Facilities Development Division www.oshpd.ca.gov/fdd
400 R Street. Suite 200, Sacramento, California 95811-6213 Phone (916) 440-8300 Fax (916) 654-2973

APPLICATION FOR PREAPPROVAL

SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0084-10

Check whether application is: NEW [X] RENEWAL [ ]

1.0

Caterpillar Electric Power Division	Jordan Levitt
Manufacturer	*Manufacturer's Technical Representative*

PO Box 61552, Mossville, IL 61552-0610

Mailing Address

309-578-7318	levitt_jordan_a@cat.com
Telephone	*E-mail Address*

2.0

Diesel Generator Set	Electrical Power Generator
Product Name	*Product Type*

C1.5, C2.2, C4.4, C6.6, C9, C15, C18, C27, C32, 3512C, 3516C, 3516C-HD, C175-16

Product model No (List all unique product identification numbers and/or serial numbers)

General Description: These are diesel powered electrical generators. C18 thru C175-16 shall be on external spring isolators anchored to structure without fuel tanks, and C1.5 thru C27 shall be rigid mounted on structure with or without UL 142 Fuel Tanks. Enclosure pre-approval is limited to C1.5 thru C32, enclosure for other generators shall require separate approval by OSHPD.

3.0

The VMC Group	John Wilson
Applicant Company Name	*Contact Person*

113 Main St, Bloomingdale NJ, 07403

Mailing Address

973-838-1780	jwilson@thevmcgroup.com
Telephone	*E-mail Address*

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

	7/15/2011
Signature of Applicant	*Date*
CEO	The VMC Group
Title	*Company Name*

Registered Design Professional Preparing the Report

4.0

The VMC Group
Company Name

Mr. Ken Tarlow | SE2851
Contact Name | *California License Number*

113 Main Street, Bloomingdale, NJ 07403
Mailing Address

973-838-1780 | ken.tarlow@thevmcgroup.com
Telephone | *E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

The VMC Group
Company Name

Mr. Ken Tarlow | SE2851
Contact Name | *California License Number*

113 Main Street, Bloomingdale, NJ 07403
Mailing Address

973-838-1780 | ken.tarlow@thevmcgroup.com
Telephone | *E-mail Address*

Anchorage Pre-Approval

6.0

☐ *Anchorage is pre-approved under OPA-*
(Separate application for anchorage pre-approval is required)

☒ Anchorage is not Pre-approved

Certification Method

70. ☒ *Testing in accordance with:* ☒ *ICC-ES AC-156* ☐ *Other (Please Specify):*

☐ *Analysis*

☐ *Experience data*

☐ *Combination of Testing, Analysis, and/or Experience Data (Please Specify):*

Testing Laboratory (if applicable)

8.0

UC San Diego | Gianmario Benzoni
Company Name | *Contact Name*

Dep't of Structural Eng, UCSD, La Jolla, CA 92093
Mailing Address

858-534-1432 | benzoni@ucsd.edu
Telephone | *E-mail:*

Testing Laboratory (Continued)

8.0

UC Berkeley	Wesley Neighbour
Company Name	*Contact Name*

1301 S. 46th St, Building 240, Richmond CA 94804

Mailing Address

510-665-3409	wdn@berkeley.edu
Telephone	*E-mail:*

Testing Laboratory (Continued)

8.0

Qualtech	Timothy A. Geers
Company Name	*Contact Name*

4600 East Tech Dr., Cincinnati OH 45245

Mailing Address

513-528-7900	tgeers@curtisswright.com
Telephone	*E-mail:*

Approval Parameters

9.0

Design in accordance with ASCE 7-05 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = $0.75S_{DS}$

S_{DS} *(Spectral response acceleration at short period) = See Attached Certified Product Summary*

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

R_p *(Equipment or component response modification factor) =2.0*

I_p *(Importance factor) = 1.5*

z/h (Height factor ratio)=0.0

Equipment or Component fundamental period(s) =See Attached

Building period limits (if any) =N/A

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

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: ☐ Yes ☒ No

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

S_{DS} *(Spectral response acceleration at short period) =*

S_1 *(Spectral response acceleration at 1 second period) =*

R (Response modification coefficient)=1.0

Ω_0 *(System overstrength factor) =1.0*

C_d *(Deflection amplification factor) =1.0*

I_p *(Importance factor) =1.5*

Height to Center of Gravity above base =

Equipment or Component fundamental period(s) = *Sec*

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: ☐ Yes ☒ No

10.0 ***List of attachments supporting the special seismic certification of equipment or components:***

