

March 22, 2019

Peter Rood
Lincoln Park DG, LLC
132 North York Street, Suite 3L
Elmhurst, IL 60126

Re: *LPGSC Ulster East Site*
Frank Scottie Boulevard, Town of Ulster, Ulster County, New York
Chazen Project # 31788.05

Dear Mr. Rood:

The purpose of this report is to obtain an understanding of future sound levels that will emanate from operations at the Lincoln Park Grid Support Center facility at the nearest residential receptor.

Residential Receptor

The nearest residence to the Lincoln Park Grid Support Center facility is located to the West on Riseley Street (Figure 1). The residence is located approximately 1,480'-11" from the transformer and inverter location, and 1,589'-7" from the HVAC location. The area in-between the residence and Glidepath can be described as mostly wooded with undulating topography.

Sound Levels from Equipment

The sound equipment producing the highest sound levels is the HVAC, transformer, and inverter. Equipment data sheets (Appendix A) and measurement distances were provided by Mott MacDonald.

HVAC = 89dB, distance of 0.98 ft

Transformer = 55dB, distance of 0.98 ft

Inverter = 66.4 dB, distance of 32.81 ft

Sound Level Projections

The formula to calculate the sound level at a location given the sound level and distance at another location is as follows:

$$L_2 = L_1 - \left| 20 * \log \frac{r_1}{r_2} \right| \text{ where:}$$

L_2 = Sound Level at Location 2
 L_1 = Sound Level at Location 1
 r_2 = Distance to Location 2
 r_1 = Distance to Location 1

Using this formula,

the Leq at the nearest residence from the HVAC is calculated as 24.80 dBa

$$L_2 = 89 \text{ dBa} - \left| 20 * \log \frac{.98 \text{ ft}}{1589.58 \text{ ft}} \right| = 24.80 \text{ dBa}$$

The Leq at the nearest residence from the transformer is calculated as <0 dBa.

$$L_2 = 55.0 \text{ dBa} - \left| 20 * \log \frac{0.98 \text{ ft}}{1480.92 \text{ ft}} \right| = < 0 \text{ dBa}$$

The Leq at the nearest residence from the inverter is calculated as 33.31 dBa.

$$L_2 = 66.4 \text{ dBa} - \left| 20 * \log \frac{32.81 \text{ ft}}{1480.92 \text{ ft}} \right| = 33.31 \text{ dBa}$$

The formula for the sum level of sound pressures of n incoherent radiating sources is as follow:

$$L_{\Sigma} = 10 * \log_{10} \left(10^{\frac{L_1}{10}} + 10^{\frac{L_2}{10}} + \dots + 10^{\frac{L_n}{10}} \right)$$

Using this formula for a scenario where all 3 pieces of equipment are running concurrently, the combined sound level at the nearest residence is calculated as 33.88 dBa.

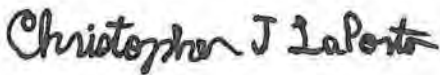
$$L_{\Sigma} = 10 * \log_{10} \left(10^{\frac{24.8}{10}} + 10^{\frac{33.31}{10}} \right) = 33.88 \text{ dBa}$$

Conclusion

Table I of §117-3 of the Code of the Town of Ulster defines the maximum permissible sound levels by receiving property category. For the residential receiving property category, the maximum permissible sound level between 7:00 AM and 10:00 PM is 72 dBa. This is reduced to 66 dBa between the hours of 10 PM and 7 AM.

With a maximum sound level of 33.88 dBa, this project is well below the maximums identified in the Town code. The woods and undulating terrain would further reduce sound levels. The facility will therefore be in compliance with Town regulations.

Sincerely,

A handwritten signature in black ink that reads "Christopher J. LaPorta". The signature is written in a cursive, slightly slanted style.

