S45W29290 Hwy 59 Waukesha, WI 53189

Solution Summary

Contact Information

Project :	CITY OF NAPLES NORTH AND SOUTH PUMP STATIONS
Solution Name :	NORTH PUMP STATION TRIPLEX 280HP
Spec Ref# :	
Description :	
Contact :	
Email :	

Prepared By

Name :	john lundahl
Company :	acf standby systems
Phone :	813-621-9671
Email :	j.lundahl@acfpower.com

Solution Type

Solution Type :	Stationary

Units

Units :	English

Environment

Ambient Temperature :	100 F / 38 C
Elevation :	1000 ft / 305 m

Engine

Duty :	Standby
Fuel :	Diesel

Electrical Configuration

Phase :	Three Phase
Frequency (Hz) :	60 Hz
Voltage (Nominal) :	480/277V (High Wye)
Voltage (Specific) :	480 volts

Market Region

Region :	US & Canada
Application:	Hospital

Generator Configuration

Sound (desired) :	No Requirement
Fuel Tank :	Sub Base UL 142
Run Time (desired) :	72 hr

Maximum Allowable Transients

Maximum Running Load :	90 %
Voltage Dip :	30.00 %
Frequency Dip :	15 hertz

Max Allowable Voltage Distortion (% THVD)

Continuous :	11 %
Momentary :	13 %

Load Sequence Configuration

Cyclic #1:	75 % After Largest
Cyclic #2:	75 % After Largest

S45W29290 Hwy 59 Waukesha, WI 53189

Generator and Load Summary

Selected Generator & Alternator

Product Family Method :	Auto Select
Product Family :	SD/MD Diesel
Sizing Method :	Auto Select
Generator :	1 x 600 kW, 18.1L
Quantity :	1
Alternator :	K0832124Y23 - 832 KW

Model
600 kW, 18.1L

600 kw, Diesel Genset -- Site rated 600 kw
18.1 L Engine with Upsized (K0832124Y23 - 832 KW) Alternator

Load Level		Transients		Harmonics	
Running :	87 %	Fdip (Hz):	1	THVD Cont:	6.6 %
Peak :	85	Vdip (%):	2.8	THVD Peak :	6.6 %

Load Summary -- Connected Load of 522.18 kW

Running		Transients		Harmonics	
kW:	522.18	kW (Step):	83.08	kVA:	563.57
kVA:	578.54	kW (Peak):	522.18	THID Cont:	12.5%
PF:	0.9	kVA (Step):	91.2	THID Peak :	12.5%

Solution Limits

Max Loading :	90 %	Fdip (Hz):	15	THVD Cont:	11 %
		Vdip (%):	30	THVD Peak :	13 %

Load List		Starting		Running		Harmonic Current Distortion			Limits	
Sequence	Description	kW	kVA	kW	kVA	Peak	Cont.	kVA	Vdip	Fdip
Step 1 (Concurrent)	Miscellaneous : Miscellaneous #1 1 X 15.00 kW @ 1.00 PF , Harmonics: THID = 0.00%	10	10	15	15	0 %	0 %	0	35.00 %	15 Hertz
Step 1 (Concurrent)	Motor : Pump 1 1 X 280.00 HP Code G (6 kVA/Hp) 12 Pulse Rectifier VFD Commercial(115%) Rated torque at start running at 100% ,	73.08	81.2	253.59	281.77	12.5 %	12.5 %	281.8	15.00 %	5 Hertz
Step 1 (Concurrent) Summary	All loads on (sequence starting) 268.6kW All loads on (sequence starting) 268.6 kW Application Peak	83.08	91.2	268.59	296.77	12.5 %	12.5 %	281.8	15 % 72 volts	8.3 % 5 hertz
Step 2 (Concurrent)	Motor : Pump 2 1 X 280.00 HP Code G (6 kVA/Hp) 12 Pulse Rectifier VFD Commercial(115%) Rated torque at start running at 100% ,	73.08	81.2	253.59	281.77	12.5 %	12.5 %	281.8	15.00 %	5 Hertz
Step 2 (Concurrent) Summary	All loads on (sequence starting) 253.6kW All loads on (sequence starting) 522.2 kW Application Peak	73.08	81.2	253.59	281.77	12.5 %	12.5 %	281.8	15 % 72 volts	8.3 % 5 hertz

