows of the house. The equipment used is listed in Table I. The meters were calibrated in the field before use with a Bruel & Kjaer Type 4230 acoustical

2 The term "sound level" is defined as the A-weighted sound pressure level in decibels (dB), sometimes expressed as dBA. The terms "sound level" and "noise level" are used interchangeably in this report.

calibrator (s/n 1026368) that was certified by its manufacturer in October 2006 to be consistent with reference values maintained by the National Bureau of Standards.

The measurement microphones were set in a vertical position, and were fitted with random incidence correctors and windscreens. The sound level meters were set to measure A-weighted sound pressure levels (sound levels), in decibels (dB), using Slow meter response. The meters were set to summarize the results of continuous noise measurements in terms of hourly statistical metrics.

Figure 2 summarizes the noise measurement data in terms of the median hourly noise levels (L50), which is the metric applied by the CEC. These values are also listed in Appendix C.

On Saturday, May 5, high winds caused the microphones to topple. The 15-foot microphone mast was taken down at about 10:30 a.m., and was placed back into operation on Sunday, May 6, at about 9:00 p.m. The measurement data at the 5-foot microphone height show the effects of the high wind speeds on the measured noise levels. These effects are the result of the aerodynamic noise (sometimes called self-noise) caused as the wind contacts the microphone assembly.

These noise measurement data also show that an unknown noise source operated daily at 5:00 a.m. It is likely that the noise source was the swimming pool pump, which was located at the side of the house within about 25 feet of the microphones.

The elevated noise levels occurring at about 4:00 p.m. on Monday May 7, 2007, are presumed to be due to lawn mowing activity.

The noise measurement data at this location indicated that nighttime median noise levels were as low as 32 dB, but most often ranged from 38 dB to 42 dB. Conversations with the Ali family members indicated that noise due to power plant operations was reported to be "loudest" when heard in the time frame of 2:00 to 4:00 a.m.

To further describe ambient noise levels, BBA measured the frequency spectrum of the ambient noise at the Ali residence at about 10:07 p.m. Monday May 7, 2007. This analysis was made using the Larson Davis Model 824 sound level meter described by Table I, and the results are shown by Figure 3. The meter was calibrated before use with a Larson Davis Model CA-250 acoustical calibrator (s/n 3173) that was certified by its manufacturer in October 2006 to be consistent with reference values maintained by the National Bureau of Standards. The power plant noise was inaudible at this time, so the frequency spectrum data show the contribution made to measured noise levels at nighttime by insects, predominantly crickets. In this sample, the measured overall A-weighted noise level was 45.5 dB, and the A-weighted contribution of the insect noise in the 4,000 Hz and 5,000 Hz frequency bands was 44.9 dB. This observation indicates that nighttime noise levels during the measurement period may be dominated by insect sounds during the hours when the insects are active.

Figure 2
Measured Median (L50) Sound Levels
May 4-8, 2007
SMUD Cosumnes Power Plant Study