Christopher LaPorta, PE
Project Engineer

Drawing Name: Z:\projects\31700-31799\31788.05 Glidepath Ulster East Site\DWG\99_FIG1_31788-05_SOUND.dwg Date Printed: Mar 22, 2019, 10:11am



ALL RIGHTS RESERVED. COPY OR REPRODUCTION OF THIS DRAWING OR DOCUMENT, OR ANY PORTION THEREOF, WITHOUT THE EXPRESS WRITTEN PERMISSION OF CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C. IS PROHIBITED. THIS DRAWING OR DOCUMENT IS NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR ANY PURPOSE OTHER THAN THE SPECIFIC PROJECT, APPLICATION AND SITUATION FOR WHICH IT WAS INTENDED. ANY MODIFICATION OF THIS DRAWING OR DOCUMENT, OR ANY USE FOR ANY PROJECT, APPLICATION OR SITUATION OTHER THAN THAT FOR WHICH IT WAS INTENDED, WILL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY TO CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C.

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW FOR ANY PERSON TO ALTER THIS DRAWING OR DOCUMENT IN ANY WAY, UNLESS HE OR SHE IS ACTING UNDER THE DIRECTION OF A LICENSED DESIGN PROFESSIONAL (PROFESSIONAL ENGINEER, LAND SURVEYOR, ARCHITECT OR LANDSCAPE ARCHITECT). IF THIS DRAWING OR DOCUMENT IS ALTERED, THE ALTERING DESIGN PROFESSIONAL SHALL AFFIX TO THE DRAWING OR DOCUMENT HIS OR HER SEAL, THE NOTATION "ALTERED BY" FOLLOWED BY HIS OR HER SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

CHAZEN ENGINEERING, LAND SURVEYING
& **LANDSCAPE ARCHITECTURE CO., D.P.C.**

Office Locations:

- ☒ Hudson Valley Office:
21 Fox Street
Poughkeepsie, New York 12601
Phone: (845) 454-3980
- ☐ Capital District Office:
547 River Street
Troy, New York 12180
Phone: (518) 273-0055
- ☐ North Country Office:
20 Elm Street (Suite 110)
Glens Falls, New York 12801
Phone: (518) 812-0513
- ☐ Westchester NY Office:
1 North Broadway, Suite 803
White Plains, New York 10601
Phone: (914) 997-8510
- Nashville Tennessee Office:
2416 21st Ave S. (Suite 103)
Nashville, Tennessee 37212
Phone: (615) 380-1359
- Chattanooga Tennessee Office:
427 E. 5TH ST. (Suite 201)
Chattanooga, Tennessee 37403
Phone: (423) 241-6575

GLIDEPATH ULSTER EAST SITE

FIGURE 1
SITE LAYOUT MAP

TOWN OF ULSTER, ULSTER COUNTY, NEW YORK

designed CUL	checked
date 03/22/19	scale 1"=200'
project no. 31788.05	
sheet no. FIG1	

Appendix A: Equipment Data Sheets

SUNNY CENTRAL STORAGE

2200-US / 2475-US / 2500-EV-US / 2750-EV-US / 2900-US



Efficient

- High power density
- Max. efficiency is 98.7%
- Lower transportation costs (up to 4 inverters in a standard shipping container)

Robust

- Proven OptiCool™ technology for intelligent, effective cooling
- Can be installed worldwide outdoors in any ambient condition

Flexible

- Conforms to all relevant grid requirements worldwide
- Four quadrant operation for full reactive power support
- Stand-alone device or a medium-voltage block solution

Versatile

- Integrated battery communication
- Customized monitoring and control of inverters
- Grid management functions for dynamic grid support
- Integrated voltage supply for internal consumption and external loads

SUNNY CENTRAL STORAGE

2200-US / 2475-US / 2500-EV-US / 2750-EV-US / 2900-US

A full power class lineup for 1,000 and 1,500 V applications

Grid-connected storage systems enable the integration of large amounts of intermittent renewable energy into the utility grid while ensuring maximum grid stability. The Sunny Central Storage is the central component of the SMA system solution for integration of large-scale storage systems. It is designed to compensate for fluctuations in solar energy generation and offers comprehensive grid management services such as automatic frequency control. The battery inverter is optimized for continuous operation at nominal load and temperature of -25°C to $+50^{\circ}\text{C}$. Thanks to its wide DC voltage range, it is compatible with various types of battery technologies. The Sunny Central Storage is also available as a medium-voltage block solution.