Transient Analysis

Most difficult alternator transient requirements (Vdip)	
Sequence :	Step 1 (Concurrent)
Load :	Pump 1
Starting kVA:	91.2
Vdip Tolerance :	15.00 %
Vdip Expected :	*2.8 %

Most difficult engine transient requirements (Fdip)	
Sequence :	Step 1 (Concurrent)
Load :	Pump 1
Starting kVA:	83.08
Fdip Tolerance :	5
Fdip Expected :	0.97

Alternator Transient Analysis (Vdip)

Sequence	Allowable Vdip	Expected Vdip	Sequence Starting kVA	Largest Transient Load
Step 1 (Concurrent)	15.0 %	*2.83 %	91.2	Pump 1
Step 2 (Concurrent)	15.0 %	*2.48 %	81.2	Pump 2

Engine Transient Analysis (Fdip)

Sequence	Allowable Fdip	Expected Fdip	Sequence Starting kW	Largest Transient Load
Step 1 (Concurrent)	5	0.97	83.08	Pump 1
Step 2 (Concurrent)	5	0.85	73.08	Pump 2

Note: UPS that revert to battery on system transients do not establish a sequence frequency dip limit through they may impact the sizing. The sizing algorithm verfifies the engine can accept the UPS within its frequency tolerance.