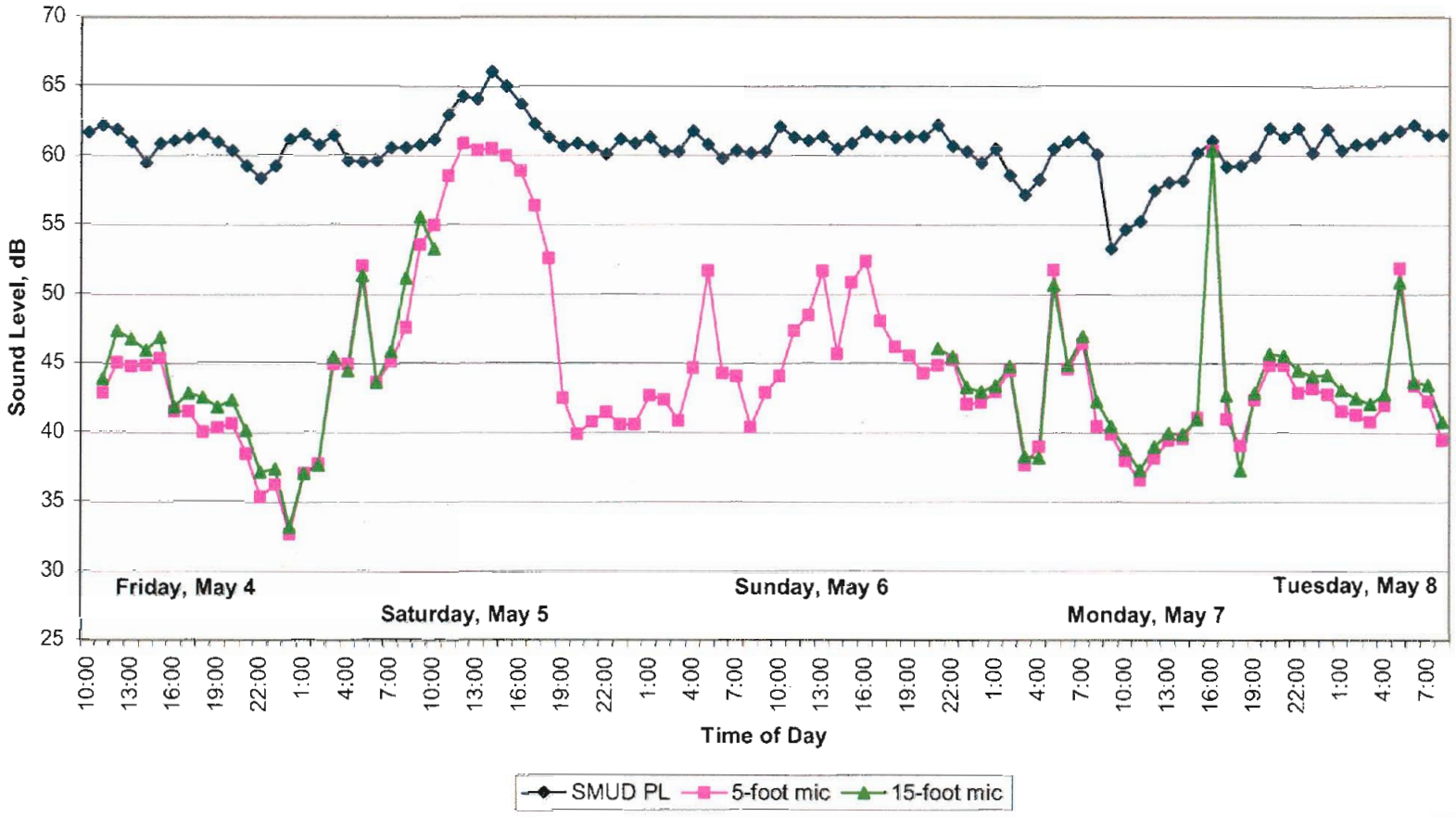

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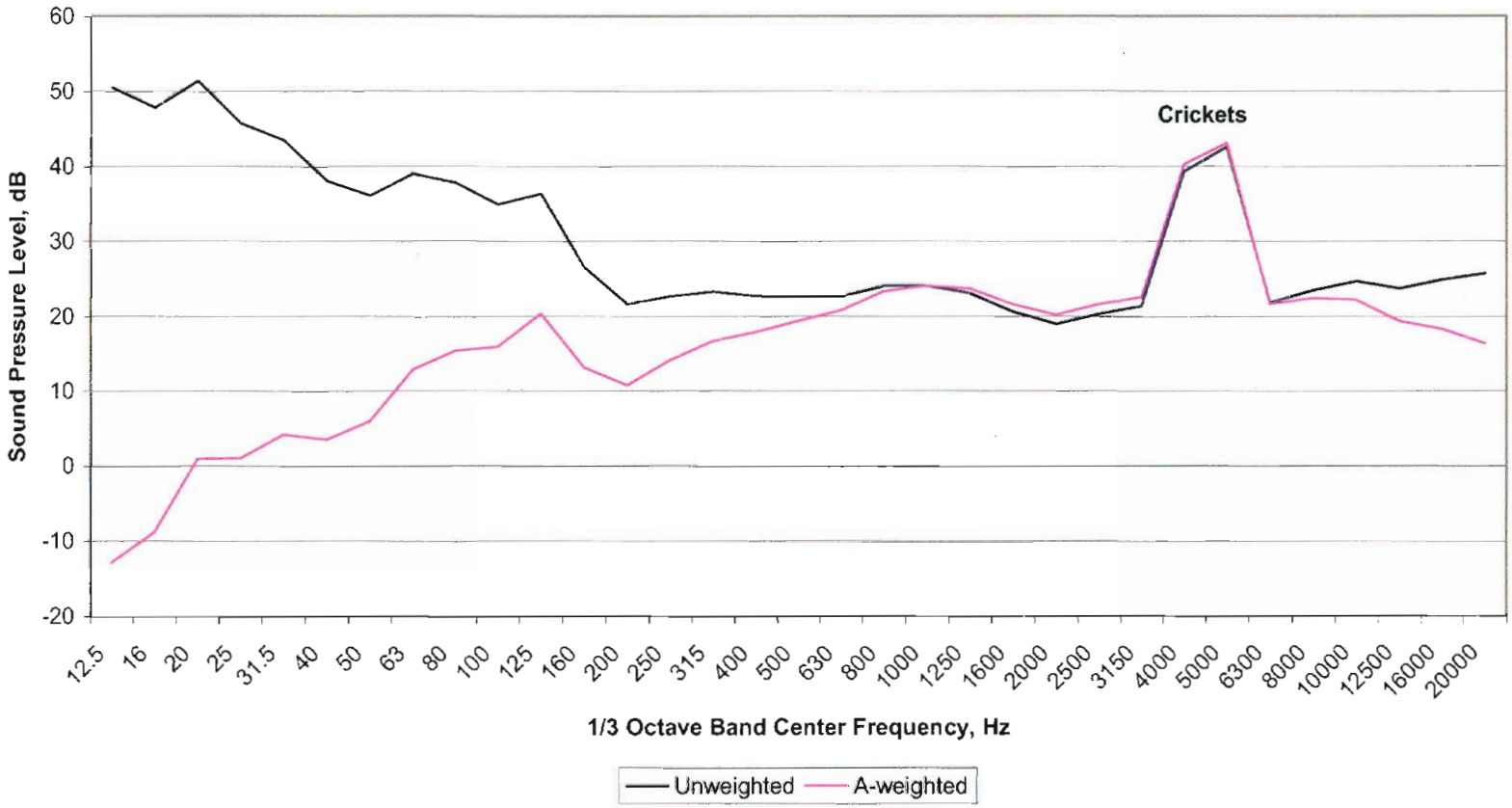
Figure 3
Nighttime Ambient Noise Frequency Spectrum
May 7, 2007: 10:07 p.m.
A-Weighted SPL = 45.5 dB
Power Plant Inaudible



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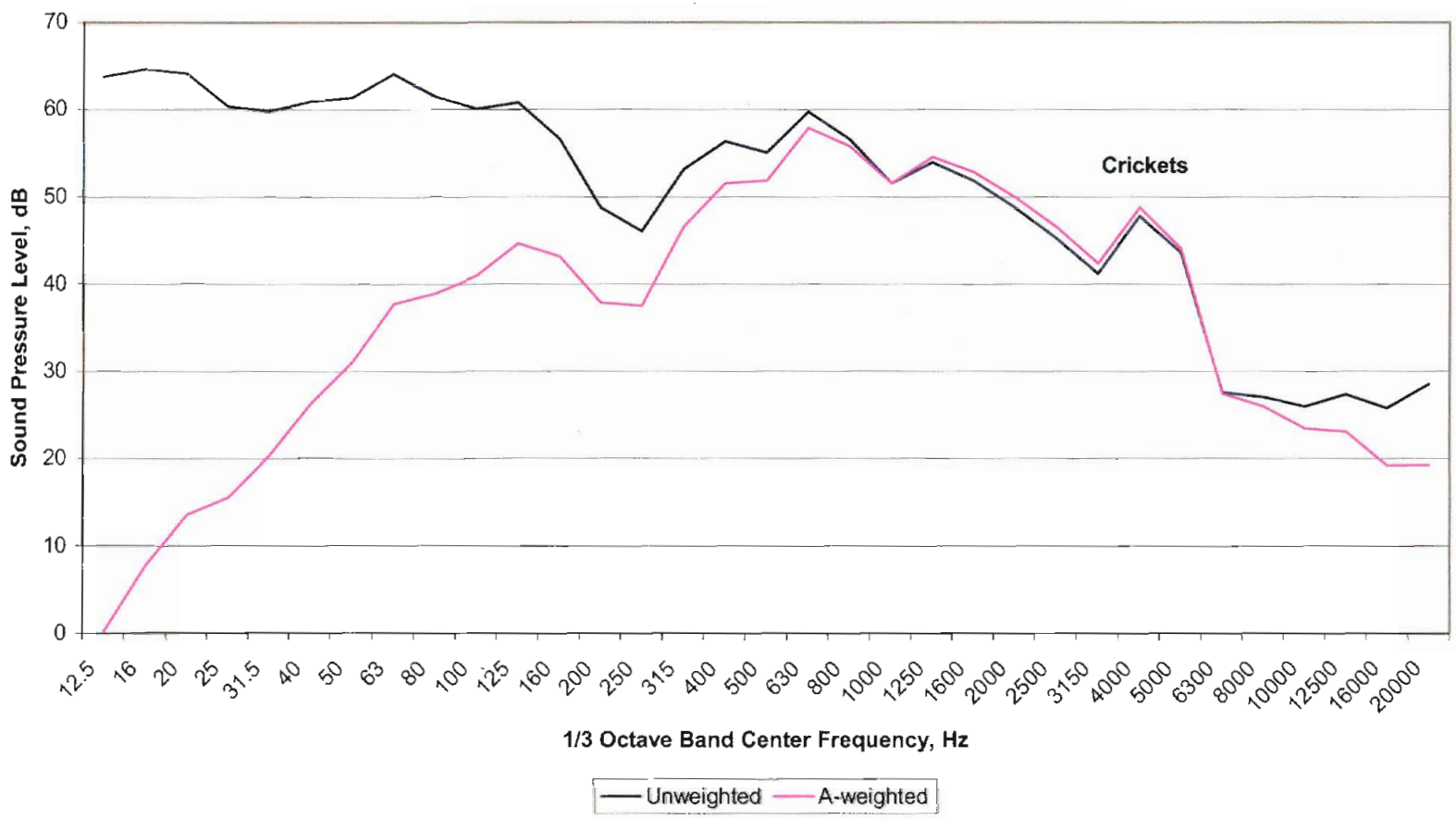
Power Plant Noise Frequency Characteristics

BBA measured the frequency spectrum of the power plant noise at the south fence line of the Cosumnes Power Plant at 10:00 p.m. Monday May 7, 2007. This analysis was made using the Larson Davis Model 824 sound level meter described by Table I, and the results are shown by Figure 4. The meter was calibrated before use with a Larson Davis Model CA-250 acoustical calibrator (s/n 3173) that was certified by its manufacturer in October 2006 to be consistent with reference values maintained by the National Bureau of Standards. The power plant noise was dominant at this time, but the frequency spectrum data also show the contribution made to measured noise levels by crickets. In this sample, the measured overall A-weighted noise level was 63.6 dB, and the A-weighted contribution of the insect noise in the 4,000 Hz and 5,000 Hz frequency bands was 47.5 dB. The noise level at this site was therefore dominated by the power plant.

The frequency spectrum measured at this site was used in the analysis of the power plant noise level reduction provided by the residential building facades. In actuality, the power plant spectrum that would be received at the residence would likely be slightly different, as the intervening ground and air over the approximately 5,000-foot distance between the power plant and the residence would absorb certain frequencies, primarily at the higher end of the spectrum. However, the spectrum shape shown by Figure 4 will provide a worst-case estimate of interior noise levels when combined with the noise level reduction data described by the following section.

Figure 4
Nighttime Power Plant Noise Frequency Spectrum
May 7, 2007: 10:00 p.m.
A-Weighted SPL = 63.6 dB



Acoustical Performance of the Existing Building Facades

To address the acoustical performance of the existing residential building facades, and the consequent amount of power plant noise reduction available to people inside the Ali residence, BBA performed measurements of the airborne sound insulation of the walls and windows of each room of the house that faces in the direction of the power plant. These measurements were conducted between about 10:00 a.m. and noon on May 8, 2007.

The rooms on the first floor of the house facing the power plant are the living room and the dining room. The rooms on the second floor that face the power plant are the master bedroom, a "daughter's" bedroom, and a bedroom used also as a home office. The existing windows at this residence are constructed with standard energy-conserving dual-pane glazing in vinyl frames. These windows typically provide acoustical performance in terms of the Sound Transmission Class (STC) rating of about 28. The front door to the first floor is made of solid wood, with glazing in the upper portion of the door.

