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 – 0103 – 10

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

1.0

Powell Industries — *Manufacturer*

Linn Cooper — *Manufacturer's Technical Representative*

12305 Kurland Dr., Houston, Texas 77034 — *Mailing Address*

713-383-5030 — *Telephone*

Linn.Cooper@powellind.com — *E-mail Address*

2.0

Power/Vac Medium Voltage Switchgear — *Product Name*

MV Switchgear — *Product Type*

Power/Vac units are custom-made; switchgear units' product IDs are prefixed with "PV." — *Product Model No. (List all unique product identification numbers and/or serial numbers)*

General Description: Floor-mounted Medium Voltage (4760V – 15000V) Metalclad Switchgear in 11ga HRPO steel enclosures, containing copper bus bars, 1200-3000A breakers, porcelain or poly glass tubes, and current, potential, & control power transformers. Tested metering section for PG&E is included.

3.0

Powell Industries — *Applicant Company Name*

Linn Cooper — *Contact Person*

12305 Kurland Dr., Houston, Texas 77034 — *Mailing Address*

713-383-5030 — *Telephone*

Linn.Cooper@powellind.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.

Signature of Applicant

4/28/2011 — *Date*

General Manager — *Title*

Powell Industries — *Company Name*

Registered Design Professional Preparing the Report

4.0

W. E. Gundy & Associates
Company Name

William E. Gundy | CE-26539
Contact Name | *California License Number*

P.O. Box 2900; Hailey, ID 83333
Mailing Address

208-788-5989 | wegai@mindspring.com
Telephone | *E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0

Forell-Elsesser Engineers, Inc.
Company Name

Marco Scanu, SE | S4454
Contact Name | *California License Number*

160 Pine St., 6th Flr., San Francisco, CA 94111
Mailing Address

415-837-0700 | m.scanu@forell.com
Telephone | *E-mail Address*

Anchorage Pre-Approval

6.

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

☒ Anchorage is not Pre-approved

Certification Method

7. ☒ *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.

Wyle Laboratories | Don Davis
Company Name | *Contact Name*

7800 Highway 20 West, Huntsville, AL 35806
Mailing Address

256-837-4411 | don.davis@wyle.com
Telephone | E-mail:

2/11

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) = 1.42g

S_{DS} *(Spectral response acceleration at short period)* = 1.89g

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

R_p *(Equipment or component response modification factor)* = 6.0

I_p *(Importance factor)* = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component fundamental period(s) = See attachment, "Resonant Frequency Summary"

Building period limits (if any) = N/A

Overall dimensions and weight (or range thereof) = See attachment, "Product Range Summary"

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*	☒	*Other (Please Specify):*	SE Acceptance Letter, Product Range Summary, CBC 2010 & AC156 Requirements Checklist	

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

4/28/2010	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
Chris Tokas, SHFR	S_{DS} (g) = **1.89** z/h = **1.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any): **Approval of Utility Metering Section is limited to tested unit only and for the outdoor configuration tested (see attached pages # 9 through # 11). Total weight of switchgear, considering all contiguous sections, shall not exceed 8,850 lbs.**

3/11

OSP APPLICATION
Powell Industries
Product Range Summary

Powell Industries - Power/Vac Medium Voltage Switchgear
Product Range Summary

	Mounting	Width	Depth	Height	Weight	Notes
Sections						
2-High Breakers	Floor	36 in	94 in	95 in	4275 lbs	1,2,3
Auxiliary Vertical	Floor	36 in	94 in	95 in	4125 lbs	1,2,3
Metering Section (PG&E)	Floor	48 in	94 in	95 in	3875 lbs	1,2

Notes

1. All enclosures are 11ga HRPO steel, NEMA Types 1 and 3R. Type 3R differs by the addition of a drip roof.
2. Certification is for sections with max. 3000A breakers.
3. Breaker & Auxiliary sections have a copper bus bar.

