Noise Monitoring and Modeling Summary Report

Prepared for
Xcel Energy High Bridge Combined Cycle Project
St. Paul, Minnesota

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Executive Summary

This report presents the noise impacts analysis for Xcel Energy's High Bridge Combined Cycle (HBCC) project in St. Paul, Minnesota. The noise impacts assessment consists of two main parts: monitoring of existing conditions and modeling of the future facility. Monitoring was conducted to evaluate existing noise sources and provide a basis of comparison for the modeling analysis. Modeling of the proposed facility was completed to demonstrate attainment with the applicable Minnesota and St. Paul noise standards.

The most stringent of the Minnesota and St. Paul noise standards is the nighttime noise limit of 50 dB(A). Monitoring at four sites around the plant site revealed that current nighttime noise conditions slightly exceed the standards. Monitoring was only performed with the existing plant in operation. Without knowledge of conditions without it in operation, no accurate assessment of its noise contribution can be made. One can assume decommissioning of the existing plant will not increase the existing noise levels.

Modeling of the Project was performed to determine its noise levels at six sites. These include the four sites used for monitoring plus the addition of two additional sites more reflective of the proposed Project location than the existing plant. Project noise information was used from a previous analysis by ATCO. Initial modeling of the Project found the HRSG stacks to be the primary noise sources. Modeling of the HRSG stacks with 10 dB DIL silencers brought noise levels at the modeled points to under 50 dB(A). Additional modeling using higher levels of silencing found the HRSG stacks no longer the primary sources, making additional stack silencing unproductive. The model's margin of accuracy was +/- 3 dB. The modeled values were under 47 dB(A) for 4 of six modeled sites, ensuring no exceedance at those points. The modeled value for the remaining two was 48 dB(A), within the limits of regulation, yet not by the models margin of accuracy.

Given that several noise sources from the existing plant will be removed, and that monitored noise levels were above modeled noise levels (at all frequencies), it is anticipated that only a barely perceptible increase in total noise, at most, (as measured in dB(A)) would be expected from the Project. ATCO's recommendation, in their prior report, of 10 dB silencing is likely adequate to ensure attainment with noise standards.

1.0 Introduction

This report presents the noise impacts analysis for Xcel Energy's High Bridge Combined Cycle (HBCC) project in St. Paul, Minnesota. The noise analysis was conducted as part of the Site Permit Application submitted to the Minnesota Environmental Quality Board. Noise impacts are required to be evaluated under the Environmental Information Requirements (Minn. Rules 4400.1150, Subp. 3.B) of the Site Permit Application.

The noise impacts assessment consists of two main parts: monitoring of existing conditions and modeling of the future facility. The monitoring was conducted to evaluate existing noise sources and to provide a basis of comparison for the modeling analysis. Modeling of the proposed facility needs to demonstrate attainment with the applicable noise standards given in Minnesota Rules chapter 7030 and the City of St. Paul Noise Regulations (Chapter 293).

1.1 Project Description

As part of its Metro Emissions Reduction Proposal (MERP), Xcel Energy proposes to replace the existing 271 MW coal-fired High Bridge Plant with a 500 MW (nominal capacity) natural gas-fired 2-on-1 combined-cycle system and associated facilities (the "Project"). The Project will consist of replacing the existing coal-fired generation plant with a natural gas-fired 2-on-1 combined-cycle system, consisting of two combustion turbines (CT), corresponding heat recovery steam generators (HRSG), and a new steam turbine generator. The new plant will be installed in a new building located at the southwest corner of the existing site. The existing plant, built in 1924, will be demolished after commissioning of the new plant.

1.2 Project Location and Nearby Land Use

The location of the Project is shown in Figure 1-1. The Project is located in downtown St. Paul on the Mississippi River. The High Bridge Generating Plant property covers approximately 77 acres along the Mississippi River and is bordered by Shepard Road to the northwest and Randolph Road to the southeast. The area immediately to the west of the plant site is industrial in use. The area immediately to the east of the plant site is a multi-unit residential development. A recreational corridor lies between the plant site and the Mississippi River. Significant development of residential housing is occurring near the Project.

