APPENDIX I

Sound Study Report

Lyon County Generating Station Project
Combined Application
MPUC Docket Nos. E002/CN-25-145, G002/GS-25-154,
E002/TL-25-161 & G002/GP-25-163
May 2025

XCEL ENERGY

Sound Study Report

Lyon County Generating Station Project

PROJECT NO. 170541

REVISION 3

MARCH 28, 2025

Contents

Tables

List of Abbreviations

Abbreviation	Term/Phrase/Name
ACHE	air-cooled heat exchanger
ANSI	American National Standards Institute
BOP	balance-of-plant
CTG	combustion turbine generator
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
GE, or GEV	General Electric or General Electric Vernova Inc.
Hz	hertz
ISO	International Organization for Standardization
L_{eq}	equivalent-continuous sound level
L_{10}	10-percentile exceedance sound level
L_{50}	50-percentile exceedance sound level
L_{90}	90-percentile exceedance sound level
MAR	Minnesota Administrative Rules
MP	measurement point
MPCA	Minnesota Pollution Control Agency
mph	miles per hour
NAC	noise area classification
NIST	U.S. National Institute of Standards and Technology
Project	Lyon County Generating Station Project
PWL	sound power level
SPL	sound pressure level

Executive Summary

Burns & McDonnell conducted a sound study for the proposed Xcel Energy Lyon County Generating Station Project (Project) located in Lyon County, Minnesota. The Project is a new development of a simple-cycle F-class combustion turbine plant consisting of two (2) General Electric Vernova Inc (GE or GEV) 7F05 combustion turbine generators (CTG) and associated balance-of-plant (BOP) equipment.

The objectives of the sound study were to identify the applicable noise regulations for the Project, conduct ambient sound level measurements for the surrounding area, and create an acoustic model for the Project to evaluate whether the Project acoustic design satisfies Project noise limits.

The State of Minnesota has noise limits which are enforced by the Minnesota Pollution Control Agency (MPCA). These include statistical exceedance level noise limits (L_{10} and L_{50}) based on receiving noise area classification (NAC). L_{10} sound limit would generally be applicable to sources that are transient or operate intermittently, since it represents the sound levels occurring more than 10 percent of any hour. While the L_{50} sound level limit would generally be more appropriate for sound sources operating continuously, since it represents the sound levels occurring more than 50 percent of any hour. Because the major noise producing equipment for this Project (when operational) are expected to operate as steady sound sources, the L_{50} sound level limits are more appropriate for Project noise limits. The Project also could operate day and/or night, so the L_{50} nighttime MPCA sound level limits of 75 dBA at the agricultural property boundaries and 50 dBA outside the residential structures are most appropriate for Project noise limits.

Ambient measurements were collected at two (2) locations representative of the property boundary and nearby noise sensitive receptors. Sound meters collected data continuously over the course of one 24-hour period from approximately 1:00 PM on March 6 to 1:00 PM on March 7, 2025. Average daytime sound levels (7:00 AM to 10:00 PM) currently range from 40 to 44 A-weighted decibels (dBA) and nighttime sound levels (10:00 PM to 7:00 AM) range from 28 to 32 dBA. This indicates existing ambient sound levels are currently below the MPCA L_{50} noise limits for the surrounding receptors.

Project sound levels have been modeled to predict future sound levels associated with the Project. The sound power levels for the GEV supplied equipment are based on sound level data supplied by GEV, including low-noise options for the stack exit. BOP equipment is based on in-house data and has been specified so the Project will meet the MPCA noise limits. Based on the current Project acoustic design, including low-noise upgrades to the exhaust stacks and the air-cooled heat exchangers (ACHE), the Project is modeled to meet the MPCA nighttime limits of 75 dBA at the property boundaries and 50 dBA outside of the residential structures.

1.0 Acoustical Terminology

The term “sound level” is often used to describe two different sound characteristics: sound power and sound pressure. Every source that produces sound has a sound power level (PWL). The PWL is the acoustical energy emitted by a sound source and is an absolute number that is not affected by the surrounding environment. The acoustical energy produced by a source propagates through media as pressure fluctuations. These pressure fluctuations, also called sound pressure levels (SPL), are what human ears hear and microphones measure.

Sound is physically characterized by amplitude and frequency. The amplitude of sound is measured in decibels (dB) as the logarithmic ratio of a sound pressure to a reference sound pressure (20 micropascals). The reference sound pressure corresponds to the typical threshold of human hearing. To the average listener, a 3-dB change in a continuous broadband sound is generally considered “just barely perceptible”; a 5-dB change is generally considered “clearly noticeable”; and a 10-dB change is generally considered a doubling (or halving, if the sound is decreasing) of the apparent loudness.

Sound waves can occur at many different wavelengths, also known as the frequency. Frequency is measured in hertz (Hz) and is the number of wave cycles per second that occur. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the lower and higher frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels, or dBA. For reference, the A-weighted sound pressure level and subjective loudness associated with some common sound sources are listed in Table 1-1. The C-weighting scale has more of an emphasis on low frequency content than the A-weighting scale and is generally used to describe the low frequency characteristics of sound levels (e.g., “rattling” or “rumbling” associated with sound levels).