INTERNAL COMPONENTS	Weight	Tested?
1200A breaker by Powell	550 lbs	tested
2000A breaker by Powell	650 lbs	tested
3000A breaker by Powell	780 lbs	tested
CPT3-60 15kVA Control Power Transformer by GE ITI	290 lbs	interpolated
CPT5-95 15kVA Control Power Transformer by GE ITI	290 lbs	tested (13.8kV)
Model 780 Standard Accuracy Current Transformers by GE ITI	30 lbs	tested
Model 785 High Accuracy Current Transformers by GE ITI	58 lbs	tested (2000:5 current ratio)
JKM-5C Bar Type Current Transformers by GE ITI	53 lbs	tested
PTG5 15kV Potential Transformers by GE ITI	85 lbs	tested (13.8kV)

FORELL/ELSESSER ENGINEERS, INC.
160 Pine Street, 6th Floor
San Francisco, CA 94111

4/11

Powell Industries - Switchgear Units
Resonant Frequency Summary

	Specimen No. 1 Floor-Mounted - 8,850 lbs (EUT1)		Specimen No. 2 Floor-Mounted - 8,000 lbs (EUT2)	
Direction	Frequency	Period	Frequency	Period
Front-Back	9.0 Hz	0.11 sec	8.9 Hz	0.11 sec
Side-Side	6.5 Hz	0.15 sec	**5.1 Hz**	**0.20 sec**
Vertical	9.2 Hz	0.11 sec	9.2 Hz	0.11 sec

FORELL/ELSESSER ENGINEERS, INC.
Structural Engineers
160 Pine St., 6th Floor
San Francisco, CA 94111

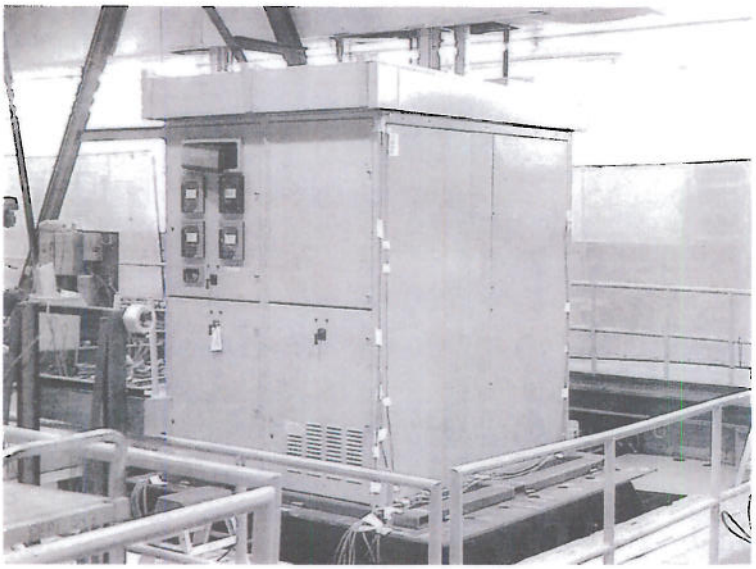
5/11

OSP APPLICATION
Powell – MV Switchgear

Date: 4/28/2011

TEST SUMMARY

Test Sample #1 (EUT1)



Powell Medium Voltage Switchgear – 2 sections, floor-mounted

Section 101 – 2-High Breaker Section
11ga HRPO steel enclosure
Copper bus bar
Porcelain & Poly Glass tubes
1200A breaker by Powell
2000A breaker by Powell
Model 780 Standard accuracy current transformers by GE ITI (x12)
36"W x 94"D x 95"H
4,725 lbs

Section 102 – Auxiliary Vertical Section
11ga HRPO steel enclosure
Copper bus bar
Porcelain & Poly Glass tubes
3000A breaker by Powell
Model 780 Standard accuracy current transformers by GE ITI (x6)
13.8kV CPT5-95 15kVA control power transformer by GE ITI (line connected)
13.8kV PTG5 15kVA potential transformer by GE ITI (x3, line connected)
36"W x 94"D x 95"H
4,125 lbs