Noise sources close to the project site include rail traffic along the Mississippi River; traffic on I-35E, Shepard Road and the Smith Avenue High Bridge; boat and barge traffic on the river; aircraft traffic from the nearby St. Paul airport; and nearby industrial activities. These sources will be present after the Project is completed. Noise sources associated with the existing facility, which will no longer be a source of community noise once the existing plant is demolished, include the coal car shakers used to vibrate the coal cars for unloading, the dust collection and ventilation fans, the coal conveyor system, trucks moving the coal piles, coal mills, trains delivering coal, ash loading and trucking, vactor trucks cleaning the boiler, diesel engine equipment (dozers, loaders, scrapers, etc) and induced-draft fan noise.

1.3 Noise Impacts Assessment

The noise impacts assessment consists of evaluating the current noise environment and evaluating the noise from the future facility. The assessment does not address noise impacts occurring during construction of the new facility or demolition of the existing facility. Noise modeling of the existing facility was not conducted.

A noise modeling assessment of a preliminary site layout was conducted by ATCO in June 2004 [Noise Impact and Control Study: High Bridge Generating Plant St. Paul, MN: ATCO Noise Management. June 2004]. The ATCO report provided the basis for the modeling conducted in this assessment and, in general, the ATCO findings were confirmed for the revised project layout. Because the ATCO report showed that low frequency noise was not of concern for the Project, low frequency noise impacts were not addressed for the revised project layout.

This report includes the following sections: Section 2 presents noise standards and terminology; the noise monitoring program is presented in Section 3; the noise modeling assessment is presented in Section 4; and Section 5 provides a summary of the Project’s noise impacts.

2.0 Noise Standards

Noise is defined as unwanted sound. Sound is transmitted as waves of pressure fluctuations through the air. The intensity of the sound is called the sound pressure level and is expressed using a logarithmic scale called the decibel (dB) scale. In this logarithmic scale a 3 dB increase corresponds to a doubling in the actual sound pressure level.

Sound levels regulated by law are measured in dB(A), termed “A-weighted”, which is a variation of the dB measurements. A-weighting is a means of converting sound measurements to reflect the way the human ear perceives sound. A-weighting gives the sound pressure level in dB(A) as set forth in Minnesota Rules 7030.0020 Subp. 2 and 4:

> *A-weighted. "A-weighted" means a specific weighting of the sound pressure level for the purpose of determining the human response to sound. The specific weighting characteristics and tolerances are those given in American National Standards Institute S1.4-1983, section 5.1.*
>
> *dB(A). "dB(A)" means a unit of sound level expressed in decibels (dB) and A-weighted.*

Minnesota Rule 7030.0040 establishes standards to regulate noise levels by land use types. Land uses such as picnic areas, churches or commercial land are assigned to a classification based on the activities occurring in each respective land use. The Noise Area Classification (NAC) is listed in the Minnesota Pollution Control Agency (MPCA) noise regulations (Minnesota Rule 7030.0050) to define the classifications. Residences are included in NAC 1, most commercial facilities are included in NAC 2, and most industrial facilities are included in NAC 3. The Minnesota Noise Standards and the City of St. Paul Sound Level Restrictions are given in Tables 2-1 and 2-2, respectively.

