APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0444 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☒ New ☐ Renewal

Manufacturer Information

Manufacturer: Cummins Power Generation

Manufacturer's Technical Representative: Steve Englund

Mailing Address: 1400 73rd AVE NE, Fridley, Minnesota 55432

Telephone: 763-574-5318 Email: steve.n.englund@cummins.com

Product Information

Product Name: QSK95 Diesel Generator Sets

Product Type: Generator Sets

Product Model Number: C3000 D6, C3000 D6e, C3250 D6, C3250 D6e, 3500 D6, C3500 D6e, and PCC3300 HMI
(List all unique product identification numbers and/or part numbers)

General Description: Diesel engine powered electrical generator sets, w/ controls, w/ and w/o radiator cooling system. Seismic enhancements made to the test units required to address anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Diesel powered electrical generator mounted on external isolators. PCC 3300 HMI is rigidly mounted to rigid structure.

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John P. Giuliano, PE

Mailing Address: 113 Main St, Bloomingdale NJ, 07403

Telephone: 973-838-1780 Email: john.giuliano@thevmcgroup.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant: Date: 8/21/15

Title: President Company Name: The VMC Group

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: The VMC Group

Name: Mr. Ken Tarlow California License Number: SE2851

Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814

Telephone: 916-449-9918 Email: ken.tarlow@thevmcgroup.com

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: U.S. Army Engineer Research and Development Center

Contact Name: Jim Wilcoski

Mailing Address: 2902 Newmark Drive, Champaign, IL 61826

Telephone: 217-373-6763 Email: james.wilcoski@usace.army.mil

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = [4.50 (S_{DS} = 2.0, z/h = 1.0), 1.80 (S_{DS} = 2.4, z/h = 0)] Spring Isolated
[1.50 (S_{DS} = 2.0, z/h = 1.0), 1.08 (S_{DS} = 2.4, z/h = 0)] Rigid

S_{DS} (Design spectral response acceleration at short period, g) = See Tables 1 and 2

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 2.0 (Spring Isolated); 6.0 (Rigid)

Ω_0 (System overstrength factor) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0 (S_{DS} = 2.0), 0.0 (S_{DS} = 2.4)

Equipment or Component Natural Frequencies (Hz) = See Attachments

Overall dimensions and weight (or range thereof) = See Attachments

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) = _____

S_{DS} (Design spectral response acceleration at short period, g) = _____

S_{D1} (Design spectral response acceleration at 1 second period, g) = _____

R (Response modification coefficient) = _____

Ω_0 (System overstrength factor) = _____

C_d (Deflection amplification factor) = _____

I_p (Importance factor) = 1.5

Height to Center of Gravity above base = _____

Equipment or Component Natural Frequencies (Hz) = _____

Overall dimensions and weight (or range thereof) = _____

Tank(s) designed in accordance with ASME BPVC, 2010: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☐ Manufacturer's Catalog

☐ Other(s) (Please Specify): _____

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature: _____ Date: October 9, 2015

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = See Above

Condition of Approval (if applicable): _____

Table 1 - Certified 60Hz Diesel Generator Set with Radiators

Model[1]	Skid Type	Power Rating [kW]	Dimensional Data				Engine	Alternator	Radiator	Controller	z/h = 1 S_{DS}(g)	z/h = 0 S_{DS}(g)	Tested / Interpolated / Extrapolated
			Max Length [in]	Max Width [in]	Max Height [in]	Max Weight [lbs]							
C3000 D6 / C3000 D6e[1]	P80	2500 - 3000	311	119	150	67,682	Cummins	Cummins	Young Touchstone	Cummins	2.00	2.40	**UUT-01**
	DIG		305	119	150	74,060					2.00	2.40	Interpolated
C3250 D6 / C3250 D6e (Note 1)	P80	2500 - 3250	322	125	150	70,218					2.00	2.40	Interpolated
	DIG		341	125	150	79,807					2.00	2.40	Interpolated
C3500 D6 / C3500 D6e[1]	P80	2750 - 3500	322	125	150	70,107					2.00	2.40	Interpolated
	DIG		341	125	150	79,807					2.00	2.40	**UUT-02**

