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– 0109-10

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

1.0 **Jefferson Electric Corporation** — *Manufacturer*

Dan Allen — *Manufacturer's Technical Representative*

9650 South Franklin Drive, Franklin WI 53132-8847 — *Mailing Address*

(414) 858-0802 — *Telephone*

dallen@jeffersonelectric.com — *E-mail Address*

2.0 **Transformer Product Family** — *Product Name*

Dry-Type Transformer — *Product Type*

Various - See Attachment — *Product model No (List all unique product identification numbers and/or serial numbers)*

General Description: Rigid floor and wall mounted Dry-Type transformer family. Including a range of KVA ratings, mounting types, construction materials, enclosure types, and potted or ventilated construction. (See attachment for details)

3.0 **Tobolski Watkins Engineering, Inc.** — *Applicant Company Name*

Derrick A. Watkins, S.E. — *Contact Person*

3710 Ruffin Road, San Diego, CA 92123 — *Mailing Address*

858-381-5843 — *Telephone*

dwatkins@tobolskiwatkins.com — *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.

Derrick Watkins — *Signature of Applicant*

05/06/2011 — *Date*

Vice President — *Title*

Tobolski Watkins Engineering, Inc. — *Company Name*

4.0 *Registered Design Professional Preparing the Report*

Tobolski Watkins Engineering Inc.
Company Name

Matthew J. Tobolski, Ph.D, P.E. — *Contact Name*
C 72806 — *California License Number*

3710 Ruffin Road, San Diego, CA 92123
Mailing Address

858-381-5843 — *Telephone*
dwatkins@tobolskiwatkins.com — *E-mail Address*

5.0 *California Licensed Structural Engineer Review and Acceptance of the Report*

Tobolski Watkins Engineering Inc.
Company Name

Derrick A. Watkins, S.E. — *Contact Name*
S 5257 — *California License Number*

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858-381-5843 — *Telephone*
dwatkins@tobolskiwatkins.com — *E-mail Address*

6.0 *Anchorage Pre-Approval*

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

☒ Anchorage is not Pre-approved

7.0 *Certification Method*

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

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

8.0 *Testing Laboratory (if applicable)*

Clark Dynamic Test Laboratory, Inc. — *Company Name*
J.R. Antenucci — *Contact Name*

1801 Route 51 South, Building 8, Jefferson Hills, PA 15025
Mailing Address

412-387-1001 — *Telephone*
jrantenucci@clarkdynamic.com — E-mail:

9.0 *Approval Parameters*

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

Design Basis of Equipment or Components (F_p/W_p) = ***0.72 S_{DS}***

S_{DS} (Spectral response acceleration at short period) = ***2.0g or 1.6g see Attachment Table # 1.***

a_p (In-structure equipment or component amplification factor) = ***1.0***

R_p (Equipment or component response modification factor) = ***2.5***

I_p (Importance factor) = ***1.5***

z/h (Height factor ratio)= ***1.0***

Equipment or Component fundamental period(s) = ***See Attachment***

Building period limits (if any) = ***None***

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

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)*

5/27/2011	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
M. R. Karim, SHFR	S_{DS} (g) = **See Section 9.0** z/h = **1.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any):