Table 2-1 Minnesota Sound Level Limits by Noise Area Classification

Noise Area Classification	Daytime (dB(A))		Nighttime (dB(A))	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

L_{50} – The sound level that is exceeded 50% of the time
L_{10} – The sound level that is exceeded 10% of the time

Table 2-2 Sound Level Restrictions for City of St. Paul

Noise Receptor	Land Use Classification	Time	Sound Level Limit (one hour L_{10} dB(A))
Class I	I-1, I-2, and I-3	At all times	80
Class II	RM-1 through RM-3	7:00 A.M. to 10:00 P.M.	65
Class II	RM-1 through RM-3	10:00 P.M. to 7:00 A.M.	55

The Minnesota Noise standards are expressed in dB(A) and are based on a statistical analysis of hour-long measurements of noise levels. The L_{50} is the sound level that must not be exceeded for more than 50% of any given hour (30 minutes), while the L_{10} is the sound level which must not be exceeded for more than 10% of any given hour (6-minutes). The daytime noise standards apply from 7 a.m. through 10 p.m; the nighttime standards apply from 10 p.m. through 7 a.m. Noise standards apply at the point of the receiver, not at the boundary of the noise source. For a residential area, the standard applies at the nearest home, not at the property line of the residential property or the property line of the noise source.

3.0 Noise Monitoring

Noise monitoring was conducted at nearby residences to assess current noise levels with the existing plant in operation. The monitored noise levels were used for comparison to modeled noise levels from the future facility (see Section 4).

3.1 Monitoring Methodology

Noise monitoring was conducted following MPCA methodologies (MR 7030.0060) at four nearby locations as shown on Figure 3-1. The noise monitoring was conducted for both the Daytime (7:00 A.M. to 10:00 P.M.) and Nighttime (10:00 P.M. to 7:00 A.M.) periods of the noise standards. Noise monitoring consisted of collecting sound pressure readings 32 times per second over the length of the monitoring period with average readings being logged at one minute intervals.. The noise monitoring data records are contained in Appendix A.

In addition to collecting noise data at the off-site receptors, a log of plant operations noise sources was maintained during the monitoring periods..

3.1.1 Noise Monitoring Equipment

The noise monitoring equipment used included Quest Technologies NoisePro DLX dosimeters and a Larson Davis 2800 sound level meter. The DLX Noise dosimeters included a built-in data logger and meet the Type II specifications set forth in ANSI S1.4-1983, as required by MR 7030.0060. The dosimeters were used to take complete measurements of both the Daytime and Nighttime periods of the standard. The dosimeter equipment settings were set at: Response = Fast; Frequency Weighting = A; and Range = Low (40 – 110 dB), in compliance with MPCA methodology. The Larson-Davis 2800 sound level meter was used to gather individual measurements of the frequency spectra at each location. Both types of noise meters were calibrated before and after monitoring.

3.1.2 Monitoring Periods

The monitoring was conducted over two separate periods:

Period #1: (Night) 12/3/04 (10:00 P.M.) to 12/4/04 (7:00 A.M.)
Period #2: (Day) 12/8/04 (7: 00 A.M.) to 12/8/04 (10:00 P.M.)

3.1.3 Meteorological Conditions

Meteorological conditions during the noise monitoring were within noise monitoring guidelines which state that measurements may not be taken "in sustained winds or in precipitation which results in a difference of less than ten decibels between the background noise level and the noise source being measured" (MR 7030.0060 Subp. 4).

During Period #1, temperatures were steady near 41 ^{o}F with light winds from the west-southwest. During Period #2, temperatures ranged from 33 to 40 ^{o}F with light southerly winds. No snow cover was present and there was no precipitation during the monitoring period. Meteorological data for the monitoring periods is given in Appendix A.

Noise propagation and attenuation are affected by many factors including meteorological conditions (temperature, humidity, wind direction), terrain, and ground cover. Although the lower winter temperatures are generally less conducive to noise propagation, the lack of foliage allows for greater sound propagation. Therefore, the noise monitoring was conducted during conditions favorable to measuring noise impacts from the existing facility.

3.1.4 Monitoring Site Descriptions

The following monitoring site location descriptions include an assessment of the distance to the current High Bridge facility as well as other general descriptions. Line-of-sight distances to the existing facility were determined in the field using a range finder. Photographs of each site monitoring location are included in Appendix A.