Sound in the environment is constantly fluctuating, as when a car drives by, a dog barks, or a plane passes overhead. Therefore, sound metrics have been developed to quantify fluctuating environmental sound levels. These metrics include the exceedance sound level. The exceedance sound level is the sound level exceeded during “x” percent of the sampling period and is also referred to as a statistical sound level. Common exceedance sound level values are the 10-, 50-,90-percentile exceedance sound levels, denoted by L_{10}, L_{50}, and L_{90}. The equivalent-continuous sound level (L_{eq}) is the arithmetic average of the varying sound over a given time period and is the most common metric used to describe sound.

Table 1-1: Typical Sound Pressure Levels Associated with Common Sound Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment
140	Deafening	Jet aircraft at 75 feet
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 feet
120	Threshold of feeling	Elevated train
110	Very loud	Jet flyover at 1,000 feet
100		Motorcycle at 25 feet
90	Moderately loud	Propeller plane flyover at 1,000 feet
80		Diesel truck (40 mph) at 50 feet
70	Loud	B-757 cabin during flight
60	Moderate	Air-conditioner condenser at 15 feet
50	Quiet	Private Office
40		Farm field with light breeze, birdcalls
30	Very quiet	Quiet residential neighborhood
20		Rustling leaves
10	Just audible	--
0	Threshold of hearing	--

Sources:
(1) Adapted from *Architectural Acoustics*, M. David Egan, 1988
(2) *Architectural Graphic Standards*, Ramsey and Sleeper, 1994

2.0 Applicable Regulations & Criteria

The Project is located in Lyon County, Minnesota. Noise emitted by the Project is governed by the State of Minnesota and is enforced by the Minnesota Pollution Control Agency (MPCA) in Minnesota Administrative Rules (MAR) *Chapter 7030, Noise Pollution Control*[1]. *Part 0040 – Noise Standards*, includes daytime and nighttime noise limits for all sources regulated by the code, separated by receiving noise area classification (NAC). The NACs are based on land use of the receptors which are defined in *Part 0050 – Noise Area Classification*. These limits have been reproduced in the following table.

Table 2-1: MPCA Noise Limits

Noise Area Classification	Daytime (7:00 AM to 10:00 PM)		Nighttime (10:00 PM to 7:00 AM)	
	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

The area immediately surrounding the Project site is primarily agricultural farms (NAC 3). Some of the surrounding agricultural properties include residences, which are subject to more stringent NAC 1 limits. In November of 2015, MPCA provided *"A guide to Noise Control in Minnesota"*[2] which provides information on acoustics terminology, measurement techniques, analysis expectations, and interpretations of the Minnesota noise regulations. Section 3.1 of the MPCA guidance document states the following:

> *"Measurements should be made in the appropriate NAC, at the area of normal outdoor human activity nearest to the noise source. The monitoring location may not necessarily be at the property line; for instance, if the property of the complainant is large and residential outdoor activity is limited to a backyard patio (possibly such as on a farm)."*

Based on this guidance, NAC 1 limits for these residences surrounding the Project should be applied closer to the residential structure instead of at the agricultural property line. Therefore NAC 3 limits will be applied at the receiving property boundaries and NAC 1 limits will only be applied at areas of normal outdoor human activity, near the residential structures.

The L_{10} sound limits would generally be applicable to sources that are transient or operate intermittently. Because the major noise producing equipment for this Project (when operational) are expected to operate as steady sound sources, the L_{50} sound level limits are more appropriate to compare Project sound levels to. Since the Project has the ability to operate day and/or night, the L_{50} nighttime sound level limits should be used as Project noise limits. It is expected that if the Project predicted sound levels meet the L_{50} MPCA limits, then the L_{10} criteria should also be satisfied since all normal operating equipment will be modeled at maximum specified operational levels.

[1] MAR, Minnesota Pollution Control Agency: https://www.revisor.mn.gov/rules/7030/. (last accessed March 11, 2025).
[2] "A Guide to Noise control in Minnesota", MPCA: https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf

3.0 Ambient Measurements

Ambient measurements were collected for the Project area to represent existing sound levels at the nearest property boundaries and nearest residential receptors. Sound level measurements were made using sound level meters that meet the ANSI S1.4 requirements for a Type 1 Precision Sound Level Meter. One-half inch random-incidence microphones were used on the meters. Microphone windscreens were used for all measurements. Sound level meters were calibrated before and after each set of measurements using a sound level calibrator. Calibration level changes did not exceed ± 0.5 dB during the measurements. The meters and calibrator were checked within a year prior of the measurements to verify compliance with the U.S. National Institute of Standards and Technology (NIST) specifications.