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OSP APPLICATION
Powell – MV Switchgear

Date: 4/28/2011

TEST SUMMARY

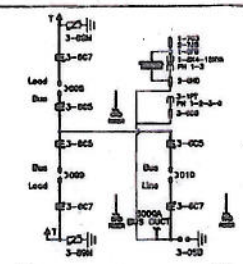
Test Sample #2 (EUT2)

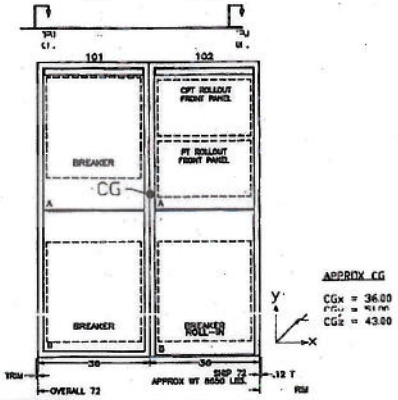
Powell Medium Voltage Switchgear – 1 Switchgear section, 1 Metering section, floor-mounted

Section 201 – Auxiliary Vertical Section
11ga HRPO steel enclosure
Copper bus bar
Porcelain & Poly Glass tubes
2000A tiebreaker by Powell
2000A upper tie by Powell
Model 785 High accuracy current transformers by GE ITI (x3)
13.8kV PTG5 15kVA potential transformer by GE ITI (x3, base connected)
13.8kV CPT5-95 15kVA control power transformer by GE ITI (x3, bus connected)
36"W x 94"D x 95"H
4,125 lbs

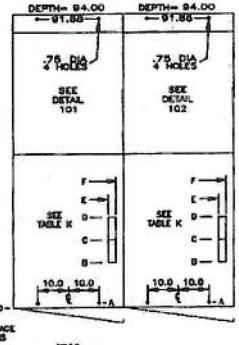
Section 202 – PG&E Metering Section
11ga HRPO steel enclosure
48"-wide PG&E Metering Stack, 13.8kV
JKM-5 bar type curent transformers by GE (x3)
48"W x 94"D x 95"H
3,875 lbs

7/11





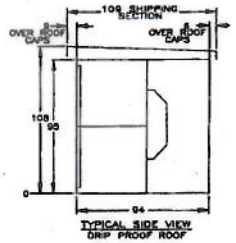
RECOMMENDED MIN. REAR AISLE SPACE 36.00

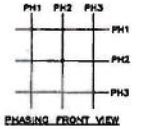


MIN. SIDE AISLE 33.00

RECOMMENDED MIN. AISLE SPACE 78.00 TO REMOVE BREAKERS

		A	B	D	E	F
ALL	ROLL-IN	8.00	8.00	10.0	10.0	6.00	2.00
ALL	ALL OTHER	5.13	8.00	10.0	10.0	3.00	2.00
ALL	ROLL-IN	8.00	8.00	10.0	10.0	5.13	1.00
ALL	ROLLOUT	5.13	8.00	11.0	11.0	5.00	3.00
ALL	ALL OTHER	5.13	8.00	10.0	10.0	3.00	2.00





G.E. SUB. 01
CUST. SUB. MV SWGR

GE CONSUMER & INDUSTRIAL

THIS DRAWING NOT TO SCALE | REV. L | 0209D4143 SH.NO. 1 OF 1 | PowerVac Switchgear SEISMIC OUTLINE DRAWING | REQUISITION: 610-99009-3-DUR | SHOP ORDER: 971099