The method used to measure the airborne sound insulation of the building facades was based upon the American Society of Testing and Materials (ASTM) Standard Guide E 966-02, using the "nearby average" method. In general, the test consisted of using a loudspeaker system to produce broad-band sound outside of each room. The sound level and frequency content were measured outside and inside the classroom using a Larson Davis Model 824 precision real time analyzer and sound level meter. The meter was calibrated before use with a Larson Davis Model CA-250 acoustical calibrator (s/n 3173) that was certified by its manufacturer in October 2006 to be consistent with reference values maintained by the National Bureau of Standards. The outdoor-indoor level reduction (OILR), in decibels, is the difference between the sound pressure levels outside and inside each room, calculated for each one-third octave band center frequency from 12.5 Hz to 20,000 Hz.

The sound pressure level measurements were performed outside of, and parallel to, the facades at a distance of 4 to 8 feet, and a single microphone was moved in a pattern so that the average noise level in front of the façade was measured. Inside each room, the microphone was moved over an area parallel to the façade, about 3 to 5 feet from the façade. Each sound pressure level measurement was conducted for at least 30 seconds, and the energy-average sound pressure level (L_{eq}) in each one-third octave band center frequency was calculated and stored in the meter. Prior to the measurements, ambient noise levels were measured in each room to allow corrections to be made to account for ambient noise if needed.

During the testing, the windows to each room were closed. For the first floor tests, the doors and windows at the rear of the house were also closed to prevent the creation of flanking paths for sound transmission. On the second floor, the door to each room was closed during the test.

Table III lists the measured space-averaged sound pressure levels outside and inside of each room, along with the calculated OILR, for each one-third octave band center frequency from 12.5 Hz to 20,000 Hz.

TABLE III
Measured One-Third Octave Band Sound Pressure Levels
Outside and Inside Affected Rooms
13900 Clay East Road
May 8, 2007

Center Frequency, Hz	Space-Averaged Sound Pressure Level, dB														
	Living Room			Dining Room			Master Bedroom			Daughter's Room			Office		
	Out	In	OILR	Out	In	OILR	Out	In	OILR	Out	In	OILR	Out	In	OILR
12.5	59.9	56.3	3.6	57.8	63.7	-5.9	60.2	58.2	2.0	56.8	56.4	0.4	57.8	57.5	0.3
16	55.7	53.6	2.1	55.2	57.4	-2.2	55.9	56.2	-0.3	55.1	53.5	1.6	53.4	54.1	-0.7
20	55.4	50.5	4.9	55.0	52.9	2.1	54.7	52.1	2.6	54.3	50.1	4.2	53.6	50.3	3.3
25	51.0	49.2	1.8	50.0	50.6	-0.6	50.4	49.6	0.8	54.1	47.2	6.9	51.0	49.3	1.7
31.5	52.5	45.6	6.9	51.5	50.4	1.1	51.7	46.6	5.1	54.4	44.2	10.2	52.5	47.2	5.3
40	61.8	45.4	16.4	61.0	49.7	11.3	61.0	44.6	16.4	60.8	45.1	15.7	61.9	46.9	15.0
50	71.6	47.5	24.1	70.8	53.5	17.3	75.6	51.4	24.2	73.7	56.6	17.1	74.4	55.0	19.4
63	84.2	60.4	23.8	81.4	57.9	23.5	88.2	61.5	26.7	82.4	62.5	19.9	86.1	65.2	20.9
80	90.0	68.4	21.6	85.9	68.7	17.2	95.2	69.5	25.7	88.8	72.5	16.3	90.7	72.9	17.8
100	86.5	69.6	16.9	84.5	70.9	13.6	94.0	67.4	26.6	88.8	70.1	18.7	89.2	70.6	18.6
125	84.2	65.1	19.1	86.1	69.6	16.5	89.1	65.9	23.2	89.7	65.6	24.1	88.9	67.3	21.6
160	84.0	62.4	21.6	89.7	63.8	25.9	90.3	59.5	30.8	90.3	63.9	26.4	90.5	67.3	23.2
200	85.8	61.4	24.4	88.3	65.9	22.4	89.3	61.8	27.5	92.0	62.9	29.1	91.1	63.8	27.3
250	87.6	59.6	28.0	90.9	61.0	29.9	86.7	58.6	28.1	90.5	60.0	30.5	90.9	60.4	30.5
315	86.4	59.3	27.1	87.9	62.5	25.4	90.1	62.3	27.8	86.1	61.7	24.4	87.4	59.5	27.9
400	89.4	56.5	32.9	91.3	60.1	31.2	92.8	55.9	36.9	89.4	57.9	31.5	89.0	54.3	34.7
500	89.1	56.3	32.8	88.7	59.0	29.7	88.8	52.3	36.5	88.3	52.8	35.5	88.5	52.7	35.8
630	90.8	55.4	35.4	92.3	57.9	34.4	91.8	51.3	40.5	91.2	49.9	41.3	91.6	49.8	41.8
800	90.3	54.3	36.0	91.1	56.4	34.7	90.5	50.4	40.1	90.7	49.2	41.5	90.4	49.2	41.2
1000	89.4	50.1	39.3	90.2	53.0	37.2	89.2	46.3	42.9	88.7	41.6	47.1	88.7	42.4	46.3
1250	88.1	51.5	36.6	89.2	54.4	34.8	88.8	45.1	43.7	88.7	40.6	48.1	88.6	41.8	46.8
1600	87.1	53.9	33.2	88.4	54.6	33.8	91.3	47.0	44.3	89.3	42.6	46.7	89.6	43.6	46.0
2000	85.9	51.8	34.1	86.4	53.3	33.1	86.8	44.2	42.6	85.9	40.6	45.3	86.4	40.9	45.5
2500	85.2	50.1	35.1	85.8	51.2	34.6	86.9	39.4	47.5	86.2	38.8	47.4	87.3	38.9	48.4
3150	84.7	46.2	38.5	84.2	46.3	37.9	86.6	37.8	48.8	85.0	37.5	47.5	86.0	37.1	48.9
4000	84.4	45.8	38.6	84.5	45.2	39.3	85.0	42.0	43.0	84.0	40.4	43.6	84.4	40.0	44.4
5000	83.8	43.4	40.4	84.4	44.5	39.9	84.6	40.5	44.1	84.1	38.6	45.5	85.0	40.0	45.0
6300	85.0	44.0	41.0	85.9	46.3	39.6	86.6	37.7	48.9	85.5	36.0	49.5	86.5	35.9	50.6
8000	84.9	40.6	44.3	85.5	42.6	42.9	86.2	36.4	49.8	84.8	34.3	50.5	86.1	35.1	51.0
10000	83.6	36.4	47.2	84.4	39.3	45.1	84.8	33.0	51.8	83.5	33.2	50.3	85.5	32.3	53.2
12500	81.0	29.9	51.1	82.4	31.3	51.1	82.1	28.5	53.6	81.2	29.4	51.8	83.5	29.5	54.0
16000	79.9	26.3	53.6	81.6	28.4	53.2	83.7	26.4	57.3	81.5	28.8	52.7	84.2	30.0	54.2
20000	78.1	26.2	51.9	79.5	26.6	52.9	78.1	26.0	52.1	77.1	27.4	49.7	80.2	27.5	52.7

To calculate the noise level reduction (NLR) that would be provided by each room façade for power plant noise, it was assumed that the power plant noise frequency spectrum would be the same as that measured at nighttime at the power plant fence line, as shown by Figure 4.

To provide a general representation of the magnitude of interior noise levels that would be expected when the power plant was audible, the overall sound pressure levels were offset so that the total A-weighted power plant noise level at the building façade would be 40 dB. The sound pressure levels in each one-third octave band were then calculated for each room by subtracting the measured OILR values. The values were then A-weighted, and were added together to arrive

at the total A-weighted sound pressure level inside each room. The power plant NLR was calculated as the difference between the assumed outdoor power plant noise level and the calculated power plant noise level inside the room. Table IV summarizes the NLR calculations and results.

These data indicate that the existing building facades provide power plant noise level reduction in the range of 29 dB to 36 dB. The primary sound transmission path for each room appeared to be the window(s).

CONCLUSIONS

Continuous noise measurements conducted at the SMUD Cosumnes Power Plant and at the Ali residence on May 4-8, 2007 provide information about ambient and power plant noise levels over that period. The data also indicate that sound produced by crickets contributes significantly to measured noise levels during nighttime hours when the insects are active.

Based upon airborne sound insulation measurements conducted at the Ali residence, the existing building facades provide power plant noise level reduction values of 29 dB to 36 dB with windows in the closed position.

Respectfully Submitted,
Brown-Buntin Associates, Inc.