Continuous, long-term sound level measurements were collected at two measurement locations surrounding the Project area. Measurement locations are shown in Figure A-1 of Appendix A, as well as the nearest receptors of interest. Measurement Point (MP) 1 was placed along the tree line close to the nearest residential receptor to the northwest of the Project (R1). MP2 was placed near the south receiving property boundary, in the right-of-way. The microphones were placed at a height of approximately five feet above the ground and mounted on a microphone pole which is connected to the monitoring system case.

The long-term monitors measured sound levels continuously over the course of one 24-hour period from approximately 1:00 PM on March 6 to 1:00 PM on March 7, 2025. MP2 experienced a power outage starting at approximately 5:20 AM on March 7th, so the meter only collected data for ~16 hours. Based on the comparison to the MP1 data, the lowest average daytime and nighttime hours were collected prior to the power outage at MP2. It is expected that from 5:00 AM to 6:00 AM, ambient sound levels at MP2 would likely trend upward until they steady out for the remainder of the measurement period, similarly to the MP1 data. The measured sound level data is shown in tabular form in Appendix B. Weather was generally acceptable for conducting ambient measurements. Weather data was gathered from a nearby meteorological station and shown in the tables in Appendix B.

The existing ambient sound levels at both locations consisted of distant traffic and occasional wind gusts. MP1 also included occasional passing traffic and noise from a nearby compressor station, which was audible during periods of low ambient sound levels. A summary of the ambient measurements is shown in the following Table 3-1 as the average A-weighted daytime and nighttime L_{10}, L_{50}, and L_{90} sound levels. As shown in the results, ambient nighttime sound levels are generally expected to be below the nighttime L_{50} limits for the Project.

Table 3-1: Ambient Measurement Summary

Measurement Location	Daytime Average (7:00 AM to 10:00 PM)			Nighttime Average (10:00 PM to 7:00 AM)		
	L_{10}	L_{50}	L_{90}	L_{10}	L_{50}	L_{90}
MP1	49	44	39	40	32	27
MP2	45	40	35	34	28	23

4.0 Sound Modeling

Operational sound levels for the proposed Project were performed using the Computer Aided Noise Abatement (CadnaA) modeling software. Equipment sound levels used for modeling were based on a combination of in-house data for the balance-of-plant (BOP) equipment and GEV provided data for the combustion turbine equipment.

4.1 Sound Modeling Methodology and Input Parameters

Predictive noise modeling was performed using the industry-accepted sound modeling software CadnaA, version 2025. The software is a scaled, three-dimensional program, which considers air absorption, terrain, ground absorption, and reflections and shielding for each piece of noise-emitting equipment. It predicts sound pressure levels at discrete locations and over a gridded area based on input source sound levels. The model calculates sound propagation based on International Organization for Standardization (ISO) 9613-2:2024, General Method of Calculation. ISO 9613-2 assesses the sound level propagation based on the octave band center-frequency range from 31.5 to 8,000 Hz.

The ISO standard considers sound propagation and directivity. The sound-modeling software calculates omnidirectional, downwind sound propagation, in tandem with user-specified directivities and propagation properties. Empirical studies accepted within the industry have demonstrated that modeling may over-predict sound levels in certain directions, and as a result, modeling results generally are considered a conservative measure of the Project's actual sound level.

The modeled atmospheric conditions were assumed to be calm. The temperature and relative humidity were left at the program's default values. Reflections and shielding were considered for sound waves encountering physical structures. Sound levels around the site can be influenced by reflections from physical structures onsite. The area surrounding the Project has mild elevation changes, which scatter and absorb the sound waves. Thus, terrain was included to account for surface effects such as ground absorption. Average ground absorption for the Project site was set to a value of 0.25 to account for the combination of hard pavements, crushed rock, and vegetative surfaces. Average ground absorption for the surrounding area was set to 1.0 to account for the generally soft, vegetative ground. Foliage was not included in the model. The modeling assumptions are outlined in Table 4-1. This model excludes noise sources not associated with the Project (e.g., existing nearby compressor station, traffic noise and local fauna). Only Project sound levels have been evaluated.

Table 4-1: Sound Modeling Parameters

Model Input	Parameter Value
Project and Facility Ground Absorption	0.25
Surrounding Land Ground Absorption	1.0
Number of Reflections	2
Receptor Height	5 feet above grade
Terrain	USGS topographic land data
Temperature	50 °F
Humidity	70%

4.2 Project Acoustical Design

The Project general arrangement is included as Figure A-2 of Appendix A. The Project is expected to include two (2) F-class simple-cycle combustion turbine generators (CTGs) along with associated BOP equipment. The CTGs are expected to be GEV 7F05 units. GEV has provided expected sound levels for the unit and associated GEV-provided equipment. The expected equipment sound levels used for this analysis are summarized in Table 4-2 below. They include low-noise options for the exhaust stack exit (i.e., upgrade stack silencer) and the air-cooled heat exchanger (ACHE) in order to meet the MPCA noise limits. The detailed sound power levels used for each piece of equipment in the noise model are provided in Appendix C.