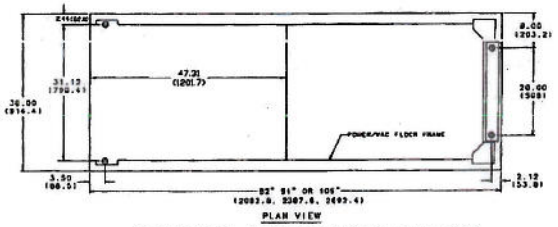
CUSTOMER: PG and E SEISMIC TEST
CUSTOMER ORDER #
STATION: JOHN TONE NATH VENKIT
LOCATION: TECHNOLOGY PROJECT
CONTRACTOR:
CONSULTANT:
DISTRIBUTOR:
DISTRIBUTOR ORDER #
CONSTRUCTION: Indoor
RATED: 13800V-3PH-3W-60HZ-50kA
MAIN BUS: LU001 – 4000A/CU, LU002 – 2000A/CU
NEUT BUS: LU001 – N/A, LU002 – N/A
GRD. BUS: LU001 – 600A/CU, LU002 – 600A/CU
ANSI SHORT CIRCUIT RATING: 50kA
BUS BRACING:
G.E. SUB. NO.:
EQUIPMENT: PowerVac Switchgear

PRIMARY DEVICE TABLE

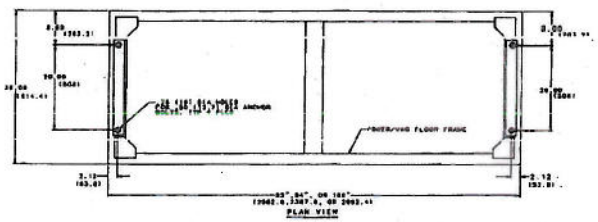
SECT AND COMPT	SUMMARY	Mkd	TYPE / CAT #	RATING	CT TOP 1st. SET	CT TOP 2nd. SET	CT BOT 1st. SET	CT BOT 2nd. SET
101A	0197A1067	008	PVED1A1A2A220201A1 ML-1S	1200	3-600:5A		3-400:5A	
101B	0197A1067	009	PVEA3A1A2A220201A1 ML-1S	3000	3-600:5A		3-600:5A	
102B	0197A1067	010	PVED4A1A2A220201A2ML-1SH	3000	3-400:5A		3-600:5A	

CABLE SCHEDULE

CABLES/TERMINALS		
PER PHASE	NEUTRAL	GROUND
2-500MCM-ONX		
2-500MCM-ONX		



MOUNTING ARRANGEMENT FOR 102



MOUNTING ARRANGEMENT FOR 101

NOTES :

DATE OF TEST = NOV 2005
TEST LOCATION = WYLE LABS, HUNTSVILLE, AL.

MOUNTING TO TABLE
4 x 1/2"-13 GR 5 BOLTS PER STACK

MAJOR COMPONENTS

101--- 2000A BREAKER---600 LBS.
101--- 1200A BREAKER---500 LBS.
102--- CPT ROLLOUT----400 LBS
102--- PT ROLLOUT-----400 LBS.
102--- 3000A BREAKER-- 700 LBS.

DATA FOR 5% CRITICAL DAMPING	
TOTAL WEIGHT	W = 8,650 LBS
MAXIMUM DEFLECTION AT TOP OF GEAR	dss = .87 INCHES dfb = .47 INCHES
QUALIFIED BY :	TIME HISTORY SHAKE TABLE TEST IEEE-693-1997 HIGH X 1.4 IBC-2003 Sa=165% 50s=1.1g
RESONANCE FREQUENCIES	fss = 6.6 HZ ffb = 9.0 HZ
MAXIMUM REATION TO ANY BOLT (DEAD LOAD +/- SEISMIC)	Vss = 1,892 LBS (SHEAR) Vfb = 1,892 LBS (SHEAR) Tv = 9,037 LBS (UP)