Jim Buntin
Vice President

TABLE IV
Calculated Power Plant Noise Level Reduction Values: 13900 Clay East Road

Center Frequency, Hz	Space-Averaged Sound Pressure Level, dB, in One-Third Octave Band															
	Source	Living Room			Dining Room			Master Bedroom			Daughter's Room			Office		
	Level	OILR	Level	SPLA	OILR	Level	SPLA	OILR	Level	SPLA	OILR	Level	SPLA	OILR	Level	SPLA
12.5	40.1	3.6	36.5	-26.9	-5.9	46.0	-17.4	2.0	38.1	-25.3	0.4	39.7	-23.7	0.3	39.8	-23.6
16	41.0	2.1	38.9	-17.8	-2.2	43.2	-13.5	-0.3	41.3	-15.4	1.6	39.4	-17.3	-0.7	41.7	-15.0
20	40.5	4.9	35.6	-14.9	2.1	38.4	-12.1	2.6	37.9	-12.6	4.2	36.3	-14.2	3.3	37.2	-13.3
25	36.7	1.8	34.9	-9.8	-0.6	37.3	-7.4	0.8	35.9	-8.8	6.9	29.8	-14.9	1.7	35.0	-9.7
31.5	36.2	6.9	29.3	-10.1	1.1	35.1	-4.3	5.1	31.1	-8.3	10.2	26.0	-13.4	5.3	30.9	-8.5
40	37.3	16.4	20.9	-13.7	11.3	26.0	-8.6	16.4	20.9	-13.7	15.7	21.6	-13.0	15.0	22.3	-12.3
50	37.7	24.1	13.6	-16.6	17.3	20.4	-9.8	24.2	13.5	-16.7	17.1	20.6	-9.6	19.4	18.3	-11.9
63	40.4	23.8	16.6	-9.6	23.5	16.9	-9.3	26.7	13.7	-12.5	19.9	20.5	-5.7	20.9	19.5	-6.7
80	37.9	21.6	16.3	-6.2	17.2	20.7	-1.8	25.7	12.2	-10.3	16.3	21.6	-0.9	17.8	20.1	-2.4
100	36.5	16.9	19.6	0.5	13.6	22.9	3.8	26.6	9.9	-9.2	18.7	17.8	-1.3	18.6	17.9	-1.2
125	37.2	19.1	18.1	2.0	16.5	20.7	4.6	23.2	14.0	-2.1	24.1	13.1	-3.0	21.6	15.6	-0.5
160	33.0	21.6	11.4	-2.0	25.9	7.1	-6.3	30.8	2.2	-11.2	26.4	6.6	-6.8	23.2	9.8	-3.6
200	25.2	24.4	0.8	-10.1	22.4	2.8	-8.1	27.5	-2.3	-13.2	29.1	-3.9	-14.8	27.3	-2.1	-13.0
250	22.5	28.0	-5.5	-14.1	29.9	-7.4	-16.0	28.1	-5.6	-14.2	30.5	-8.0	-16.6	30.5	-8.0	-16.6
315	29.6	27.1	2.5	-4.1	25.4	4.2	-2.4	27.8	1.8	-4.8	24.4	5.2	-1.4	27.9	1.7	-4.9
400	32.8	32.9	-0.1	-4.9	31.2	1.6	-3.2	36.9	-4.1	-8.9	31.5	1.3	-3.5	34.7	-1.9	-6.7
500	31.5	32.8	-1.3	-4.5	29.7	1.8	-1.4	36.5	-5.0	-8.2	35.5	-4.0	-7.2	35.8	-4.3	-7.5
630	36.2	35.4	0.8	-1.1	34.4	1.8	-0.1	40.5	-4.3	-6.2	41.3	-5.1	-7.0	41.8	-5.6	-7.5
800	33.0	36.0	-3.0	-3.8	34.7	-1.7	-2.5	40.1	-7.1	-7.9	41.5	-8.5	-9.3	41.2	-8.2	-9.0
1000	28.0	39.3	-11.3	-11.3	37.2	-9.2	-9.2	42.9	-14.9	-14.9	47.1	-19.1	-19.1	46.3	-18.3	-18.3
1250	30.4	36.6	-6.2	-5.6	34.8	-4.4	-3.8	43.7	-13.3	-12.7	48.1	-17.7	-17.1	46.8	-16.4	-15.8
1600	28.3	33.2	-4.9	-3.9	33.8	-5.5	-4.5	44.3	-16.0	-15.0	46.7	-18.4	-17.4	46.0	-17.7	-16.7
2000	25.2	34.1	-8.9	-7.7	33.1	-7.9	-6.7	42.6	-17.4	-16.2	45.3	-20.1	-18.9	45.5	-20.3	-19.1
2500	21.7	35.1	-13.4	-12.1	34.6	-12.9	-11.6	47.5	-25.8	-24.5	47.4	-25.7	-24.4	48.4	-26.7	-25.4
3150	17.6	38.5	-20.9	-19.7	37.9	-20.3	-19.1	48.8	-31.2	-30.0	47.5	-29.9	-28.7	48.9	-31.3	-30.1
4000	24.2	38.6	-14.4	-13.4	39.3	-15.1	-14.1	43.0	-18.8	-17.8	43.6	-19.4	-18.4	44.4	-20.2	-19.2
5000	20.0	40.4	-20.4	-19.9	39.9	-19.9	-19.4	44.1	-24.1	-23.6	45.5	-25.5	-25.0	45.0	-25.0	-24.5
6300	4.0	41.0	-37.0	-37.1	39.6	-35.6	-35.7	48.9	-44.9	-45.0	49.5	-45.5	-45.6	50.6	-46.6	-46.7
8000	3.5	44.3	-40.8	-41.9	42.9	-39.4	-40.5	49.8	-46.3	-47.4	50.5	-47.0	-48.1	51.0	-47.5	-48.6
10000	2.4	47.2	-44.8	-47.3	45.1	-42.7	-45.2	51.8	-49.4	-51.9	50.3	-47.9	-50.4	53.2	-50.8	-53.3
12500	3.8	51.1	-47.3	-51.6	51.1	-47.3	-51.6	53.6	-49.8	-54.1	51.8	-48.0	-52.3	54.0	-50.2	-54.5
16000	2.2	53.6	-51.4	-58.0	53.2	-51.0	-57.6	57.3	-55.1	-61.7	52.7	-50.5	-57.1	54.2	-52.0	-58.6
20000	5.0	51.9	-46.9	-56.2	52.9	-47.9	-57.2	52.1	-47.1	-56.4	49.7	-44.7	-54.0	52.7	-47.7	-57.0
Total	**40.0**			**8.7**			**10.8**			**4.2**			**6.7**			**6.5**
NLR				**31.3**			**29.2**			**35.8**			**33.3**			**33.5**

APPENDIX A

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B
Noise Measurement Site Photographs

BBA

BROWN • BUNTIN
ASSOCIATES, INC

Cosumnes Power Plant Fence Line

BBA
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13900 Clay East Road

BROWN • BUNTIN ASSOCIATES, INC.

13900 Clay East Road

APPENDIX C
Hourly Noise Measurement Results

BBA
BROWN · BUNTIN
ASSOCIATES, INC

APPENDIX C-1
Hourly Noise Measurement Results
SMUD Cosumnes Power Plant South Fence Line