Site #1 – Centex Homes (East) – Monitor was placed on the top of the 3rd brick post from the river, on the wall (fence line) between the Centex Homes and the plant. Site is near Randolph Avenue, public playground and river. Service & delivery trucks currently park in nearby cul-de-sac with their engines running while waiting for access through plant gate. Monitor was placed approximately 252 yards from plant stack, 140 yards from plant building & 84 yards from closest Centex apartment building.

Site #2 – Cliff Street (North) – Monitor was placed on the railing in front of a residence's home at 263 Cliff Street. Monitor was placed approximately 386 yards from plant stack/building.

Site #3 – Cherokee Avenue (South) – Monitor was placed in park area to the north and across the street from a home with a street address of 426 Cherokee Avenue. Line-of-sight distance readings from this location to the plant could not be made due to the heavy tree coverage on top of the bluff. Using Figure 3-1, the distance from the monitor to the existing facility was approximately 400 yards.

Site #4 – Island Station (West-Southwest) – Monitor was placed approximately 89 yards east of the old power plant.

3.2 Noise Monitoring Results

The monitoring results given in Table 3-1 indicate that daytime noise standards were exceeded at Site #2 north of the plant for both the L_{10} (by 5 decibels) and the L_{50} (by 3 decibels) standards. Daytime noise standards were not exceeded at the other three monitoring locations. L_{50} nighttime standards were exceeded at all four monitoring locations by 1 to 5 decibels. L_{10} nighttime standards were exceeded at Sites #1 (east) and #2 (north) of the plant by 1 and 7 decibels respectively.

Based on observations taken by Kim Hand of Barr Engineering and Sharon Sarappo of Xcel Energy during the course of this project, the noise coming from the plant appeared to be minimal in comparison to the background noise (e.g. traffic, construction). These observations were confirmed as no apparent correlation existed in a comparison of the noise sources/times logged by the plant and patterns in actual noise monitoring data (see Section 4 of Appendix A for plant operations logs).

The plant was in operation during all of the monitoring periods leaving determination of the impact that the existing plant has on ambient noise levels unresolved. To more accurately determine the impact that the existing plant has on noise levels in the nearby residential areas, background noise levels would need to be collected during a 24 hour period when the plant is not in operation and compared to the data collected during this project (when the plant was in operation).

Table 3-1 Ambient Noise Level Monitoring Results (December 2004)

Monitor Location	L10 (dBA)		L50 (dBA)		L90 (dBA)		LAVG (dBA)		Observations
	Day	Night	Day	Night	Day	Night	Day	Night	
Applicable State Standard	65	55	60	50	--	--	--	--	
1 – Centex Homes (E)	62	**56***	58	**52***	55	49	60	55	Heavy traffic noise from High Bridge (just west and above monitor), construction noise from bluffs to the north, noise from plant was not perceptible. Service & delivery trucks currently park in nearby cul-de-sac with their engines running while waiting for access through plant gate
2 – Cliff Street (N)	**70***	**62***	**63***	**55***	59	53	67	60	Heavy traffic from Cliff Street and High Bridge, barking dog, high frequency humming from plant, train noise
3 – Cherokee Avenue (S)	57	55	55	**52***	52	50	55	53	Light street traffic from Cherokee Avenue, high frequency humming from plant
4 – Island Station (W)	60	54	55	**51***	54	50	58	52	Construction noise to the NE (e.g. bulldozers), plane traffic, noise from plant was not perceptible

***Exceeds Minnesota sound level standard**

dB(A) – Decibels A-weighted

LAVG – Average sound level. This is the average sound level over the sample period.

L_{90} – The sound level that was exceeded 90% of the time during the sample period.

L_{50} – The sound level that was exceeded 50% of the time during the sample period.