Table 4-2: Project Expected Acoustical Design

Equipment	QTY	Sound Level Rating	Notes
Combustion Turbine Equipment – GE Provided			
GEV CTG Package	2	85 dBA SPL average at 3 feet	Standard package equipment *(includes exhaust diffuser noise barrier)*
Exhaust Stack Exit	2	110 dBA PWL	Includes low-noise silencer
BOP Equipment			
GSU Transformer	2	85 dBA at 3 feet	Standard offering
Air-Cooled Heat Exchanger	2	98 dBA PWL	Low-noise option
Auxiliary Transformer	2	75 dBA at 3 feet	Standard offering
Dew Point Heater	2	80 dBA at 3 feet	Standard offering
Pumps, valves, skids, etc.	--	85 dBA at 3 feet	Standard offering

4.3 Model Results

The Project will operate at fairly constant sound levels during normal operation and has the potential to operate day and/or night. Therefore, steady-state sound level predictions were completed for normal, continuous operation of the Project, which should be comparable to the expected L_{50} sound levels for the Project. The predicted overall steady-state operational A-weighted sound levels, which do not include contributions from ambient sound sources, are shown with 5-dB contours in Figure A-3 of Appendix A. Sound levels are also provided for the specific nearest receptors of interest in Table 4-3 below.

Table 4-3: Project Design Modeled Sound Level Results

Receptor Name[a]	Noise Area Classification (NAC)	MCPA Nighttime Noise L_{50} Limits (dBA)	Project Modeled Sound Levels (dBA)
A1	NAC 3	75	56
A2	NAC 3	75	54
A3	NAC 3	75	60
A4	NAC 3	75	50
R1	NAC 1	50	46
R2	NAC 1	50	39
R3	NAC 1	50	50
R4	NAC 1	50	41

a. "A#" denotes agricultural receptors along the receiving property lines. "R#" denotes residential receptors near receiving residential structures.

Model results are for continuous operation of the Project, using expected worst-case operational sound levels for all normal operating equipment. Predicted sound levels should be considered conservative for estimating L_{50} sound levels for the future Project. As shown in the contour figures and the previous table, the Project as currently designed is expected to meet the MPCA nighttime L_{50} limits at all the nearest receptors (agricultural and residential) and therefore comply with the MPCA noise requirements. As previously indicated, the Project acoustic design is expected to include an upgraded exhaust stack silencer and a low-noise ACHE.

5.0 Conclusion

Burns & McDonnell conducted a sound study for the proposed Xcel Energy Lyon County Generating Station Project located in Lyon County, Minnesota. The Project is a new development of a simple-cycle F-class combustion turbine plant consisting of two (2) GEV 7F05 CTGs and associated BOP equipment.

The State of Minnesota has noise limits which are enforced by the MPCA. These include noise limits based on receiving NAC and these limits are applicable to the Project. The area immediately surrounding the Project site is primarily agricultural farms (NAC 3) and residences on agricultural properties (NAC 1). According to the MPCA guidance document, measurements for residential receptors located on large farms should be limited to areas of normal activity. So, NAC 1 limits for these residences have been applied closer to the residential structure instead of at the agricultural property line. Based on Project operations, the L_{50} sound level limit is the most appropriate limit for the Project because of the continuous, steady noise source characteristics of the Project when operational.

Ambient measurements were collected at two (2) locations representative of the property boundary and nearby noise sensitive receptors. Average daytime L_{50} sound levels currently range from 40 to 44 dBA and nighttime sound levels range from 28 to 32 dBA. This indicates existing ambient sound levels are currently below the MPCA noise limits for the surrounding receptors.

Project sound levels have been modeled to predict future sound levels associated with the Project. The sound power levels for the GEV supplied equipment are based on sound level data supplied by GEV, including low-noise options for the stack exit. BOP equipment is based on in-house data and has been specified so the Project will meet the MPCA noise limits. Based on the current Project acoustic design, including low-noise upgrades to the exhaust stacks and the ACHEs, the Project is expected to meet the MPCA L_{50} nighttime limits of 75 dBA at the property boundaries and 50 dBA outside of the residential structures.

Appendix A – Figures

LEGEND

- Project Property Boundary
- Nearest Receptors
- Measurement Points (MPs)

REFERENCE

0 0.1 0.2
MILES

0 0.1 0.2
KILOMETERS

N

Figure A-1 - Ambient Measurement Points

LOCATION:	Lyon County, MN
PROJECT:	Xcel Energy Lyon County Generating Station
PROJ. NO.:	170541
CREATED:	03/21/2025