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
04May 07	9:49:57	602.6	61.8	89.6	80.3	53.6	68.4	63.9	63.6	62.2	59.5	54.9
04May 07	10:00:00	3600	62.3	97.9	82.3	59.4	64.0	63.0	62.9	62.4	61.7	60.4
04May 07	11:00:00	3600	62.4	97.9	74.8	58.4	64.5	63.8	63.6	62.9	62.2	60.8
04May 07	12:00:00	3600	62.7	98.3	83.2	58.7	64.8	63.8	63.6	62.8	61.9	60.4
04May 07	13:00:00	3600	61.7	97.3	80.8	55.2	64.8	63.5	63.2	62.3	61.0	58.1
04May 07	14:00:00	3600	60.5	96.0	76.1	54.2	64.1	62.8	62.6	61.1	59.5	56.7
04May 07	15:00:00	3600	61.3	96.9	77.2	54.4	64.7	63.4	63.2	62.1	60.9	58.2
04May 07	16:00:00	3600	61.3	96.8	71.8	54.7	64.1	63.2	63.0	62.2	61.1	58.3
04May 07	17:00:00	3600	62.2	97.8	82.9	55.8	64.7	63.3	63.0	62.2	61.3	59.0
04May 07	18:00:00	3600	62.2	97.8	78.4	57.4	64.5	63.3	63.1	62.5	61.6	60.1
04May 07	19:00:00	3600	61.3	96.9	76.9	58.6	63.0	62.4	62.3	61.7	61.0	59.7
04May 07	20:00:00	3600	60.7	96.3	76.3	58.1	62.8	61.9	61.8	61.2	60.4	59.2
04May 07	21:00:00	3600	60.4	96.0	78.3	56.8	63.8	62.7	62.5	60.7	59.3	58.0
04May 07	22:00:00	3600	59.3	94.8	82.0	55.6	60.9	60.4	60.2	59.5	58.4	56.5
04May 07	23:00:00	3600	59.4	95.0	63.6	57.1	61.6	60.8	60.7	60.0	59.3	57.7
05May 07	0:00:00	3600	61.8	97.4	82.7	58.2	63.8	62.9	62.7	62.0	61.2	59.7
05May 07	1:00:00	3600	62.1	97.7	82.5	59.2	63.8	62.9	62.9	62.3	61.6	60.4
05May 07	2:00:00	3600	60.9	96.5	64.8	57.6	63.0	62.3	62.0	61.5	60.8	59.5
05May 07	3:00:00	3600	61.7	97.2	64.6	57.5	63.9	63.2	63.0	62.2	61.5	60.1
05May 07	4:00:00	3600	59.8	95.4	62.8	57.5	61.9	61.2	61.0	60.5	59.7	58.3
05May 07	5:00:00	3600	60.3	95.8	78.0	56.7	62.6	61.4	61.1	60.4	59.6	58.2
05May 07	6:00:00	3600	60.2	95.8	74.9	57.6	63.3	61.6	61.4	60.5	59.7	58.4
05May 07	7:00:00	3600	61.6	97.2	84.9	57.7	63.5	62.0	61.9	61.4	60.6	59.3
05May 07	8:00:00	3600	61.3	96.9	80.6	57.1	63.3	62.3	62.0	61.4	60.6	59.2
05May 07	9:00:00	3600	61.5	97.1	77.8	57.1	65.5	63.3	63.0	61.8	60.8	59.2
05May 07	10:00:00	3600	62.3	97.8	78.8	56.5	67.3	64.5	64.0	62.5	61.2	59.3
05May 07	11:00:00	3600	65.4	101.0	83.0	57.4	71.7	68.8	68.2	65.5	63.0	60.0
05May 07	12:00:00	3600	66.5	102.1	80.1	57.8	72.8	70.5	70.0	67.4	64.4	60.7
05May 07	13:00:00	3600	66.5	102.1	78.7	58.5	73.6	70.5	69.8	67.0	64.2	61.0
05May 07	14:00:00	3600	68.2	103.8	80.0	58.0	74.5	72.4	71.9	69.1	66.1	61.7

APPENDIX C-1
Hourly Noise Measurement Results
SMUD Cosumnes Power Plant South Fence Line

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
05May 07	15:00:00	3600	67.2	102.8	78.6	58.5	73.8	71.0	70.5	68.0	65.1	61.4
05May 07	16:00:00	3600	65.7	101.3	80.3	58.4	72.3	69.0	68.5	66.0	63.8	61.0
05May 07	17:00:00	3600	64.0	99.6	77.8	57.0	70.4	67.4	66.8	64.2	62.3	60.2
05May 07	18:00:00	3600	62.9	98.4	80.3	57.4	68.2	64.9	64.4	62.6	61.3	59.6
05May 07	19:00:00	3600	60.8	96.4	66.0	57.6	62.8	62.0	61.9	61.4	60.7	59.3
05May 07	20:00:00	3600	61.5	97.0	82.7	58.5	62.9	62.3	62.1	61.6	60.9	59.8
05May 07	21:00:00	3600	61.2	96.8	80.3	58.3	62.9	62.0	61.9	61.3	60.6	59.4
05May 07	22:00:00	3600	60.4	96.0	77.8	57.0	62.5	61.7	61.5	60.8	60.1	58.8
05May 07	23:00:00	3600	61.5	97.1	66.9	57.4	64.6	63.4	63.1	62.1	61.2	59.5
06May 07	0:00:00	3600	61.3	96.9	75.3	56.3	64.6	63.3	63.0	61.9	60.9	59.0
06May 07	1:00:00	3600	61.7	97.3	76.9	57.9	64.8	63.7	63.5	62.4	61.3	59.5
06May 07	2:00:00	3600	60.5	96.1	64.6	57.0	63.2	62.3	62.0	61.2	60.3	58.6
06May 07	3:00:00	3600	60.5	96.1	66.3	56.7	62.9	62.0	61.9	61.1	60.3	58.9
06May 07	4:00:00	3600	62.5	98.1	68.2	57.5	65.9	64.9	64.7	63.4	61.8	60.0
06May 07	5:00:00	3600	61.4	97.0	72.7	57.4	65.2	63.7	63.4	61.9	60.8	59.0
06May 07	6:00:00	3600	60.5	96.1	74.4	55.9	64.5	62.6	62.1	61.0	59.8	57.9
06May 07	7:00:00	3600	61.2	96.8	81.8	57.8	62.8	61.8	61.7	61.0	60.4	59.1
06May 07	8:00:00	3600	60.3	95.8	63.3	57.3	62.1	61.6	61.5	60.8	60.2	59.0
06May 07	9:00:00	3600	60.4	96.0	65.2	56.6	62.7	61.8	61.7	61.0	60.3	58.9
06May 07	10:00:00	3600	62.3	97.9	66.9	57.6	64.9	64.1	63.9	63.1	62.1	60.3
06May 07	11:00:00	3600	62.1	97.7	83.0	57.2	65.5	64.1	63.9	62.5	61.3	59.5
06May 07	12:00:00	3600	61.8	97.4	79.8	57.8	64.1	62.9	62.8	61.9	61.1	59.5
06May 07	13:00:00	3600	62.0	97.6	76.5	56.8	65.3	63.4	63.2	62.3	61.4	59.7
06May 07	14:00:00	3600	61.3	96.8	78.3	56.1	63.9	62.4	62.2	61.4	60.5	58.8
06May 07	15:00:00	3600	61.3	96.9	76.7	56.6	64.6	62.9	62.8	61.8	60.9	59.2
06May 07	16:00:00	3600	62.6	98.1	80.7	57.8	66.6	64.6	64.2	62.8	61.7	60.1
06May 07	17:00:00	3600	62.3	97.9	78.5	58.2	66.5	63.7	63.3	62.3	61.4	60.1
06May 07	18:00:00	3600	61.8	97.4	80.0	57.7	64.8	63.1	62.9	62.0	61.3	60.0
06May 07	19:00:00	3600	61.8	97.4	79.8	58.9	64.0	63.2	62.9	62.1	61.4	60.2
06May 07	20:00:00	3600	61.8	97.4	78.5	59.2	63.9	63.0	62.8	62.0	61.4	60.2

APPENDIX C-1
Hourly Noise Measurement Results
SMUD Cosumnes Power Plant South Fence Line