ATTACHMENT A - OSP Submittal: Jefferson Transformers

TABLE 1 - Seismically Qualified Product List

Group	Phase	Encapsulated	Mount	Enclosure	Rating (KVA)	Max. Weight (lbs)	Height (in)	Width (in)	Depth (in)	Testing Required	Qualified Level
1	Single	Encapsulated	Wall	NEMA 3R	1.5	32	12.5	6.7	5.3	Interpolated	Sds=2.0 z/h=1.0
					2	40	12.5	6.7	5.3		
					3	68	14.6	7.6	7.2		
					5	104	14.6	7.6	7.2		
					7.5	126	16.1	10.6	8.6		
					10	185	16.1	10.6	8.6		
					15	245	21.1	13.7	10.1		
					25	385	21.1	13.7	10.1	UUT-3, NEMA 3R Copper	
2	Single	Encapsulated	Wall	NEMA 3R	7.5	107	16.1	10.6	8.6	UUT-2, NEMA 3R Aluminum	Sds=2.0 z/h=1.0
					10	157	16.1	10.6	8.6	Interpolated	
					15	208	21.1	13.7	10.1		
					25	327	21.1	13.7	10.1		
2a	Three	Encapsulated	Floor	NEMA 3R	3	110	13.1	15.1	8.1	Interpolated	Sds=2.0 z/h=1.0
					6	140	13.1	15.1	8.1		
					9	190	15.1	19.0	9.1		
					15	245	15.1	19.0	9.1		
3	Three	Encapsulated	Floor	NEMA 3R	30	1,062	37.0	25.3	12.8	Interpolated	Sds=2.0 z/h=1.0
					45	1,182	37.0	25.3	12.8		
					75	1,320	37.0	25.3	12.8	UUT-1, NEMA 3R Aluminum	
4	Single	Ventilated or Open Core/Coil	Floor	NEMA 1 or NEMA 3R	1	56	18.0	13.0	12.0	UUT-4, NEMA 1 Copper	Sds=2.0 z/h=1.0
					2	67	18.0	13.0	12.0	Interpolated	Sds=1.6 z/h=1.0
					3	85	18.0	13.0	12.0		
					5	104	18.0	13.0	12.0		
					7.5	155	24.0	15.0	14.0		
					10	188	24.0	15.0	14.0		
					15	211	27.0	15.0	15.0		
					25	298	29.0	17.0	17.0		
					37.5	451	31.0	18.0	20.0		
					50	538	32.0	20.0	22.0		
					75	691	34.0	22.0	22.0		
					100	844	36.0	24.0	22.0		
					167	1,148	46.0	30.0	35.0		
4a	Single	Totally Enclosed Non Ventilated	Floor	NEMA 3R	1	67	18.0	13.0	12.0	Interpolated	Sds=1.6 z/h=1.0
					2	104	18.0	13.0	12.0		
					3	155	18.0	13.0	12.0		
					5	188	21.0	17.0	14.0		
					7.5	211	21.0	17.0	14.0		
					10	298	25.0	22.0	17.0		
					15	451	25.0	22.0	17.0		
					25	538	32.0	27.0	21.0		
					37.5	691	38.0	29.0	23.0		
					50	844	42.0	23.0	26.0		
					75	1,235	42.0	23.0	26.0		
					100	2,001	46.0	35.0	30.0		
					167	3,340	60.0	48.0	33.0		

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5	Three	Ventilated or Open Core/Coil	Floor	NEMA 1 or NEMA 3R	1	59	18.0	13.0	12.0	Interpolated	Sds=1.6 z/h=1.0
					2	78	18.0	13.0	12.0		
					3	101	18.0	13.0	12.0		
					6	144	18.0	13.0	12.0		
					9	199	21.0	17.0	14.0		
					12	243	21.0	17.0	14.0		
					15	250	22.0	19.0	16.0		
					30	350	25.0	22.0	17.0		
					45	500	28.0	25.0	18.5		
					75	740	28.0	25.0	18.5		
					112.5	930	38.0	29.0	23.0		
					150	1,210	42.0	33.0	26.0		
					225	1,500	46.0	35.0	30.0		
					300	2,125	52.0	35.0	30.0		
					500	3,090	60.0	48.0	33.0		
					750	4,800	66.0	56.0	39.0		
					1000	5,500	71.0	64.0	44.0	UUT-5, NEMA 3R Aluminum	
5a	Three	Totally Enclosed Non Ventilated	Floor	NEMA 3R	1	78	18.0	13.0	12.0	Interpolated	Sds=1.6 z/h=1.0
					2	144	18.0	13.0	12.0		
					3	166	18.0	13.0	12.0		
					6	243	21.0	17.0	14.0		
					9	300	21.0	17.0	14.0		
					12	350	25.0	22.0	17.0		
					15	350	25.0	22.0	17.0		
					30	600	32.0	27.0	21.0		
					45	795	38.0	29.0	23.0		
					75	1,210	42.0	33.0	26.0		
					112.5	1,500	46.0	35.0	30.0		
					150	2,125	52.0	35.0	30.0		
					225	3,090	60.0	48.0	33.0		
					300	4,800	66.0	56.0	39.0		
					500	5,500	71.0	64.0	44.0		

Notes:

1) Qualification level may increase for mounting locations within structure with z/h<1.0.
2) Qualified units can be constructed of aluminum or copper windings
3) ~~Open core and coil style~~ Tranformers are certified for direct mounting to structure only.