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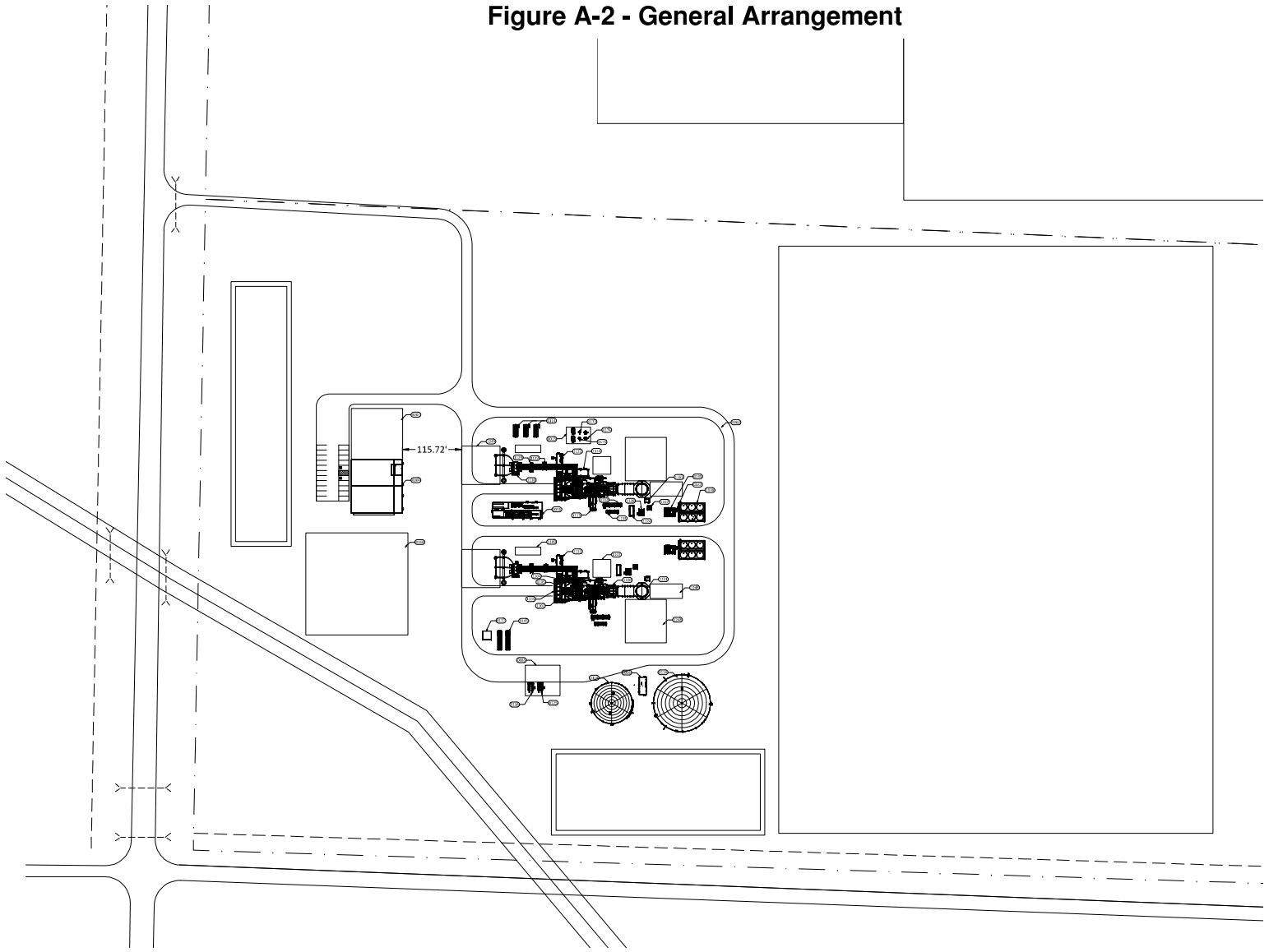
Figure A-2 - General Arrangement



LEGEND:

0001 ADMINISTRATION BUILDING
0004 WAREHOUSE BUILDING
0006 FIRE WATER PUMP ENCLOSURE
0013 AIR COMPRESSOR BUILDING (OPTION)
0036 MEDIUM VOLTAGE ELECTRICAL ENCLOSURE
0062 ROADWAY
0085 DEMIN WATER TRAILER UNLOAD
0112 OIL WATER SEPERATOR
0114 EMERGENCY DIESEL GENERATORS
0118 DEMIN WATER PUMPS
0119 DEMIN WATER STORAGE TANK
0124 SERVICE/FIRE WATER STORAGE TANK
0125 SERVICE WATER PUMP
0135 CLOSED COOLING WATER PUMPS
0137 CLOSED COOLING WATER EXPANSION TANKS
0145 HYDROGEN TRAILERS (BY OWNER)
0168 FUEL GAS REGULATING AND METERING AREA
0173 AIR COMPRESSORS
0174 DESICCANT AIR DRYERS
0175 DRY AIR RECEVEIR
0177 LIQUID CO2 SKID
0319 WET AIR RECEIVER
1030 AIR COOLED HEAT EXCHANGER
1100 COMBUSTION TURBINE
1101 COMBUSTION TURBINE GENERATOR
1102 CT MAINTENANCE AREA
1103 GENERATOR ROTOR REMOVAL AREA
1104 CO2 BOTTLE RACK AND MANIFOLD
1105 AIR INLET FILTER
1113 LUBE OIL/GAS VALVE MODULE (ACCESSORY MODULE)
1114 PACKAGED ELECTRICAL ELECTRONIC CONTROL CENTER (PEECC)
1122 CTG LCI AND EXCITATION COMPARTMENT
1124 WATER MIST SKID
1127 CTG GENERATOR BREAKER
1129 CTG AUXILIARY TRANSFORMER
1130 GENERATOR STEP-UP TRANSFORMER
1133 WATER WASH DRAINS TANK
1138 FUEL GAS ABSOLUTE SEPARATOR
1149 AIR INTAKE HEATING SKID
1151 STACK
1163 CONTINUOUS EMISSIONS MONITORING SYSTEMS BUILDING (CEMS)
1167 FUEL GAS DRAINS TANK
1248 FUTURE EXPANSION
1249 RESERVED FOR CLIENT HV EQUIP