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
06May 07	21:00:00	3600	62.4	98.0	67.0	58.6	65.5	64.3	64.0	63.0	62.2	60.1
06May 07	22:00:00	3600	61.0	96.6	65.6	57.8	63.7	62.8	62.6	61.7	60.7	59.1
06May 07	23:00:00	3600	60.7	96.3	76.2	56.8	63.7	62.7	62.5	61.6	60.3	58.3
07May 07	0:00:00	3600	59.8	95.4	64.1	56.5	62.8	61.7	61.4	60.5	59.5	57.9
07May 07	1:00:00	3600	60.8	96.4	65.6	55.7	64.0	62.9	62.7	61.6	60.5	58.3
07May 07	2:00:00	3600	59.0	94.5	71.8	54.7	62.6	60.9	60.7	59.7	58.6	56.7
07May 07	3:00:00	3600	57.6	93.2	62.2	54.0	61.2	59.7	59.5	58.4	57.2	55.5
07May 07	4:00:00	3600	58.8	94.4	64.1	54.6	61.9	61.0	60.8	59.7	58.3	56.2
07May 07	5:00:00	3600	61.7	97.3	76.8	56.2	66.9	63.8	63.4	61.8	60.5	58.4
07May 07	6:00:00	3600	61.5	97.1	76.3	57.3	65.4	63.3	63.0	62.0	61.0	59.1
07May 07	7:00:00	3600	62.3	97.9	81.3	58.4	65.8	64.4	64.1	62.4	61.3	60.0
07May 07	8:00:00	3600	60.0	95.5	73.0	52.7	62.5	61.8	61.7	61.0	60.1	56.0
07May 07	9:00:00	3600	55.6	91.2	76.1	49.2	60.3	56.6	56.3	54.7	53.3	51.3
07May 07	10:00:00	3600	56.0	91.5	74.6	49.1	60.6	58.0	57.7	56.2	54.7	52.0
07May 07	11:00:00	3600	59.7	95.3	78.7	50.6	67.3	59.5	59.0	57.0	55.3	52.6
07May 07	12:00:00	3600	59.8	95.3	83.6	51.4	62.6	60.6	60.3	58.9	57.5	54.5
07May 07	13:00:00	3600	58.8	94.4	71.8	50.9	63.1	61.9	61.7	60.2	58.1	54.3
07May 07	14:00:00	3600	59.9	95.5	84.2	52.2	63.0	61.7	61.4	59.8	58.2	55.2
07May 07	15:00:00	3600	61.3	96.9	82.4	52.1	63.9	62.8	62.6	61.5	60.2	55.9
07May 07	16:00:00	3600	67.9	103.5	99.7	55.2	63.9	62.9	62.8	61.9	61.1	59.0
07May 07	17:00:00	3600	60.8	96.4	83.3	53.4	63.9	61.8	61.5	60.4	59.2	56.2
07May 07	18:00:00	3600	60.0	95.6	78.2	54.6	62.8	61.7	61.5	60.6	59.3	57.2
07May 07	19:00:00	3600	60.8	96.3	76.1	53.5	64.0	63.2	63.0	62.0	59.9	57.1
07May 07	20:00:00	3600	62.7	98.3	79.8	58.4	64.9	63.8	63.6	62.8	62.0	60.3
07May 07	21:00:00	3600	61.6	97.2	68.0	58.7	64.8	63.8	63.4	62.3	61.3	59.4
07May 07	22:00:00	3600	62.7	98.2	77.9	58.1	66.1	64.8	64.7	63.4	62.0	60.3
07May 07	23:00:00	3600	60.8	96.4	66.3	57.1	64.5	63.3	63.0	61.6	60.2	58.3
08May 07	0:00:00	3600	62.1	97.7	68.5	58.3	65.4	63.9	63.8	62.9	61.9	59.7
08May 07	1:00:00	3600	60.6	96.2	64.8	57.4	63.2	62.3	62.1	61.2	60.4	59.1
08May 07	2:00:00	3600	61.1	96.7	73.0	58.5	63.1	62.5	62.3	61.6	60.8	59.6

APPENDIX C-1
Hourly Noise Measurement Results
SMUD Cosumnes Power Plant South Fence Line

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
08May 07	3:00:00	3600	61.1	96.7	70.6	58.0	63.6	62.7	62.5	61.7	60.9	59.4
08May 07	4:00:00	3600	61.4	96.9	64.7	58.7	63.4	62.7	62.5	61.8	61.3	60.1
08May 07	5:00:00	3600	62.8	98.4	83.3	58.7	65.4	63.2	63.0	62.5	61.8	60.6
08May 07	6:00:00	3600	62.9	98.5	81.1	58.9	65.5	63.9	63.8	62.9	62.2	60.7
08May 07	7:00:00	3600	62.2	97.8	79.3	58.5	64.8	63.0	62.9	62.2	61.5	60.1
08May 07	8:00:00	3600	61.8	97.4	78.0	55.9	63.9	63.0	62.9	62.2	61.5	60.0
08May 07	9:00:00	2914.9	61.3	96.0	78.0	53.0	64.6	63.4	63.1	61.9	60.6	57.7

APPENDIX C-2
Hourly Noise Measurement Results
13900 Clay East Road: 5-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
04May 07	10:35:16	1483.4	56.8	88.5	81.0	32.1	65.5	56.9	55.4	48.6	42.6	36.6
04May 07	11:00:00	3600	43.9	79.5	57.8	37.9	49.0	46.2	45.8	44.3	42.9	40.4
04May 07	12:00:00	3600	46.2	81.8	61.9	39.1	51.4	49.0	48.7	46.9	45.1	42.5
04May 07	13:00:00	3600	49.6	85.2	79.0	39.0	54.3	50.8	49.8	46.8	44.8	42.2
04May 07	14:00:00	3600	51.3	86.9	77.8	39.3	59.1	49.8	49.0	46.7	44.9	42.3
04May 07	15:00:00	3600	47.7	83.3	63.1	38.1	55.8	50.0	49.5	47.4	45.4	41.8
04May 07	16:00:00	3600	43.1	78.6	60.1	34.9	49.6	46.0	45.6	43.7	41.6	37.5
04May 07	17:00:00	3600	50.5	86.1	82.6	35.1	52.7	48.0	47.3	44.5	41.6	38.1
04May 07	18:00:00	3600	45.0	80.5	71.1	33.9	52.0	46.8	46.1	42.7	40.1	37.0
04May 07	19:00:00	3600	47.1	82.6	72.9	35.1	54.5	47.3	46.2	42.8	40.4	37.7
04May 07	20:00:00	3600	43.7	79.3	64.0	35.4	51.6	46.9	45.9	43.1	40.7	38.1
04May 07	21:00:00	3600	41.2	76.7	59.3	31.3	48.2	44.2	43.5	40.6	38.5	34.4
04May 07	22:00:00	3600	40.5	76.1	62.8	28.6	49.5	44.3	43.3	38.7	35.4	31.3
04May 07	23:00:00	3600	42.7	78.2	57.6	27.4	52.1	47.3	46.4	41.9	36.3	31.2
05May 07	0:00:00	3600	37.6	73.2	59.8	25.6	46.4	38.1	37.3	34.9	32.7	28.3
05May 07	1:00:00	3600	38.8	74.4	56.9	30.6	43.7	40.8	40.3	38.7	37.1	33.9
05May 07	2:00:00	3600	38.8	74.3	54.9	32.5	42.9	41.0	40.7	39.2	37.8	35.6

APPENDIX C-2
Hourly Noise Measurement Results
13900 Clay East Road: 5-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
05May 07	3:00:00	3600	46.1	81.7	52.4	36.8	50.6	49.5	49.2	47.7	45.0	41.2
05May 07	4:00:00	3600	45.4	81.0	52.9	32.6	49.9	48.5	48.2	46.9	45.0	39.7
05May 07	5:00:00	3600	53.7	89.3	62.9	39.9	57.9	56.9	56.8	56.0	52.1	46.7
05May 07	6:00:00	3600	45.2	80.8	63.0	36.8	50.2	48.0	47.6	45.8	43.7	40.5
05May 07	7:00:00	3600	46.8	82.3	66.5	40.1	51.9	49.4	49.0	46.9	45.2	42.6
05May 07	8:00:00	3600	49.6	85.2	64.9	41.8	56.0	53.3	52.8	49.9	47.6	44.7
05May 07	9:00:00	3600	55.4	90.9	77.6	40.8	60.6	57.9	57.6	55.7	53.6	49.0
05May 07	10:00:00	3600	57.2	92.8	81.5	45.4	61.8	59.3	58.9	57.0	55.0	51.1
05May 07	11:00:00	3600	63.5	99.0	84.1	48.9	71.9	68.0	67.1	62.0	58.6	53.5
05May 07	12:00:00	3600	62.8	98.4	75.8	48.3	69.6	66.8	66.2	63.5	60.9	56.4
05May 07	13:00:00	3600	61.9	97.5	74.0	49.1	68.4	65.5	64.9	62.5	60.4	56.3
05May 07	14:00:00	3600	62.6	98.2	77.5	49.5	69.7	66.3	65.7	63.0	60.5	56.2
05May 07	15:00:00	3600	62.9	98.5	76.0	46.8	70.8	67.1	66.5	63.4	60.0	54.1
05May 07	16:00:00	3600	61.2	96.8	74.4	46.1	68.7	65.2	64.6	61.8	58.9	52.4
05May 07	17:00:00	3600	58.8	94.4	72.3	44.4	66.5	62.8	62.2	59.5	56.4	49.7
05May 07	18:00:00	3600	55.5	91.0	74.4	42.9	62.9	59.0	58.5	55.7	52.6	47.6
05May 07	19:00:00	3600	45.2	80.8	61.6	37.3	52.7	48.2	47.5	44.7	42.5	40.1
05May 07	20:00:00	3600	55.8	91.3	89.4	37.8	49.7	43.1	42.6	40.9	39.9	38.5
05May 07	21:00:00	3600	41.9	77.5	60.0	38.2	46.7	42.9	42.7	41.7	40.8	39.6
05May 07	22:00:00	3600	41.9	77.5	51.6	34.1	46.0	44.3	43.9	42.6	41.5	38.5
05May 07	23:00:00	3600	41.2	76.8	56.4	34.5	45.1	43.5	43.2	41.9	40.6	38.2
06May 07	0:00:00	3600	41.7	77.3	54.8	35.0	46.5	44.6	44.4	42.8	40.6	37.7
06May 07	1:00:00	3600	43.4	78.9	54.5	39.0	47.1	45.5	45.2	43.9	42.7	41.0
06May 07	2:00:00	3600	43.0	78.6	49.6	37.6	47.3	45.8	45.4	43.9	42.4	40.1
06May 07	3:00:00	3600	41.5	77.1	53.1	36.0	45.8	43.9	43.6	42.1	40.9	39.0
06May 07	4:00:00	3600	46.2	81.8	54.3	39.8	51.7	50.1	49.7	46.9	44.7	42.3
06May 07	5:00:00	3600	54.9	90.5	66.1	36.9	60.3	58.8	58.7	58.0	51.7	46.1
06May 07	6:00:00	3600	45.2	80.7	57.3	36.8	50.4	47.7	47.3	45.8	44.3	41.3
06May 07	7:00:00	3600	44.9	80.5	58.9	37.0	50.4	47.2	46.8	45.5	44.1	40.6
06May 07	8:00:00	3600	59.0	94.5	88.5	33.9	51.6	46.0	45.4	42.6	40.4	37.3
06May 07	9:00:00	3600	51.3	86.9	71.8	34.6	60.8	55.7	54.5	48.0	42.9	37.6