☒ *Test Report* ☐ *Drawings* ☒ *Manufacturer's Catalog*

☐ *Calculations* ☐ *Others (Please Specify):*

11.0 ***OSHPD Approval*** *(For Office Use Only)*

Signature & Date 9/19/2011	**December 31, 2016** *Approval Expiration Date*
M. R. Karim, SHFR *Name & Title*	S_{DS} (g) = **See Section 9.0** z/h = **0.0** *Special Seismic Certification Valid Up to*

Condition of Approval (if any):

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Caterpillar 13 - 3100 kW Test Summary
Certified Product Summary

CATERPILLAR OSHPD OSP PRODUCT MATRIX

Series	Max Rating	Fuel Tank Option	Radiator	Engine	Alternator Terminal Box	Length (in)	Width (in)	Height (in)	Max. Weight (lbs)	Controls	External Isolators	UUT	S_{DS}
C1.5 Enclosed	13 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	66	34	69	2216	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C1.5 Open	13 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	55	22	42	1991	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C2.2 Enclosed	30KW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	83	38	66	2662	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C2.2 Open	30KW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	75	28	55	2225	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C4.4 Enclosed	100 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	111	44	87	6091	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C4.4 Open	100 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	103	44	80	5320	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C6.6 Enclosed	175 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	154	52	95	9805	Caterpillar EMCP Series Controller	No	Extrapolated	1.93
C6.6 Open	175 kW	Yes	Denso-Marston	Caterpillar	Leroy-Somer	130	52	81	8635	Caterpillar EMCP Series Controller	No	Tested Non-Isolated with & w/o Tank	1.93
C9 Enclosed	300 kW	Yes	Bearward	Caterpillar	Leroy-Somer	166	63	127	8405	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C9 Open	300 kW	Yes	Bearward	Caterpillar	Leroy-Somer	135	63	102	6775	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C15 Enclosed	550 kW	Yes	Bearward	Caterpillar	Leroy-Somer	231	81	138	12720	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C15 Open	550 kW	Yes	Bearward	Caterpillar	Leroy-Somer	231	81	83	10445	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C15 Enclosed	550 kW	Yes	Bearward	Caterpillar	Leroy-Somer	229	70	143	12620	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C15 Open	550 kW	Yes	Bearward	Caterpillar	Leroy-Somer	168	70	127	10185	Caterpillar EMCP Series Controller	No	Interpolated	1.93
C18 Enclosed	600 kW	Yes	Bearward	Caterpillar	Leroy-Somer	252	75	114	13650	Caterpillar EMCP Series Controller	No	Tested Non-Isolated with & w/o Tank	2.20
C18 Open	600 kW	Yes	Bearward	Caterpillar	Leroy-Somer	149	57	85	10800	Caterpillar EMCP Series Controller	Yes	Tested Non-Isolated	2.20
C18 Open	600 kW	No	Bearward	Caterpillar	Leroy-Somer	149	57	85	10800	Caterpillar EMCP Series Controller	Yes	Tested Isolated	2.20
C27 Open	800 KW	Yes	AKG	Caterpillar	Leroy-Somer	184	75	82	13706	Caterpillar EMCP Series Controller	No	Tested Isolated	2.10
C27 Enclosed	800 KW	Yes	AKG	Caterpillar	Leroy-Somer	329	91	144	22475	Caterpillar EMCP Series Controller	No	Tested Non-Isolated	2.10
C32 Enclosed	1000 KW	No	AKG	Caterpillar	Leroy-Somer	329	91	144	24729	Caterpillar EMCP Series Controller	No	Interpolated	2.10
C32	1000 KW	No	AKG	Caterpillar	Leroy-Somer	180	73	88	16314	Caterpillar EMCP Series Controller	Yes	Interpolated	2.10
3512C	1500 KW	No	Young Touchstone	Caterpillar	Leroy-Somer	260	94	111	37551	Caterpillar EMCP Series Controller	Yes	Interpolated	2.10
3516C	2000 KW	No	Young Touchstone	Caterpillar	Leroy-Somer	292	105	129	45557	Caterpillar EMCP Series Controller	Yes	Interpolated	2.10
3516C HD	2500 KW	No	Young Touchstone	Caterpillar	Leroy-Somer	301	105	129	48362	Caterpillar EMCP Series Controller	Yes	Tested Isolated	2.10
C175-16	3100 KW	No	Young Touchstone	Caterpillar	Leroy-Somer	330	120	142	62100	Caterpillar EMCP Series Controller	Yes	Extrapolated	2.10