- PRELIMINARY -
NOT FOR CONSTRUCTION

N

100 0 100 200
SCALE IN FEET

SCALE: 1" = 100'-0"

NO	REVISION	ZONE	DATE	BY	CHK	ENG	NO	REVISION	ZONE	DATE	BY	CHK	ENG
R1	REV_DESCRIPTION1	Z1	D1	B1	C1	E1	R8	REV_DESCRIPTION8	Z8	D8	B8	C8	E8
R2	REV_DESCRIPTION2	Z2	D2	B2	C2	E2	R9	REV_DESCRIPTION9	Z9	D9	B9	C9	E9
R3	REV_DESCRIPTION3	Z3	D3	B3	C3	E3	R10	REV_DESCRIPTION10	Z10	D10	B10	C10	E10
R4	REV_DESCRIPTION4	Z4	D4	B4	C4	E4	R11	REV_DESCRIPTION11	Z11	D11	B11	C11	E11
R5	REV_DESCRIPTION5	Z5	D5	B5	C5	E5	R12	REV_DESCRIPTION12	Z12	D12	B12	C12	E12
R6	REV_DESCRIPTION6	Z6	D6	B6	C6	E6	R13	REV_DESCRIPTION13	Z13	D13	B13	C13	E13
R7	REV_DESCRIPTION7	Z7	D7	B7	C7	E7	R14	REV_DESCRIPTION14	Z14	D14	B14	C14	E14

REFERENCE DRAWINGS		
DWG NO.	MANUFACTURER	DESCRIPTION
DWGNO1	MFR1	DESC1
DWGNO2	MFR2	DESC2
DWGNO3	MFR3	DESC3
DWGNO4	MFR4	DESC4
DWGNO5	MFR5	DESC5
DWGNO6	MFR6	DESC6

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: _____

Typed or Printed Name: _____

Date: _____ License Number: _____

Xcel Energy®
TB23
TB0
TB24

DWN:	TB9	DATE:	TB10	CHK:	TB13	DATE:	TB14
ENG:	TB11	DATE:	TB12	CHK:	TB15	DATE:	TB16
PM:	TB17	DATE:	TB18	PROJ. NO:	TB21		
APVD:	TB19	DATE:	TB20	SCALE:	TB22		