APPENDIX C-2
Hourly Noise Measurement Results
13900 Clay East Road: 5-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
06May 07	10:00:00	3600	47.0	82.6	62.5	35.7	54.6	51.1	50.4	47.0	44.1	40.7
06May 07	11:00:00	3600	53.7	89.3	82.9	39.4	61.2	55.6	54.6	50.1	47.4	43.3
06May 07	12:00:00	3600	51.4	87.0	64.8	38.4	58.9	55.5	54.9	52.2	48.5	43.3
06May 07	13:00:00	3600	54.0	89.6	70.5	41.1	61.3	57.6	57.1	54.5	51.7	45.8
06May 07	14:00:00	3600	48.9	84.5	64.1	37.0	56.3	53.2	52.6	48.8	45.7	41.3
06May 07	15:00:00	3600	54.0	89.6	68.0	39.4	61.5	58.2	57.7	54.9	50.9	44.6
06May 07	16:00:00	3600	55.5	91.0	71.8	42.0	63.0	59.4	58.8	55.7	52.4	47.4
06May 07	17:00:00	3600	51.0	86.6	66.8	39.1	58.5	55.4	54.8	51.2	48.1	42.8
06May 07	18:00:00	3600	47.8	83.4	61.7	39.1	54.1	51.3	50.7	48.3	46.2	42.4
06May 07	19:00:00	3600	48.7	84.3	66.9	39.9	57.3	50.5	49.9	47.8	45.6	42.2
06May 07	20:00:00	3600	62.7	98.2	90.6	40.9	70.9	52.0	50.4	45.6	44.3	42.9
06May 07	21:00:00	3600	46.4	82.0	69.1	41.6	51.3	47.1	46.8	45.7	44.9	43.3
06May 07	22:00:00	3600	45.9	81.5	60.0	40.8	48.9	47.8	47.7	46.8	45.3	42.5
06May 07	23:00:00	3600	42.4	78.0	49.8	38.3	45.5	44.5	44.2	43.3	42.1	40.3
07May 07	0:00:00	3600	42.6	78.2	56.0	38.5	45.7	44.5	44.2	43.2	42.2	40.6
07May 07	1:00:00	3600	43.4	78.9	49.5	38.8	46.8	45.5	45.2	44.1	43.0	41.2
07May 07	2:00:00	3600	44.7	80.3	52.8	35.4	48.4	47.2	46.9	45.9	44.5	40.0
07May 07	3:00:00	3600	38.5	74.0	48.9	33.8	42.8	40.9	40.6	39.1	37.7	35.9
07May 07	4:00:00	3600	43.3	78.9	54.5	30.4	52.1	49.3	48.3	41.7	39.0	35.1
07May 07	5:00:00	3600	55.1	90.7	65.6	37.8	61.6	59.0	58.8	57.7	51.8	45.7
07May 07	6:00:00	3600	46.0	81.6	62.6	35.3	51.8	48.8	48.5	47.0	44.6	39.9
07May 07	7:00:00	3600	57.6	93.2	84.9	40.9	57.1	53.1	52.6	49.7	46.5	43.4
07May 07	8:00:00	3600	55.3	90.9	83.8	35.6	60.2	51.2	49.7	43.7	40.5	38.0
07May 07	9:00:00	3600	48.9	84.5	71.3	33.3	57.9	52.0	49.6	41.9	39.9	36.3
07May 07	10:00:00	3600	49.4	84.9	72.9	30.8	54.8	44.4	43.5	40.4	38.0	34.5
07May 07	11:00:00	3600	50.4	86.0	80.5	30.9	49.0	42.1	41.5	38.8	36.6	33.8
07May 07	12:00:00	3600	40.4	75.9	61.3	33.4	46.1	43.2	42.6	40.3	38.2	35.6
07May 07	13:00:00	3600	56.8	92.4	88.4	34.6	50.0	44.2	43.6	41.4	39.5	37.1
07May 07	14:00:00	3600	57.4	92.9	85.9	35.1	54.8	45.6	44.5	41.5	39.6	37.4
07May 07	15:00:00	3600	57.5	93.1	86.3	35.4	59.6	51.7	50.6	44.4	41.1	38.2
07May 07	16:00:00	3600	71.7	107.2	89.8	34.6	82.3	74.9	73.3	67.9	60.4	40.6

APPENDIX C-2
Hourly Noise Measurement Results
13900 Clay East Road: 5-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
07May 07	17:00:00	3600	50.5	86.1	73.1	28.5	62.7	50.5	48.4	42.8	41.0	35.9
07May 07	18:00:00	3600	46.4	82.0	78.9	32.8	52.6	47.2	46.2	41.7	39.1	35.2
07May 07	19:00:00	3600	42.8	78.3	55.0	37.3	47.1	44.8	44.6	43.6	42.4	39.5
07May 07	20:00:00	3600	46.1	81.7	56.5	41.1	52.6	49.1	48.5	45.8	44.9	43.0
07May 07	21:00:00	3600	45.2	80.8	54.0	42.1	48.8	46.7	46.5	45.7	44.9	43.7
07May 07	22:00:00	3600	45.4	81.0	72.6	39.8	52.3	45.8	45.4	43.8	42.9	41.4
07May 07	23:00:00	3600	43.3	78.9	47.4	38.6	45.8	44.9	44.8	44.1	43.2	41.4
08May 07	0:00:00	3600	42.9	78.5	52.5	40.1	45.3	44.4	44.2	43.6	42.8	41.4
08May 07	1:00:00	3600	41.8	77.4	49.1	38.5	44.9	43.6	43.3	42.4	41.6	40.1
08May 07	2:00:00	3600	41.6	77.2	52.6	37.6	44.9	43.2	43.0	42.0	41.3	39.8
08May 07	3:00:00	3600	41.3	76.9	55.4	37.6	44.9	43.2	42.9	41.8	40.8	39.2
08May 07	4:00:00	3600	42.7	78.3	52.5	39.1	47.4	45.1	44.8	43.3	42.0	40.4
08May 07	5:00:00	3600	54.8	90.4	64.8	40.1	60.6	58.8	58.7	57.5	51.9	46.5
08May 07	6:00:00	3600	45.2	80.8	62.3	38.4	51.4	48.0	47.6	45.4	43.4	40.8
08May 07	7:00:00	3600	53.4	89.0	84.1	37.6	54.5	47.9	47.0	44.3	42.3	40.1
08May 07	8:00:00	3600	43.3	78.9	61.4	34.4	53.1	46.1	45.1	41.3	39.5	37.2
08May 07	9:00:00	3600	60.8	96.4	91.3	33.9	62.9	55.0	53.6	43.3	39.1	36.4
08May 07	10:00:00	515.3	58.6	85.7	73.3	36.0	67.1	63.9	63.2	58.6	52.6	43.7

APPENDIX C-3
Hourly Noise Measurement Results
13900 Clay East Road: 15-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
04May 07	10:30:21	1778.1	52.7	85.2	78.2	36.0	60.0	52.3	51.1	45.5	41.9	39.2
04May 07	11:00:00	3600	44.7	80.3	56.6	38.2	49.7	47.3	46.9	45.4	43.9	40.7
04May 07	12:00:00	3600	48.5	84.1	58.4	39.4	53.9	51.9	51.5	49.4	47.4	44.2
04May 07	13:00:00	3600	50.1	85.7	76.0	39.7	55.5	52.5	51.9	49.0	46.8	43.5
04May 07	14:00:00	3600	52.1	87.7	77.3	40.5	60.0	52.7	51.9	48.5	46.0	43.0
04May 07	15:00:00	3600	49.3	84.9	61.6	38.7	57.1	52.7	52.1	49.6	46.9	42.7