SUNNY CENTRAL STORAGE

2200-US / 2475-US / 2900-US

Technical Data	SCS 2200-US	SCS 2475-US	SCS 2900-US
Battery side (DC)			
DC Voltage range (at 25°C / at 50°C) ¹⁾	570 V to 950 V / 950 V	634 V to 1000 V / 1000V	740 V to 950 V / 850V
Minimal / Maximal DC voltage	545 V / 1000 V ²⁾	614 V / 1000 V	720 V / 1000 V
Max. DC current (at 25°C / at 50°C)	3960 A / 3600 A		4110 A / 3600 A
Max. interruption current capability ³⁾	6400 A		
Number of DC cables per polarity	26		
Grid side (AC)			
Max. AC power (at 25°C / at 50°C)	2200 kVA / 2000 kVA	2475 kVA / 2250 kVA	2940 kVA / 2670 kVA
Max. AC current (at 25°C / at 50°C)	3300 A / 3000 A	3292 A / 2993 A	3265 A / 2964 A
Max. total harmonic distortion	< 3% at nominal power		
Nominal AC voltage / nominal AC voltage range	385 V / 308 V to 462 V	434 V / 347 V to 520 V	520 V / 468 V to 572 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz		
Power factor at rated power / displacement power factor adjustable	1 / 0 underexcited to 0 overexcited ⁹⁾		
Efficiency			
Max. efficiency ⁴⁾ / European efficiency ⁴⁾	98.6% / 98.4%		98.6% / 98.4%
Protective Devices			
Input-side disconnection point	DC load-break switch		
Output-side disconnection point	AC circuit breaker		
DC overvoltage protection	Surge arrester, type I		
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III		
Ground-fault monitoring / remote ground-fault monitoring	○ / ○		
Insulation monitoring	●		
Degree of protection: electronics / air duct & connection area (UL 50)	Type 3R / Type 1		
General Data			
Dimensions (W / H / D)	2780 mm / 2318 mm / 1588 mm		
Weight	< 3400 kg		
Self-consumption (max. ⁵⁾ / partial load ⁶⁾ / average ⁷⁾	< 8100 W / < 1800 W / < 2000 W		
Self-consumption (standby)	< 300 W		
Auxiliary power supply: integrated 8.4 kVA transformer / external	○ / ○		
Operating temperature range	-25°C to 60°C		
Noise emission ⁸⁾	66.4 dB(A)		
Temperature range (standby)	-40°C to 60°C		
Temperature range (storage)	-40°C to 70°C		
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% [2 month/year] / 0% to 95%		
Maximum operating altitude above MSL 2000 m	●		
Fresh air consumption	6500 m³/h		
Features			
DC connection	Terminal lugs on each input (without fuse) with NEMA lug hole pattern		
AC connection	With busbar system (three busbars, one per line conductor)		
Communication	Modbus TCP		
Enclosure / roof color	RAL 9016 / RAL 7004		
Display	○ HMI touchscreen (10.1")		
Supply transformer for external loads	○ (2.5 kVA)		
Certification and approvals	UL 1741, UL 1741 SA ¹⁰⁾ , IEEE 1547, UL 1998, UL 840 Cat. IV, CAN/CSA C22.2 107.1-1		
EMC standards	IEC / EN 61000-6-4, IEC / EN 61000-6-2, EN 55022, CISPR 22:2008 modified class A, FCC Part 15 Class A		
● Standard features ○ Optional			
Type designation	SCS-2200-US-10	SCS-2475-US-10	SCS-2900-US-10