C175-16 is offered with a remote radiator option, not covered under this OSP
Weights and dimensions for enclosed C27 and C32 include 2000 gal fuel tank
All base construction and enclosures are carbon steel
All Units tested at z/h = 0.0

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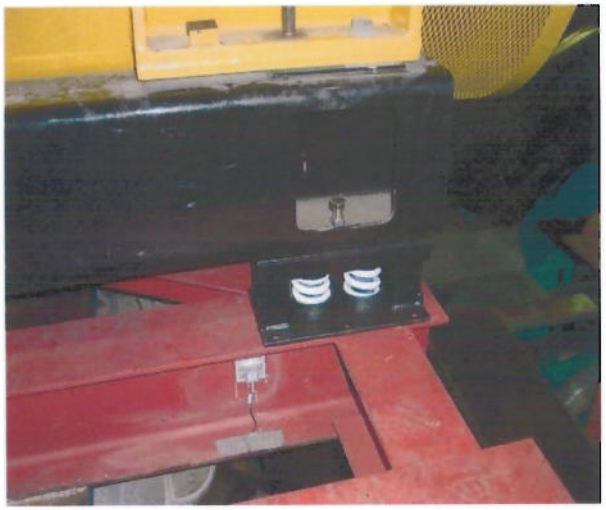
Caterpillar 800 - 3100 kW Test Summary

Unit Under Test - Summary

Control Panel Test - Summary

Model	Mounting	Length	Width	Height	Weight	Report Number	UUT # (From Test Report)	Lowest Natural Frequencies		
								S-S; X	F-B; Y	Vert; Z
3500 Remote	Wall Mounted	25	12	40	170	SRMD-2010-07	4	7.69	5.03	10.87
C175 LV	Base Mounted with or without Isolators	58	28	21	1000	Q0021	2	7.60	1.40	7.80

UUT's were tested with Control Panels. The 3500 Remote panel is remotely mounted for use with the 3500 Series, and the C175 LV is a Low Voltage



Unit Mounted onto The VMC Group M2SSH Isolators

Control Panel Mounted to Structural Fixture

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Caterpillar 800 - 3100 kW Test Summary

Unit Under Test - Summary

Model	kW	Component Summary	Engine	Alternator	Radiator	Enclosure Material	Isolation System	Fuel Tank	Length	Width	Height	Weight	Report Number	UUT # (From Test Report)	Lowest Natural Frequencies		
															S-S; X	F-B; Y	Vert; Z
3516C HD	2500	Carbon Steel	Caterpillar	Leroy-Somer	Young Touchstone	N/A	M2SSH	None	301	105	129	48400	SRMD-2010-07	1	2.73	2.16	1.21
C27	800				AKG	N/A	M2SS	None	184	75	82	13700		2	2.56	1.86	2.02
C27	800					Carbon Steel	None	Empty	237	88	144	28650		3	5.29	3.61	0.37
C27	800						None	Full	237	88	144	36775		3	4.02	3.66	5.53

C3516 Mounted onto The VMC Group M2SSH Isolators

Enclosed C27 Mounted on UL142 Fuel Tank

Caterpillar 175 - 600 kW Test Summary

Unit Under Test - Summary

Model	Rating	External Isolated	Fuel Tank	Enclosure	UUT	Laboratory	Report #	S_{DS}	z/h	Lowest Natural Frequency Hz.		
										S-S; X	F-B; Y	Vert; Z
C6.6 Open	175 kW	No	NA	No	Test #5	Qualtech NP	Q1110.0	1.93	0	5.5	7.3	8.6
C6.6 Open	175 kW	No	Empty	No	Test #1	Qualtech NP		1.93	0	NA	NA	NA
C6.6 Open	175 kW	No	Full	No	Test #2	Qualtech NP		1.93	0	5.6	4.9	7.9
C18 Enc	600 kW	No	Empty	Yes	UUT2A	UC Berkeley	STI/2011-05	2.2	0	5.8	6.7	8.2
C18 Enc	600 kW	No	Full	Yes	UUT2B	UC Berkeley		2.2	0	5.9	6.7	7.8
C18 Open	600 kW	No	NA	No	UUT1A	UC Berkeley		2.2	0	6.2	7.3	8.3
C18 Open	600 kW	Yes	NA	No	UUT1B	UC Berkeley		2.2	0	2.6	3.5	5.3

Tests #1 & #2, hard mounted on a tank

Tests #5, hard mounted onto table

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Caterpillar 175 - 600 kW Test Summary

Unit Under Test - Summary

UUT 1A, No tank, bolted to table

UUT 2A & 2B, Enclosed, on tank, bolted to table

UUT 1B, No tank, on VMC MSSH-1E Isolators

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