L_{10} – The sound level that was exceeded 10% of the time during the sample period

Table 3-2 Monitoring Results for One Minute Reading (Sound Level Meter)

Site #	Date	Start Time	L10 dBA (Day)	L50 dBA (Day)	LEQ dBA (Day)	MAX dBA (Day)
Applicable State Standard			65	60		
1 – Centex Apts. (E)	11/30/04	10:45 A.M.	61	59	60	65
2 – Cliff Street (N)	11/30/04	11:22 A.M.	**69***	58	65	75
3 – Cherokee Avenue (S)	11/30/04	11:37 A.M.	58	57	57	60
4 – Island Station (W)	11/30/04	12:28 P.M.	54	51	52	57

***Exceeds Minnesota sound level standard**

dB(A) – Decibels A-weighted

LEQ – This is the true equivalent sound level (the average sound level) over the sample period.

MAX – The highest sound level during the sample period.

L_{50} – The sound level that was exceeded 50% of the time during the sample period.

L_{10} – The sound level that was exceeded 10% of the time during the sample period

4.0 Noise Modeling of HBCC Project

4.1 Noise Modeling Overview

Noise modeling was conducted to demonstrate that the Project will be in attainment with state noise standards. The SPM9613 noise modeling software (Power Acoustics Inc.) was used in the current analysis. This software calculates noise propagation and attenuation following the international standard ISO9613-1 and 2.

Modeling conducted by ATCO in June 2004 of a preliminary site layout [Noise Impact and Control Study: High Bridge Generating Plant St. Paul, MN: ATCO Noise Management. June 2004] provided the basis for the modeling of the current facility. However, because the ATCO modeling used a different model, the current modeling analysis required some modifications to the ATCO modeling. Appendix B contains detailed supporting data and calculations for the modeling analysis.

4.2 Modeling Methodology

The SPM9613 model requires a noise spectrum over ten octave band intervals from 31.5 to 8000 Hz (1Hz = 1 cycle/ second) for each noise source. Sound spectra for the Project sources were obtained from ATCO and are given in Appendix B.

The model allows for input of buildings and other reflector/barrier structures. The model calculates either noise contours throughout the modeling domain or noise levels at individual receptors (observer points). Multiple model runs were conducted to develop both contours and noise levels at specific receptors. The primary difference between the contour modeling and modeling at specific receptors is the treatment of terrain as discussed in Section 4.3.4.

The modeling assumed typical summer nighttime conditions of 15 ^{o}C and 80% relative humidity. Noise propagation is typically higher in summer, so the modeled meteorological conditions reflect a reasonable worst-case scenario.

Noise propagation and attenuation are affected by many factors including meteorology, terrain, and land use. Because it is not possible to account for all of the factors that affect noise propagation and attenuation, noise modeling conducted following the ISO9613-2 standard is accepted to have a margin of error of +/- 3 dB(A). To account for this margin of error, the target modeled sound level is 3 dB(A) less than the standards, and for the limiting residential nighttime standard of 50 dB(A), the target modeling result is 47 dB(A).

4.3 Computer Modeling

4.3.1 Observer Points

Six model receptors (observer points) were selected for the model, as shown in Figure 3-1. These receptor points were chosen to represent current and future residences in the Project vicinity. Four of the six observer points corresponded to the monitoring locations (observer points 1-4). Potential tree removal near the Cherokee Avenue location (observer point 3) will not affect the modeled noise projections. The modeling was conservatively performed without the attenuating effects of foliage. Observer point 5 was located at the tip of the Island Station peninsula where there is a proposed residential development. Observer point 6 was located approximately at the southwestern-most extent of Cliff Street, northwest of the Project site. Observer point 6 is the location of the nearest existing residence northwest of the Project. Observer points 5 and 6 were chosen for their proximity to the Project site, not their proximity to the existing plant. A numbering switch occurred in modeling the noise monitoring points. In data files relating to the model, observer point 1 reflects Cliff Street and observer point 2 reflects Centex Apartments. These site numbers are reversed from the noise monitoring location identifiers.