Table 2 - Certified 60Hz Diesel Generator Set without Radiators

Model[1, 2]	Skid Type	Power Rating [kW]	Dimensional Data				Engine	Alternator	Radiator	Controller	z/h = 1 S_{DS}(g)	z/h = 0 S_{DS}(g)	Tested / Interpolated / Extrapolated
			Max Length [in]	Max Width [in]	Max Height [in]	Max Weight [lbs]							
C3000 D6 / C3000 D6e[1]	P80	2500 - 3000	239	82	118	56,218	Cummins	Cummins	N/A	Cummins	2.00	2.40	**Similar to UUT-01**
	DIG		250	99	118	63,544					2.00	2.40	Interpolated
C3250 D6 / C3250 D6e (Note 1)	P80	2500 - 3250	239	82	118	56,218					2.00	2.40	Interpolated
	DIG		250	99	118	63,544					2.00	2.40	Interpolated
C3500 D6 / C3500 D6e[1]	P80	2750 - 3500	239	82	118	56,218					2.00	2.40	Interpolated
	DIG		250	99	118	64,816					2.00	2.40	**Similar to UUT-02**

Table 3 - Certified PCC3300 HMI Pedestal Mounted

Model	Dimensions				Manufacturer	z/h = 1 S_{DS}(g)	z/h = 0 S_{DS}(g)	Tested / Interpolated / Extrapolated
	Max Length [in]	Max Width [in]	Max Height [in]	Max Weight [lbs]				
PCC3300 HMI (Pedestal Mounted)	20	20	52	64	Cummins	2.00	2.40	**UUT-03**

Notes

1) The only differences between the "e" and non-"e" models is software.

2) Generator sets listed in Table 2 are identical to those listed in Table 1 except that they lack a radiator.

3) UUT-01 & UUT-02 are tested on spring isolators.

Table 4 - Certified Subcomponents: Engine

Applicable Genset Model(s)	Manufacturer Model (Note 3)	Max Weight [lbs]	Manufacturer	Optional Engine Features	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / **C3500 D6** / C3500 D6e	QSK 95	29,321	Cummins	Duplex Fuel Filters Non-Duplex Fuel Filters Cartridge Lube Oil Filter DC Prelube Device Standard Electric Starter Redundant Electric Starter Coalescing Breather	**UUT-01, UUT-02**

Table 5 - Certified Subcomponents: Alternator

Applicable Genset Model(s)	Model Number	Manufacturer	Material	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e	P80 S	Cummins	Carbon Steel Laminations and Copper Windings	Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	P80 T			Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	P80 W			Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	P80 X			**UUT-01**
N/A	P80 Y			Interpolated
C3500 D6 / C3500 D6e	DIG C			Interpolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	DIG D			Interpolated
N/A	DIG E			Interpolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	DIG F			Interpolated
C3500 D6 / C3500 D6e	DIG G			**UUT-02**

Table 6 - Certified Subcomponents: Radiator

Applicable Genset Model(s)	Customer Part Number	Core Size [ft²]	Material	Manufacturer	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / **C3500 D6** / C3500 D6e	A049E404	84	Copper Core Carbon Steel Structure	Young Touchstone	**UUT-01**
	A048D643	94			**UUT-02**

Table 7 - Certified Subcomponents: Skid

Applicable Genset Model(s)	Material	Skid Type	Part Number	Manufacturer	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / **C3500 D6** / C3500 D6e	Structural Carbon Steel	P80	A047N790	Cummins	**UUT-01**
		DIG	A047Y181		**UUT-02**

Table 8 - Certified Subcomponents: Controller

Applicable Genset Model(s)	Model Number	Manufacturer	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / **C3500 D6** / C3500 D6e	PCC 3300	Cummins	**UUT-01, UUT-02**

Table 9 - Other Certified Subcomponents: Air Cleaner

Applicable Genset Model(s)	Description	Manufacturer	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / **C3500 D6** / C3500 D6e	Normal Duty	Cummins	**UUT-01**
	Heavy Duty		**UUT-02**

Table 10 - Certified Subcomponents: PCC3300 HMI

Applicable Genset Model(s)	Component	Decription	Material	Manufacturer	UUT / Interpolated / Extrapolated
C3000 D6 / C3000 D6e / C3250 D6 / C3250 D6e / C3500 D6 / C3500 D6e	HMI	HMI wrapper	ASTM A569 (mild steel)	Cummins	**UUT-03**
	Pedestal	Pedestal base	ASTM A36 (mild steel)		
		Pedestal upright	ASTM B221 6063 T-52 (Aluminum)		

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-01

VMA-49625-01

Model Line	Model Number	Manufacturer
3000-3500 kW QSK95 Generator Sets	C3000 D6	Cummins Power Generation