1) Another voltage range can be offered on request

2) With power derating

3) Battery short circuit disconnection has to be done on the battery side

4) Efficiency measured without internal power supply

5) Self-consumption at rated operation

6) Self-consumption at < 75% P_n at 25°C

7) Self-consumption averaged out from 5% to 100% P_n at 25°C

8) Sound pressure level at a distance of 10 m

9) Depending on the DC voltage

10) Only for PF 1 / 0.8 underexcited to 0.8 overexcited

SUNNY CENTRAL STORAGE

2500-EV-US / 2750-EV-US

Technical Data	SCS 2500-EV-US	SCS 2750-EV-US
Battery side (DC)		
DC Voltage range (at 25 °C / at 50 °C) ¹⁾	850 V to 1425 V / 1250 V	875 V to 1425 V/ 1275 V
Minimal / Maximal DC voltage ²⁾	778 V / 1500 V	849 V / 1500 V
Max. DC current (at 25 °C / at 50 °C)	3000 A / 2700 A	3206 A / 2700 A
Max. interruption current capability ³⁾	6400 A	6400 A
Number of DC cables per polarity	26	
Grid side (AC)		
Max. AC power (at 25 °C / at 50 °C)	2500 kVA / 2250 kVA	2750 kVA / 2500 kVA
Max. AC current (at 25 °C / at 50 °C)	2624 A / 2362 A	2646 A / 2405 A
Max. total harmonic distortion	< 3% at nominal power	
Nominal AC voltage / nominal AC voltage range	550 V / 440 V to 660 V	600 V / 480 V to 660 V
AC power frequency / range	50 Hz / 47 Hz to 53 Hz 60 Hz / 57 Hz to 63 Hz	
Power factor at rated power / displacement power factor adjustable	1 / 0 underexcited to 0 overexcited ⁹⁾	
Efficiency		
Max. efficiency ⁴⁾ / European efficiency ⁴⁾	98.6% / 98.3%	98.7% / 98.6%
Protective Devices		
Input-side disconnection point	DC load-break switch	
Output-side disconnection point	AC circuit breaker	
DC overvoltage protection	Surge arrester, type I	
Lightning protection (according to IEC 62305-1)	Lightning Protection Level III	
Ground-fault monitoring / remote ground-fault monitoring	○ / ○	
Insulation monitoring	●	
Degree of protection: electronics / air duct & connection area (UL 50)	Type 3R / Type 1	
General Data		
Dimensions (W / H / D)	2780 mm / 2318 mm / 1588 mm	
Weight	< 3400 kg	
Self-consumption (max. ⁵⁾ / partial load ⁶⁾ / average ⁷⁾	< 8100 W / < 1800 W / < 2000 W	
Self-consumption (standby)	< 370 W	
Auxiliary power supply: integrated 8.4 kVA transformer / external	○ / ○	
Operating temperature range	−25 °C to 60 °C	
Noise emission ⁸⁾	64.3 dB(A)	
Temperature range (standby)	−40 °C to 60 °C	
Temperature range (storage)	−40 °C to 70 °C	
Max. permissible value for relative humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%	
Maximum operating altitude above MSL 2000 m	●	
Fresh air consumption	6500 m³/h	
Features		
DC connection	Terminal lugs on each input (without fuse) with NEMA lug hole pattern	
AC connection	With busbar system (three busbars, one per line conductor)	
Communication	Modbus TCP	
Enclosure / roof color	RAL 9016 / RAL 7004	
Display	○ HMI touchscreen (10.1")	
Supply transformer for external loads	○ (2.5 kVA)	
Certification and approvals	UL 62109-1, UL 1741 Chapter 13 CRD 61, UL 1741 SA ¹⁰⁾ , IEEE 1547, UL 1998, CAN/CSA C22.2 107.1-1	
EMC standards	IEC / EN 61000-6-4, IEC / EN 61000-6-2, EN 55022, CISPR 22:2008 modified class A, FCC Part 15 Class A	
● Standard features ○ Optional		
Type designation	SCS-2500-EV-US-10	SCS-2750-EV-US-10