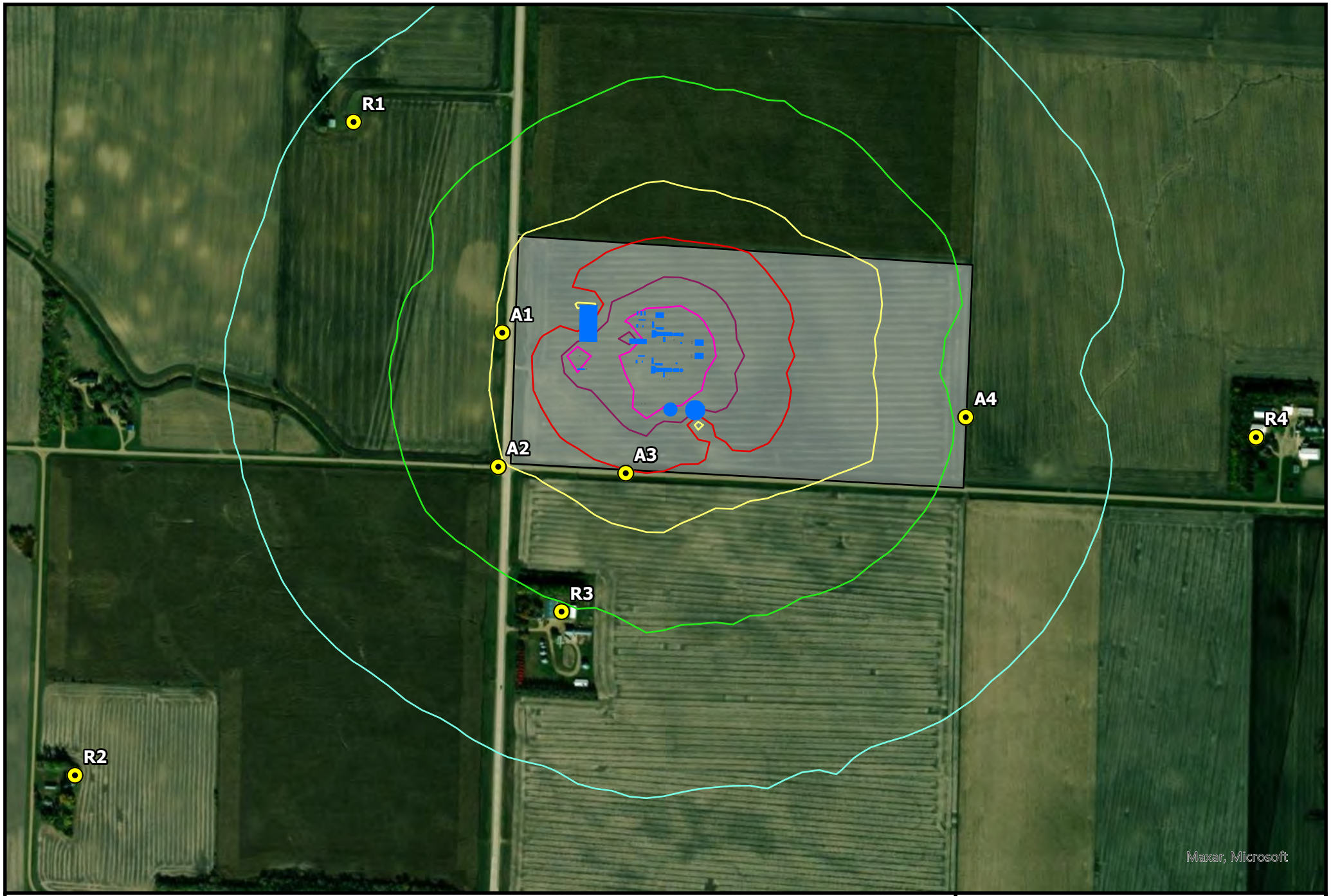
THIS MAP/DOCUMENT IS A TOOL TO ASSIST EMPLOYEES IN THE PERFORMANCE OF THEIR JOBS. YOUR PERSONAL SAFETY IS PROVIDED FOR BY USING SAFETY PRACTICES, PROCEDURES, AND EQUIPMENT AS DESCRIBED IN THE SAFETY TRAINING PROGRAMS AND MANUALS.

Klewlt

UNIT 0
TB2
TB3
TB4
TB5

TB6

REV
TB8



LEGEND

- Project Property Boundary
- Project Structures
- Nearest Receptors
- 45 dBA
- 50 dBA
- 55 dBA
- 60 dBA
- 65 dBA
- 70 dBA

REFERENCE

0 0.1 0.2
MILES

0 0.1 0.2
KILOMETERS

N

Figure A-3 - Sound Level Contours

LOCATION:	Lyon County, MN
PROJECT:	Xcel Energy Lyon County Generating Station
PROJ. NO.:	170541
CREATED:	03/21/2025

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Appendix B – Ambient Sound Level Data

Table 1 - Hourly Average Sound Levels

Time	MP1 [dBA]				MP2 [dBA]				Weather Data				
	Leq	L10	L50	L90	Leq	L10	L50	L90	Temp (°F)	Dew Point (°F)	Humidity	Wind Dir	Aveage Wind Speed
3/6/25 1:00 PM	47	50	45	42	49	47	42	37	42	30	61%	NW	4 mph
3/6/25 2:00 PM	50	53	49	45	48	51	47	42	42	31	66%	NW	2 mph
3/6/25 3:00 PM	51	54	50	46	51	51	47	43	37	30	75%	NNW	5 mph
3/6/25 4:00 PM	49	51	48	45	45	48	44	40	34	28	78%	NNW	4 mph
3/6/25 5:00 PM	47	49	45	41	46	44	39	35	32	26	79%	NNW	4 mph
3/6/25 6:00 PM	45	48	43	38	44	43	38	33	31	26	81%	NNW	1 mph
3/6/25 7:00 PM	44	48	43	35	43	44	37	31	31	26	82%	-	-
3/6/25 8:00 PM	42	45	39	33	38	41	34	29	30	25	83%	-	-
3/6/25 9:00 PM	43	45	38	32	34	37	32	27	30	25	80%	NNW	1 mph
3/6/25 10:00 PM	40	42	33	28	33	36	29	25	30	25	80%	NNW	2 mph
3/6/25 11:00 PM	34	37	29	25	29	33	25	21	30	24	78%	NNW	1 mph
3/6/25 12:00 AM	31	34	25	23	26	28	22	19	29	23	77%	NNW	2 mph
3/7/25 1:00 AM	34	36	25	21	41	32	23	20	29	23	78%	NNW	1 mph
3/7/25 2:00 AM	36	38	30	25	35	36	28	23	29	23	79%	NNW	1 mph
3/7/25 3:00 AM	39	41	33	28	34	38	33	28	28	23	81%	NNW	2 mph
3/7/25 4:00 AM	37	40	35	30	34	37	32	27	28	23	81%	NNW	2 mph
3/7/25 5:00 AM	41	44	35	27	--	--	--	--	28	23	80%	NNW	1 mph
3/7/25 6:00 AM	43	47	41	36	--	--	--	--	28	22	76%	NNW	2 mph
3/7/25 7:00 AM	44	47	42	37	--	--	--	--	28	21	76%	NNW	2 mph
3/7/25 8:00 AM	45	49	43	38	--	--	--	--	29	21	74%	NNW	3 mph
3/7/25 9:00 AM	45	48	43	38	--	--	--	--	29	21	72%	NNW	3 mph
3/7/25 10:00 AM	44	47	42	37	--	--	--	--	31	20	64%	N	4 mph
3/7/25 11:00 AM	45	48	43	38	--	--	--	--	35	21	57%	NNW	3 mph
3/7/25 12:00 PM	45	48	42	38	--	--	--	--	37	22	53%	N	3 mph
Average Daytime:	**47**	**49**	**44**	**39**	**46**	**45**	**40**	**35**					
Average Nighttime:	**39**	**40**	**32**	**27**	**35**	**34**	**28**	**23**					