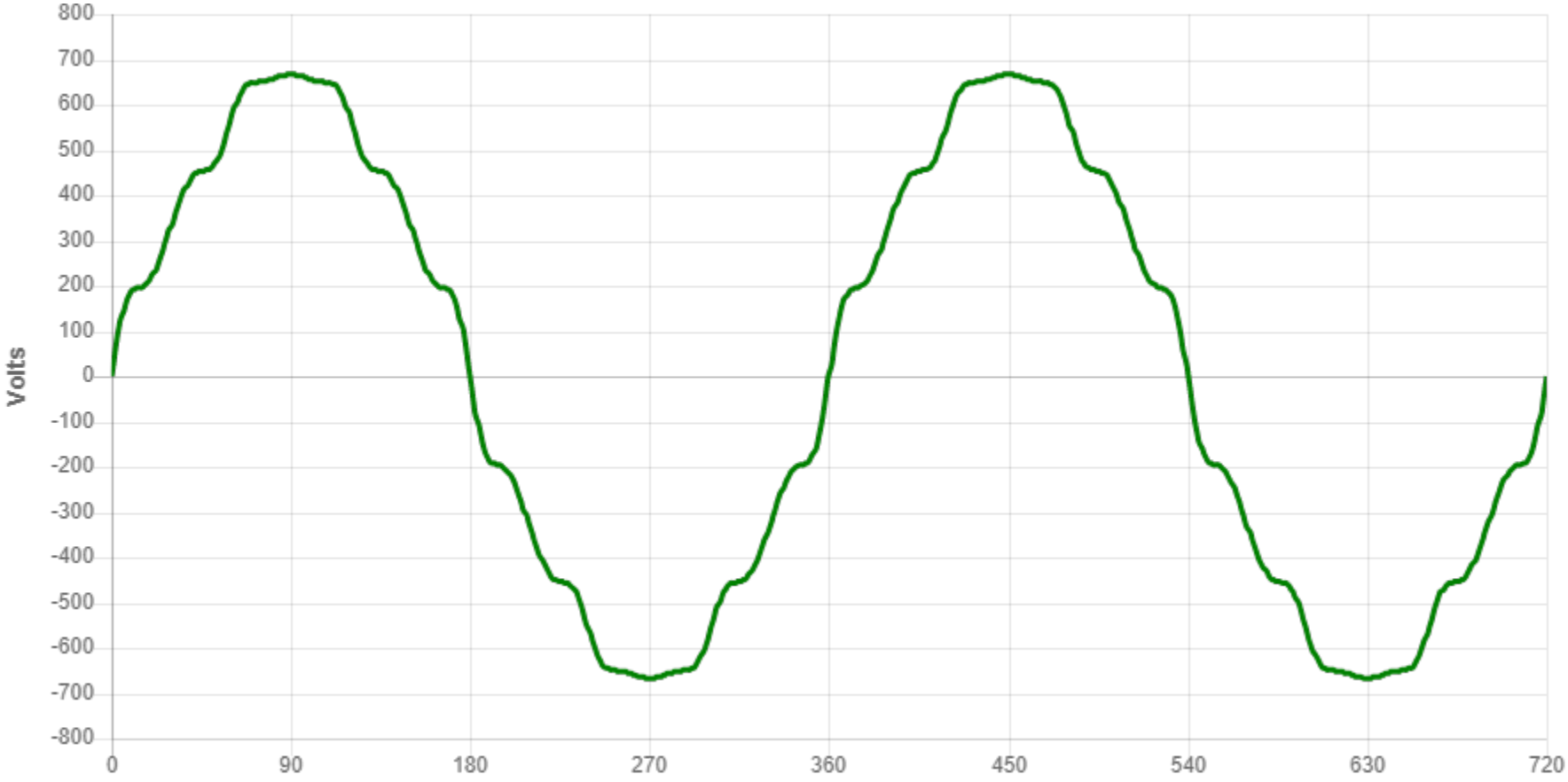
Harmonic Analysis

Harmonic Profile :	Application Total (running)	**Sequence**	(Total)
kVA Nonlinear Load:	563.5	**THID: 12.5 %**	THVD: 6.6 %
kVA Base (all non-linear):	563.57	**Selected sequence(s) harmonic alternator loading:**	70 %

Selected Harmonic Current and Voltage Profiles

Profile	3rd	5th	7th	9th	11th	13th	15th	17th	19th
Current	0 %	9.3 %	4.9 %	0 %	5.2 %	4 %	0 %	1.4 %	1.2 %
Voltage	0 %	3.1 %	2.3 %	0 %	3.9 %	3.5 %	0 %	0.8 %	1.2 %