1) Another voltage range can be offered on request

2) With power derating

3) Battery short circuit disconnection has to be done on the battery side

4) Efficiency measured without internal power supply

5) Self-consumption at rated operation

6) Self-consumption at < 75% P_n at 25 °C

7) Self-consumption averaged out from 5% to 100% P_n at 25 °C

8) Sound pressure level at a distance of 10 m

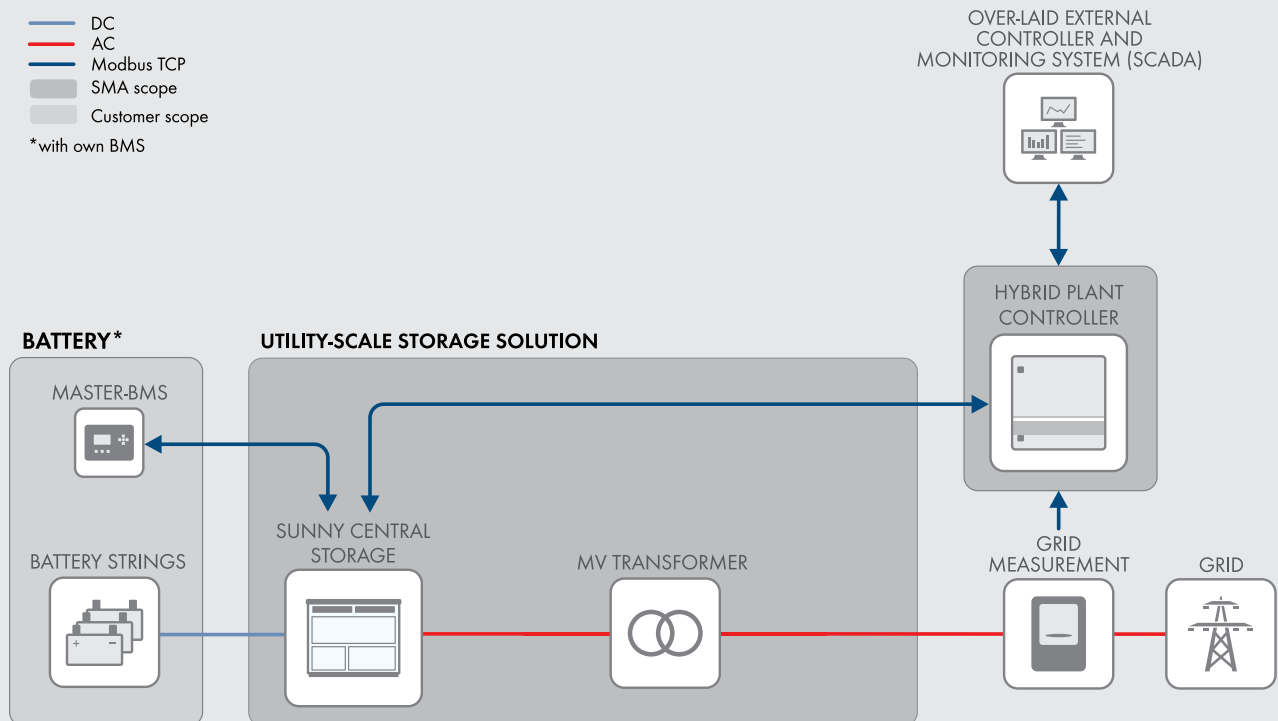
9) Depending on the DC voltage

10) Only for PF 1 / 0.8 underexcited to 0.8 overexcited

SUNNY CENTRAL STORAGE APPLICATIONS

- Provides ancillary grid services
- Supports the growth of renewable energy in public grids
- Increases fuel saving potential in PV hybrid diesel systems

— DC
 — AC
 — Modbus TCP
 — SMA scope
 — Customer scope
 *with own BMS



By combining several of these schemes, higher power systems can be realized

Grid-connected functions

- Setpoints for active and reactive power
- Static grid support Q(U), (P(f) on request)
- Dynamic grid support (FRT)
- Active islanding detection (AID)
- High compatibility with different battery types

Compatible with energy management system functionalities

- External static grid supporting functions
- Ramp-rate control of PV power
- Peak shaving
- Energy shifting
- Genset optimization control
- Reducing necessary spinning reserve of gensets
- Battery start-up and stop sequence
- Operates the battery within optimal operation window