Appendix C – Modeled Sound Levels

Appendix C - Project Acoustic Design Modeled Sound Power Levels

Xcel Energy

Lyon County Generating Station

Name	Number of Sources	Sound Power Level (dB)[1] Octave Band Frequency (Hz) 31.5	63.0	125	250	500	1000	2000	4000	8000	Overall (dBA)	Notes[2]
GE Supplied Equipment												
GT Stack Exit	2 (1 per CTG)	131	123	115	110	109	104	90	81	71	**110**	GE Provided (Low-noise option)
GT Compartment Vent Fan	8 (4 per CTG)	102	102	110	101	98	95	94	98	95	**104**	GE Provided
GT Accessory Skid	2 (1 per CTG)	101	103	99	98	97	96	96	97	88	**103**	GE Provided
GT Exhaust Diffuser	2 (1 per CTG)	105	112	96	92	86	84	85	88	75	**94**	GE Provided
GT Exhaust Duct & Lower Stack	2 (1 per CTG)	119	121	111	106	100	98	99	102	89	**107**	GE Provided (Estimated sound levels)
GT Generator	2 (1 per CTG)	104	108	118	107	95	88	89	76	63	**104**	GE Provided
GT Load Compartment	2 (1 per CTG)	92	98	97	92	92	98	98	93	83	**103**	GE Provided
GT Air Inlet Face	2 (1 per CTG)	111	103	99	90	87	86	91	99	93	**102**	GE Provided
GT Air Inlet House	2 (1 per CTG)	104	98	100	102	96	81	95	82	57	**100**	GE Provided
GT Enclosure	2 (1 per CTG)	106	103	101	95	97	97	101	106	94	**109**	GE Provided
BOP Equipment												
ACHE Pump	4 (2 per ACHE)	82	94	90	93	94	97	92	80	61	**100**	Estimated 85 dBA @ 3-ft (B&H spectrum)
Dew Point Heater Stack	1	119	101	93	88	89	95	93	92	91	**100**	Estimated 85 dBA @ 3-ft (B&H spectrum)
Fuel Filter Skid	2 (1 per CTG)	103	96	90	85	87	88	97	97	92	**102**	Estimated 85 dBA @ 3-ft (B&H spectrum)
Fuel Gas Valve	1	101	94	88	83	85	86	95	95	90	**100**	Estimated 85 dBA @ 3-ft (B&H spectrum)
Water Pump	2	82	94	90	93	94	97	92	80	61	**100**	Estimated 85 dBA @ 3-ft (B&H spectrum)
ACHE	2 (1 per CTG)	99	99	92	96	94	93	92	89	72	**98**	Low-noise option (75 dBA @ 3-ft)
Air Intake Heater Skid	1	101	94	88	83	85	86	95	95	90	**100**	Estimated 85 dBA @ 3-ft (B&H spectrum)
Aux Transformer	2 (1 per CTG)	90	87	88	85	88	85	80	78	68	**89**	Estimated 75 NEMA (B&H transformer spectrum)
Dew Point Heater	1	109	106	104	99	96	92	85	81	77	**98**	Estimated 80 dBA @ 3-ft (B&H spectrum)
GSU Transformer	2 (1 per CTG)	104	101	102	99	102	99	94	92	82	**103**	Estimated 85 NEMA (B&H transformer spectrum)
GT Fuel Module	2 (1 per CTG)	77	89	85	88	89	92	87	75	56	**95**	Estimated 85 dBA @ 3-ft (B&H spectrum)

Notes:

1. All sound levels are based on expected acosutic design for the project equipment (including low noise options where noted)

2. B&H - Bies & Hansen Engineering Noise Control (4th and 5th Ed.) - used for estimated frequency spectral data


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