TABLE 2 - Test Unit Summary

Test Unit	Natural Frequencies (Hz)			Level Qualified			UUT Weight (lbs)
	F-B	S-S	V	S_{DS}	z/h	F_p/W_p	
UUT-1	15.6	20.8	N/A	2.0	1	1.44	1,110
UUT-2	32.5	N/A	28.3				125
UUT-3	N/A	N/A	28.3				320
UUT-4	15.6	20.8	25.1				57
UUT-5	7.7	6.2	32.9	1.6		1.15	4,700

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UUT – 1

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0068-CO-001

Manufacturer: Jefferson Electric

Model Line: Dry Type Transformers

Model Number: 413-1234-800

Product Construction Summary:
NEMA 3R. Painted carbon steel enclosure.

Options/Subcomponent Summary:
75 kVA. 3 phase. Aluminum Windings. Encapsulated.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,110	12.8	25.3	37.0	15.6	20.8	>30.0

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}
IBC 2009	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.8g	0.4g

Test Mounting Details:

Unit is non-isolated floor mounted using (4) 1/2"-13 grade 5 bolts, washers, and lock washers.

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6/10

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UUT – 2

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0068-CO-001

Manufacturer: Jefferson Electric

Model Line: Dry Type Transformers

Model Number: 411-0131-277

Product Construction Summary:
NEMA 3R. Painted carbon steel enclosure.

Options/Subcomponent Summary:
7.5 kVA. Single phase. Aluminum Windings. Encapsulated.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
125	8.6	10.6	16.1	>30.0	>30.0	28.3

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}
IBC 2009	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.8g	0.4g

Test Mounting Details:

Unit is non-isolated wall mounted using (4) 1/4"-20 grade 5 bolts, washers, and lock washers.

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UUT – 3

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0068-CO-001

Manufacturer: Jefferson Electric

Model Line: Dry Type Transformers

Model Number: 411-1187-804

Product Construction Summary:
NEMA 3R. Painted carbon steel enclosure.

Options/Subcomponent Summary:
25 kVA. Single phase. Copper Windings. Encapsulated.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
320	10.1	13.7	21.1	>30.0	>30.0	28.3

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}
IBC 2009	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.8g	0.4g

Test Mounting Details:

Unit is non-isolated wall mounted using (4) 1/4"-20 grade 5 bolts, washers, and lock washers.

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UUT – 4

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0068-CO-001

Manufacturer: Jefferson Electric

Model Line: Dry Type Transformers

Model Number: 421-8071-000

Product Construction Summary:
NEMA 1. Painted carbon steel ventilated enclosure.

Options/Subcomponent Summary:
1 kVA. Single phase. Copper Windings.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
57	12.0	13.0	18.0	15.6	20.8	25.1

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}
IBC 2009	ICC-ES AC 156	2.0g	1.0	1.5	3.2g	2.4g	1.8g	0.4g

Test Mounting Details:

Unit is non-isolated Floor mounted using (4) 1/2"-13 grade 5 bolts, washers, and lock washers.

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UUT – 5

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2010-0068-CO-001

Manufacturer: Jefferson Electric

Model Line: Dry Type Transformers

Model Number: 424-R001-003

Product Construction Summary:
NEMA 3R. Painted carbon steel ventilated enclosure.

Options/Subcomponent Summary:
1000 kVA. 3 phase. Aluminum Windings.

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
4,700	44.0	64.0	71.0	7.7	6.8	33.1

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}
IBC 2009	ICC-ES AC 156	1.6g	1.0	1.5	2.56g	1.92g	1.07g	0.43g

Test Mounting Details:

Unit is non-isolated Floor mounted using (4) 1/2"-13 grade 5 bolts, washers, and lock washers.

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10/10