Product Construction Summary

Diesel powered electrical generator set 3000 kW. Carbon Steel base frame

Options / Subcomponent Summary

Engine: Cummins / QSK 95, Alternator: Cummins / P80X, Radiator: Young Touchstone / A049E404, Skid: Cummins / A047N790, Controller: Cummins / PCC 3300, Air Cleaner: Cummins / Normal Duty

UUT Properties

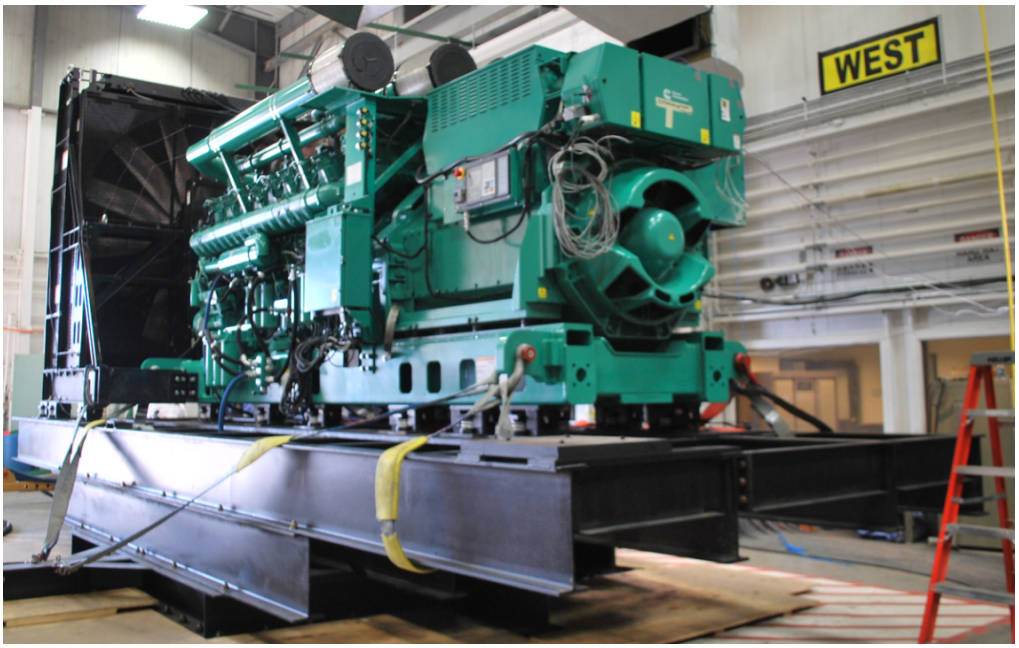
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
67,682	311.00	119.00	150.00	3.3	3.2	6.7

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2013	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54
		2.40	0.0	1.5	2.40	0.96	1.61	0.65

Test Mounting Details

Unit is mounted to test fixture using (18) VMC M2SSHX-1E spring isolators. Isolators are welded to the fixture.



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-02

VMA-49625-01

Model Line	Model Number	Manufacturer
3000-3500 kW QSK95 Generator Sets	C3500 D6	Cummins Power Generation

Product Construction Summary

Diesel powered electrical generator set 3500 kW. Carbon Steel base frame

Options / Subcomponent Summary

Engine: Cummins / QSK 95, Alternator: Cummins / DIG G, Radiator: Young Touchstone / A048D643, Skid: Cummins / A047Y181, Controller: Cummins / PCC 3300, Air Cleaner: Cummins / Heavey Duty

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
79,807	341.00	125.00	150.00	3.3	3.2	6.6

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2013	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54
		2.40	0.0	1.5	2.40	0.96	1.61	0.65

Test Mounting Details

Unit is mounted to test fixture using (20) Caldyn RJEHD spring isolators. Isolators are welded to the fixture.

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-03

VMA-49625-01

Model Line	Model Number	Manufacturer
HMI only on pedestal	PCC 3300 HMI	Cummins Power Generation

Product Construction Summary

ASTM A36 mild steel pedestal base, ASTM B221 6063 T-52 Aluminum pedestal upright, ASTM A569 mild steel HMI wrapper

Options / Subcomponent Summary

N/A

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
66	20.00	20.00	52.00	7.3	4.3	> 33.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2013	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.34	0.54
		2.40	0.0	1.5	2.40	0.96	1.61	0.65

Test Mounting Details

Unit is mounted to test fixture using (4) M12 Grade 8 Bolts.

The UUT was filled with contents and maintained structural integrity and functionality