4.3.2 Source Modeling of the Main Building

The main HBCC building, referred to in the ATCO report as the turbine hall, was modeled using a collection of sources instead of as a single source as in the ATCO modeling due to limitations of the SPM9613 model. Because the SPM9613 software was unable to model the internal building sources and the transmission loss of the walls, calculation of the sound radiated by the structure was done independently of the model. Data given by ATCO for sound levels inside the building and transmission loss values were used to calculate the total sound level radiating from the building. The turbine building walls and roof were each modeled separately with the radiated sound levels distributed according to the surface area of each face relative to overall building surface area. Detailed calculations can be found in Appendix B.

4.3.3 Barrier Modeling of Main Building

The main building acts as both a source of and a barrier to sound propagation. To account for the building as a barrier, the building was also modeled as a set of barriers, each located slightly inside the source placement of the walls. The SPM9613 model was unable to create a roof barrier, so sources on the roof were modeled with roof elevation set as their ground elevation, with a ground hardness of 0.

4.3.4 Terrain Modeling

Terrain is incorporated into the model differently for the observer point and contour modeling. For the observer point modeling, the elevation of the source and receptor are input to the model. For the contour modeling, the terrain throughout the model domain is input to the model. In the contour modeling, the model allows for terrain features (e.g., hills) which affect sound propagation in between the source and the receptor. For the contour modeling, the model creates an 11 by 11 grid, with each corner point being definable in its elevation and land use. Terrain elevations were obtained from the USGS digital elevation model (DEM) for the area and as shown in Figure 4-1. The low-lying portion, shown in red in the hardness plot (4-1b), represents the Mississippi River. A grid size of 100 meter per square was used to incorporate the six observer locations as shown in Figure 4-1b. The (0,0) coordinate of the grid represents the Project location.

4.4 Observer Point Modeling Results

4.4.1 Initial Modeling

Initial modeling was conducted to verify that the SPM9613 model would reproduce the results of the ATCO modeling, and to estimate the sound levels from the revised facility layout. The initial modeling was conducted without including noise mitigation. Table 4-1 shows the results of the initial modeling without installing noise mitigation. The initial modeling showed noise levels of 55 dB(A) at observer points 5 and 6, which exceeded nighttime noise regulations. The HRSG stacks were the primary source of noise in excess of the limits, as was the case in the ATCO modeling. These initial results confirmed the ATCO report's initial recommendation of adding silencing to the HRSG stacks.

4.4.2 Modeling with Mitigation

ATCO also provided data for the effects of silencers upon the HRSG stacks. In modeling a preliminary site layout, ATCO recommended a silencer with 10 dB dynamic insertion loss (DIL) at the 250 Hertz octave band. The modeling results for this level of mitigation are also shown in Table 4-1. Modeled noise levels were acceptable at observer points 1 through 4. Modeling results at points 5 and 6 were at 48 dB(A); this is within the 50 dB(A) limit, but did not meet the target sound level of 47 dB(A).

Table 4-1 Modeled Noise Levels With and Without Mitigation to the HRSGs - dB(A)

Observer point	w/o Mitigation	w/ 10 dB DIL Mitigation	w/ 15 dB DIL Mitigation
1	49	45	44
2	50	46	46
3	49	46	46
4	49	44	43
5	53	48	48
6	54	48	48

To determine if additional silencing on the HRSGs would bring the sound levels to less than or equal to 47 dB(A) at all observer locations, the DIL values were increased to 15dB at the 250 Hz octave band. The additional silencing showed a minimal decrease (<1 dB) in sound levels at observer points 5 and 6, not below the target sound level of 47 dB(A). In examining the contribution of the silenced HRSG stacks to the sound levels at points 5 and 6, it was found that they were no longer among the primary contributing sources. As shown in Table 4-2, modeling of the HBCC plant without including the HRSG stacks confirmed that further reduction of the HRSG stack noise output would have little effect upon the overall modeled sound levels (Table 4-2).