S45W29290 Hwy 59 Waukesha, WI 53189



Harmonic Analysis

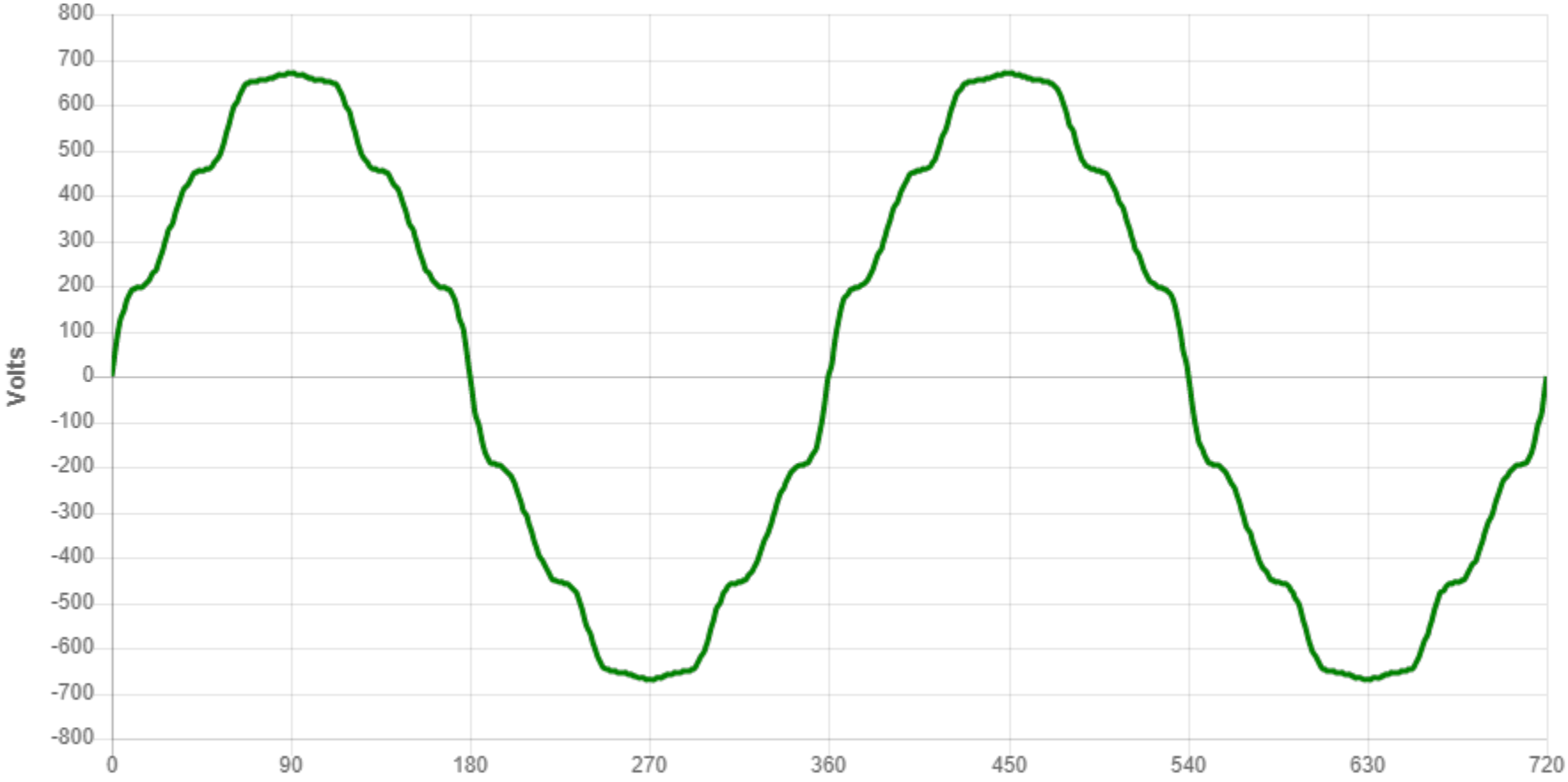
Harmonic Profile :	Application Total (peak)	**Sequence**	(Total)
kVA Nonlinear Load:	563.6	**THID: 12.5 %**	THVD: 6.6 %
kVA Base (all non-linear):	563.57	**Selected sequence(s) harmonic alternator loading:**	70 %

Selected Harmonic Current and Voltage Profiles

Profile	3rd	5th	7th	9th	11th	13th	15th	17th	19th
Current	0 %	9.3 %	4.9 %	0 %	5.2 %	4 %	0 %	1.4 %	1.2 %
Voltage	0 %	3.1 %	2.3 %	0 %	3.9 %	3.5 %	0 %	0.8 %	1.2 %

11/17/2022

S45W29290 Hwy 59 Waukesha, WI 53189



Gas Piping

Gas Pipe size only applies to gaseous fuel.

S45W29290 Hwy 59 Waukesha, WI 53189

Exhaust Piping

Generator Summary	
Sizing Method :	Auto Select
Pipe Size :	2.00"
Product Family :	SD/MD Diesel
Generator :	600 kW, 18.1L
Total Exahust Flow (ft3 / Min):	4980
Maximum Back Pressure (inches of water) :	28.96

Inputs	
Length of run (ft):	1
Number of Standard Elbows :	0
Number of Long Elbows (radius > 1.5 dia):	0
Number of 45 elbows :	0

Solution	
Pressure Drop (inches of water) :	0

*Piping pressure drop calculations only. Verify installation is performed per code requirements