APPENDIX C-3
Hourly Noise Measurement Results
13900 Clay East Road: 15-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
04May 07	16:00:00	3600	43.8	79.4	62.1	34.3	50.7	47.4	46.7	44.2	41.9	37.9
04May 07	17:00:00	3600	48.6	84.2	78.2	36.2	53.8	49.8	49.2	46.0	42.9	39.1
04May 07	18:00:00	3600	46.6	82.2	72.7	37.6	52.8	48.6	47.9	44.8	42.6	39.9
04May 07	19:00:00	3600	46.1	81.7	70.7	38.5	53.0	47.9	47.1	43.9	41.9	40.1
04May 07	20:00:00	3600	44.4	80.0	63.7	38.5	51.5	47.3	46.6	43.9	42.4	40.3
04May 07	21:00:00	3600	42.0	77.6	55.3	34.3	48.4	45.0	44.6	42.2	40.2	36.7
04May 07	22:00:00	3600	41.3	76.8	58.9	30.2	50.2	45.2	44.2	40.0	37.2	34.0
04May 07	23:00:00	3600	42.8	78.4	57.3	29.0	51.8	47.1	46.3	42.6	37.4	32.4
05May 07	0:00:00	3600	38.2	73.8	58.3	26.9	47.1	39.0	38.0	35.3	33.2	29.4
05May 07	1:00:00	3600	38.7	74.3	54.1	31.5	43.6	41.0	40.6	38.8	37.1	34.2
05May 07	2:00:00	3600	38.7	74.3	55.7	31.8	42.2	40.8	40.5	38.9	37.7	35.5
05May 07	3:00:00	3600	46.1	81.7	51.9	38.3	49.8	48.9	48.7	47.5	45.5	41.8
05May 07	4:00:00	3600	45.1	80.6	51.6	32.2	49.3	47.9	47.7	46.4	44.5	39.7
05May 07	5:00:00	3600	52.3	87.8	61.5	40.4	55.8	55.0	54.9	54.2	51.4	46.5
05May 07	6:00:00	3600	45.0	80.6	60.4	37.5	49.9	47.9	47.6	45.7	43.7	40.5
05May 07	7:00:00	3600	47.2	82.8	62.3	39.9	52.7	50.0	49.6	47.6	45.9	43.3
05May 07	8:00:00	3600	53.1	88.7	64.3	42.9	59.3	56.8	56.3	53.9	51.2	47.2
05May 07	9:00:00	3600	59.0	94.6	86.7	43.0	65.7	61.7	61.1	58.6	55.6	49.4
05May 07	10:00:00	3600	55.0	90.6	75.3	44.3	60.1	57.6	57.2	55.3	53.3	49.5
05May 07	11:00:00	1669.9	61.4	93.7	80.7	47.2	70.5	64.0	63.2	59.5	55.9	51.1
06May 07	20:53:58	361.8	66.9	92.4	84.5	34.9	77.6	71.5	68.5	54.4	48.7	46.3
06May 07	21:00:00	3600	46.6	82.2	60.2	42.1	49.5	47.7	47.5	46.7	46.1	45.0
06May 07	22:00:00	3600	46.1	81.7	60.2	42.2	48.6	47.3	47.0	46.3	45.5	44.1
06May 07	23:00:00	3600	43.7	79.2	49.3	39.0	46.2	45.6	45.4	44.5	43.3	41.6
07May 07	0:00:00	3600	43.3	78.9	53.2	40.1	46.4	44.9	44.8	43.9	43.0	41.4
07May 07	1:00:00	3600	43.7	79.3	49.2	39.5	46.7	45.6	45.3	44.4	43.4	41.8
07May 07	2:00:00	3600	44.9	80.5	51.6	36.2	48.8	47.5	47.3	46.2	44.8	39.3
07May 07	3:00:00	3600	38.9	74.5	48.6	33.7	42.6	41.2	40.9	39.6	38.3	36.2
07May 07	4:00:00	3600	42.1	77.7	52.8	32.3	50.5	47.9	47.0	40.5	38.2	35.1
07May 07	5:00:00	3600	51.5	87.1	58.0	36.9	55.8	54.7	54.5	53.3	50.7	45.4

APPENDIX C-3
Hourly Noise Measurement Results
13900 Clay East Road: 15-foot microphone height

Date	Time	Duration seconds	A-Weighted Sound Pressure Level, dB									
			Leq	SEL	Lmax	Lmin	L(2)	L(8)	L(10)	L(25)	L(50)	L(90)
07May 07	6:00:00	3600	45.8	81.4	60.3	35.3	51.2	48.5	48.2	46.8	44.9	40.1
07May 07	7:00:00	3600	51.8	87.4	74.9	42.5	56.4	53.3	52.9	50.4	47.0	44.2
07May 07	8:00:00	3600	48.9	84.5	72.9	38.2	57.5	50.0	48.7	44.2	42.3	40.3
07May 07	9:00:00	3600	46.6	82.1	68.0	34.0	56.3	49.7	48.3	42.5	40.5	37.0
07May 07	10:00:00	3600	52.2	87.8	75.9	32.2	55.0	45.7	44.9	41.7	38.8	35.0
07May 07	11:00:00	3600	45.2	80.8	72.7	31.1	47.1	43.0	42.5	39.8	37.3	34.4
07May 07	12:00:00	3600	41.1	76.7	58.1	33.5	48.2	44.4	43.7	41.2	39.0	35.9
07May 07	13:00:00	3600	48.7	84.3	79.5	34.1	48.4	44.4	44.0	41.9	40.0	37.2
07May 07	14:00:00	3600	50.1	85.7	76.2	35.2	53.9	45.0	44.4	41.8	39.9	37.4
07May 07	15:00:00	3600	50.3	85.9	76.2	35.1	57.5	50.6	49.5	44.2	41.0	37.6
07May 07	16:00:00	3600	69.1	104.7	83.9	32.3	79.8	73.4	71.9	67.3	60.4	39.9
07May 07	17:00:00	3600	50.6	86.2	72.8	28.4	63.1	49.9	48.2	44.7	42.7	34.4
07May 07	18:00:00	3600	43.5	79.0	67.1	30.5	52.9	46.8	45.7	40.7	37.3	33.6
07May 07	19:00:00	3600	43.1	78.7	53.7	34.5	47.3	45.5	45.3	44.3	42.9	37.7
07May 07	20:00:00	3600	46.7	82.3	56.7	42.4	52.5	49.4	48.8	46.6	45.7	44.0
07May 07	21:00:00	3600	45.7	81.3	53.7	43.0	48.5	46.9	46.8	46.2	45.6	44.4
07May 07	22:00:00	3600	45.9	81.5	67.4	41.6	51.9	46.8	46.5	45.3	44.5	43.2
07May 07	23:00:00	3600	44.1	79.7	48.3	40.9	46.5	45.7	45.5	44.8	44.1	42.6
08May 07	0:00:00	3600	44.2	79.8	51.5	41.5	45.8	45.0	45.0	44.7	44.2	43.1
08May 07	1:00:00	3600	43.2	78.8	48.3	40.1	44.9	44.4	44.3	43.7	43.1	41.9
08May 07	2:00:00	3600	42.7	78.3	52.9	39.3	45.2	43.8	43.7	43.0	42.5	41.2
08May 07	3:00:00	3600	42.4	77.9	55.0	38.2	44.5	43.7	43.5	42.8	42.1	40.5
08May 07	4:00:00	3600	43.1	78.6	52.2	39.9	46.4	44.2	44.0	43.4	42.8	41.9
08May 07	5:00:00	3600	51.5	87.0	61.4	40.6	55.7	54.5	54.2	53.1	50.9	46.2
08May 07	6:00:00	3600	45.2	80.8	60.2	39.0	51.3	47.8	47.3	45.4	43.7	41.2
08May 07	7:00:00	3600	48.0	83.6	75.1	39.2	54.1	48.3	47.5	45.1	43.5	41.3
08May 07	8:00:00	3600	43.8	79.4	59.3	35.6	53.2	46.5	45.6	42.6	40.8	38.3
08May 07	9:00:00	3600	52.9	88.5	80.0	34.1	57.5	52.4	51.3	44.2	39.9	37.1
08May 07	10:00:00	231.9	49.0	72.7	59.5	34.9	56.2	54.3	53.9	50.0	44.8	38.7