General Data

Table 6. General data — 6 to 7.5 tons — standard efficiency

	6 Tons	7.5 Tons	7.5 Tons
	T/YSC072H3,4,W	Single Compressor T/YSC090H3,4,W	Dual compressor T/YSC092H3,4,W
Cooling Performance^(a)			
Gross Cooling Capacity	75,000	92,500	94,800
EER ^(b)	11.2	11.2	11.2
Nominal cfm/AHRI Rated cfm	2,400/2,100	3,000/2,400	3,000/2,325
AHRI Net Cooling Capacity	71,000	87,000	90,000
IEER (T/Y) ^(c)	12.9 / 12.7	12.9 / 12.7	12.9/12.7 ^(d)
System Power (kW)	6.36	7.77	8.04
Compressor			
Number/Type	1/Scroll	1/Scroll	2/Scroll
Sound			
Outdoor Sound Rating (dB) ^(e)	89	89	91
Outdoor Coil			
Type	Microchannel	Microchannel	Microchannel
Configuration	Full Face	Full Face	Face-split
Tube Size (in.)	0.71	1.00	0.71
Face Area (sq. ft.)	16.91	16.91	17.31
Rows/FPI (Fins per inch)	1/23	1/21	1/23
Indoor Coil			
Type	Lanced	Lanced	Lanced
Configuration	Full Face	Full Face	Face-split
Tube Size (in.)	0.3125	0.3125	0.3125
Face Area (sq. ft.)	9.89	9.89	12.36
Rows/FPI (Fins per inch)	3/16	4/16	3/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection No./Size (in.)	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan			
Type	Propeller	Propeller	Propeller
No. Used/Diameter (in.)	1/26	1/26	1/26
Drive Type/No. Speeds	Direct/1	Direct/1	Direct/1
CFM	6,037	6400	6600
Motor HP	0.70	0.70	0.70
Motor RPM	1,100	1,100	1,100
Indoor Fan			
Type	FC Centrifugal	FC Centrifugal	FC Centrifugal ^(f)
No. Used/Diameter (in.)/Width (in.)	1/12x12	1/12x12	1/15x15 ^(g)
Drive Type/No. Speeds/RPM	Belt/Variable/1,750	Belt/Variable/1,750	Belt/Variable/1,750 ^(h)
Motor HP (Standard/Oversized)	1.0/2.0	1.0/3.0	1.0/3.0 ⁽ⁱ⁾
Motor Frame Size (Standard/Oversized)	56/56	56/56	56/56
Filters^(j)			
Type Furnished	Throwaway	Throwaway	Throwaway
Number Size Recommended	(4) 16x25x2	(4) 16x25x2	(4) 20x25x2
Refrigerant Charge^(k)			
lbs of R-410A	5.5	7.5	3.8/3.6
Heating Performance (Gas/ Electric Only)^(l)			
Heating Input			
Low Heat Input (Btu)	80,000	120,000	120,000
Mid Heat Input (Btu)	120,000	150,000/105,000	150,000/105,000
High Heat Input (Btu)	150,000/105,000	200,000/140,000	200,000/140,000
Heating Output			



Certified Test Report

ABB Inc.

Distribution Transformers

ABB PO: [REDACTED] Item: [REDACTED]
Stock Code: [REDACTED]
Customer Name: [REDACTED]
Customer Purchase Order: [REDACTED]
3PH 60 Hertz Coolant - MINERAL OIL
Winding High Voltage - DELTA BIL: 150
2000 KVA
34500 Volts
HV Taps : 36220 35360 34500 33640 32780

Mfg Serial Number : [REDACTED]
Project Name : [REDACTED]
PADMOUNT
K Factor: 1
Winding Low Voltage
2000 KVA
660Y Volts

Resistance, losses, impedance, efficiency and regulation corrected to 0 degrees C and are based on wattmeter reading unless otherwise stated. The resistance for 3 phase transformers is the sum of the 3 phases in series.

	Resistance(Ohms)		Iexc Amps	No-load Loss	Load Loss	Total Loss				
Test Date	HV	LV	%	@100%V			%Z	%R	%X	X/R
11/09/2017	17.40683	.00166	0.16	2,434	13,402	15,836	6.01	0.67	5.97	8.91
	Quoted Values						N/A			

Regulation @100%Load					
@PF	100%	90%	85%	80%	75%
	0.85	3.35	3.84	4.21	4.52

Temperature rise calculated from basic design data which has been verified by test results of similar unit (Serial Number = [REDACTED], KVA = 2000.0, High Voltage = 12470, Date = [REDACTED])

Winding Rise by Resistance in degree C					
Load	HV	LV	Guarantee	Top Fluid	Test Date
Base	50.8	50.5	55	52.5	[REDACTED]

Insulation Test Levels			
Applied Potential Test			
Winding	Rated Volts	Test Volts applied	Duration of test
HV	34500	50000	60 Sec
LV	660	10000	60 Sec

Induced Potential test:
Voltage = 1320
(Applied to Low Voltage for 7200 Cycles)

Efficiency				
125%	100%	75%	50%	25%
99.32	99.46	99.59	99.73	99.87

Sound Test : Test result from a similar unit

(Serial Number = [REDACTED], KVA = 2000, High Voltage = 12470, Date = [REDACTED])

ONAN(db)
50.1