Table 4-2 HBCC Plant Modeling without HRSG Stacks

Observer point	dB(A)
1	44
2	45
3	46
4	43
5	48
6	47

Although the 10 dB silencing did not meet the target sound levels at observer points 5 and 6, given the conservative nature of the modeling, this level of silencing of the HRSG stacks should ensure that the Project remains below noise standards. Further analysis may be warranted using a more precise model to confirm that this is indeed a sufficient level of silencing for the plant.

4.5 Contour Modeling

The SPM9613 software also allows for the creation of a contour map of the simulation results. Figures 4-2, 4-3, and 4-4 correspond to the observer point modeling and show the modeled contours for the initial modeling without mitigation, modeling with 10 dB silencing, and modeling with 15 dB silencing, respectively.

Contour modeling of the site confirmed the results of the individual observer modeling. The contour modeling also allowed for a check of whether other locations should be studied as observers. The contour modeling confirmed that the selected observer points were the most affected residences. Observer locations have been marked in the contour plots in Figures 4-1b, 4-2, 4-3, and 4-4.

4.6 Modeling Comparison to Monitoring Data

Comparison of the output levels of the model with the monitoring readings is presented in Figures 4-5 and 4-6. Figure 4-5(a) shows the octave band modeling results for all six locations and Figure 4-5(b) shows the 1/3 octave band monitoring output for Island Station (Site #4). Site #4 was the quietest of the monitoring sites, although all of the monitoring sites showed similar noise patterns (see Section 3 of Appendix A). In Figure 4-6, the octave band levels (linear unweighted) of both monitoring and modeling data are compared for Site #4. To generate Figure 4-6, the 1/3 octave band values gathered by the Larson Davis Sound Level Meter (Figure 4-5(b)) were added (on the logarithmic scale) to give a direct comparison to the modeling results. As shown in Figure 4-6, the values of the modeled output (foreground) are all below the values from the monitoring data. The greatest difference in sound level is at the 31.5 Hz band, the difference between the modeled noise level and the monitored level is over 15 dB. The least difference in sound level is at the 125 Hz band, with a difference of 5 dB. A difference of 10 db corresponds to half as loud in perceived loudness.

The similarity in the overall curve of the data values indicates that the noise spectrum of the Project, as modeled, is very similar to the existing noise spectrum with the exception of the highest octave band (8000 Hz) where the Project shows almost no impact. Therefore, the Project is not expected to have a significant effect upon the character of the current noise environment.

5.0 Conclusions

The HBCC plant will introduce a new noise source to the area at the same time an existing noise source will be removed. Modeling of the Project with noise mitigation on the HRSG stacks, showed attainment with applicable standards, however at observer points 5 and 6 the modeled results were close to the nighttime standards (but less than 3 dB lower).. Further evaluation of the Project's noise impacts using a more refined model may be warranted.

Monitoring of the current noise environment allows for an estimation of future noise levels. Examination of the monitoring data for the existing environment around the plant and in nearby neighborhoods indicates that noise levels are over the nighttime L_{50} standards at all monitoring locations, and based on the observations of the monitoring program personnel, non-plant sources (primarily traffic) contributed most of the noise. The silencing being included on the new HRSG stacks will minimize the Project's noise levels. Given that several noise sources from the existing plant will be removed, and that monitored noise levels were above modeled noise levels (at all frequencies), it is anticipated that only a barely perceptible increase in total noise, at most, (as measured in dB(A)) would be expected from the Project.

The Project will be a base-load facility. As such, the noise levels from the Project will be fairly constant. Intermittent noise generated by the existing facility from the many coal handling activities will be eliminated with the installation of the Project.

Modeling of the revised facility layout confirmed ATCO's results. ATCO's recommendation of 10 dB silencing is likely adequate to ensure attainment with noise standards. Additional noise modeling may be necessary to validate these results, as the SPM9613 software is limited in resolution.