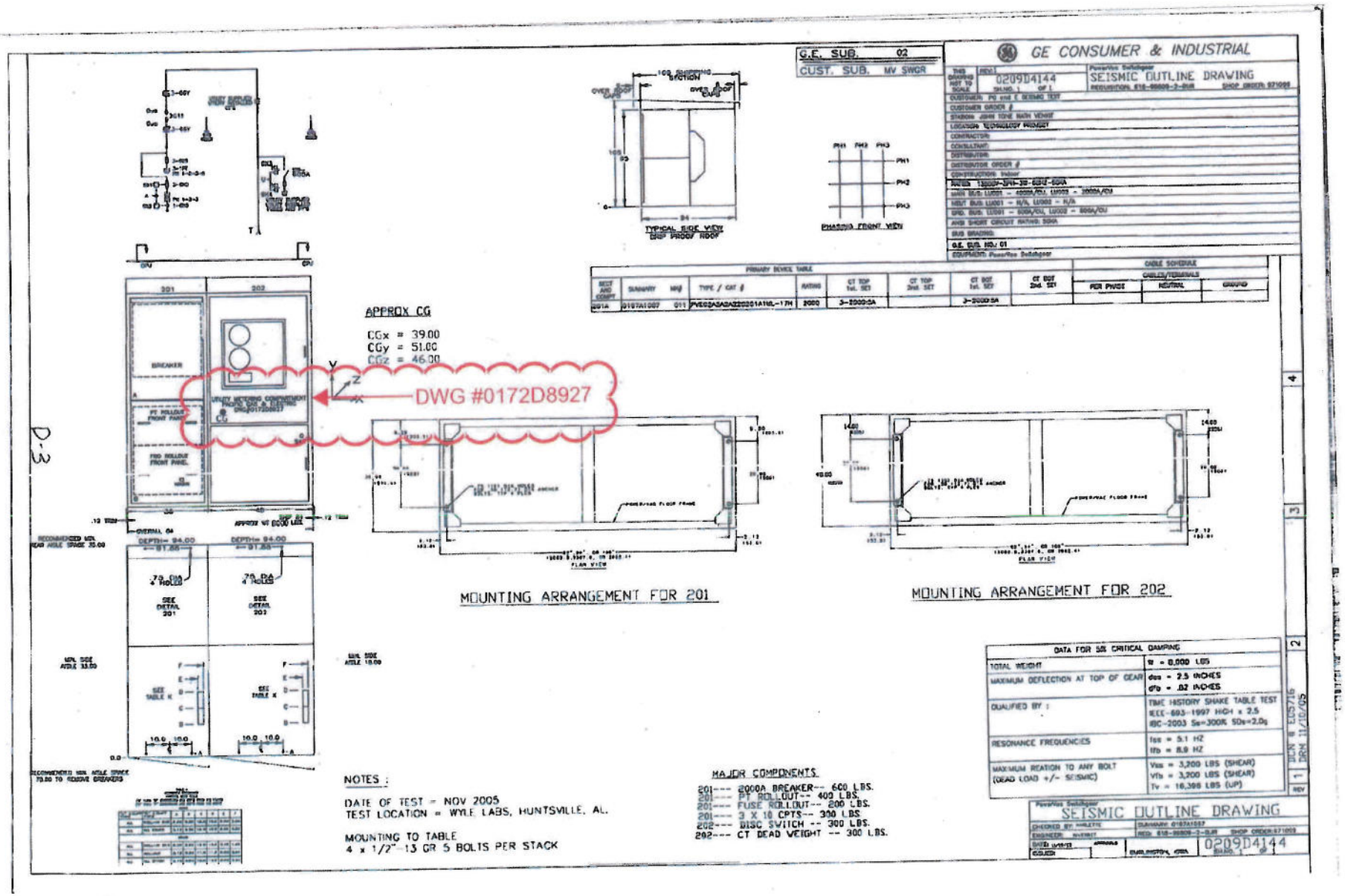
PowerVac Switchgear SEISMIC OUTLINE DRAWING

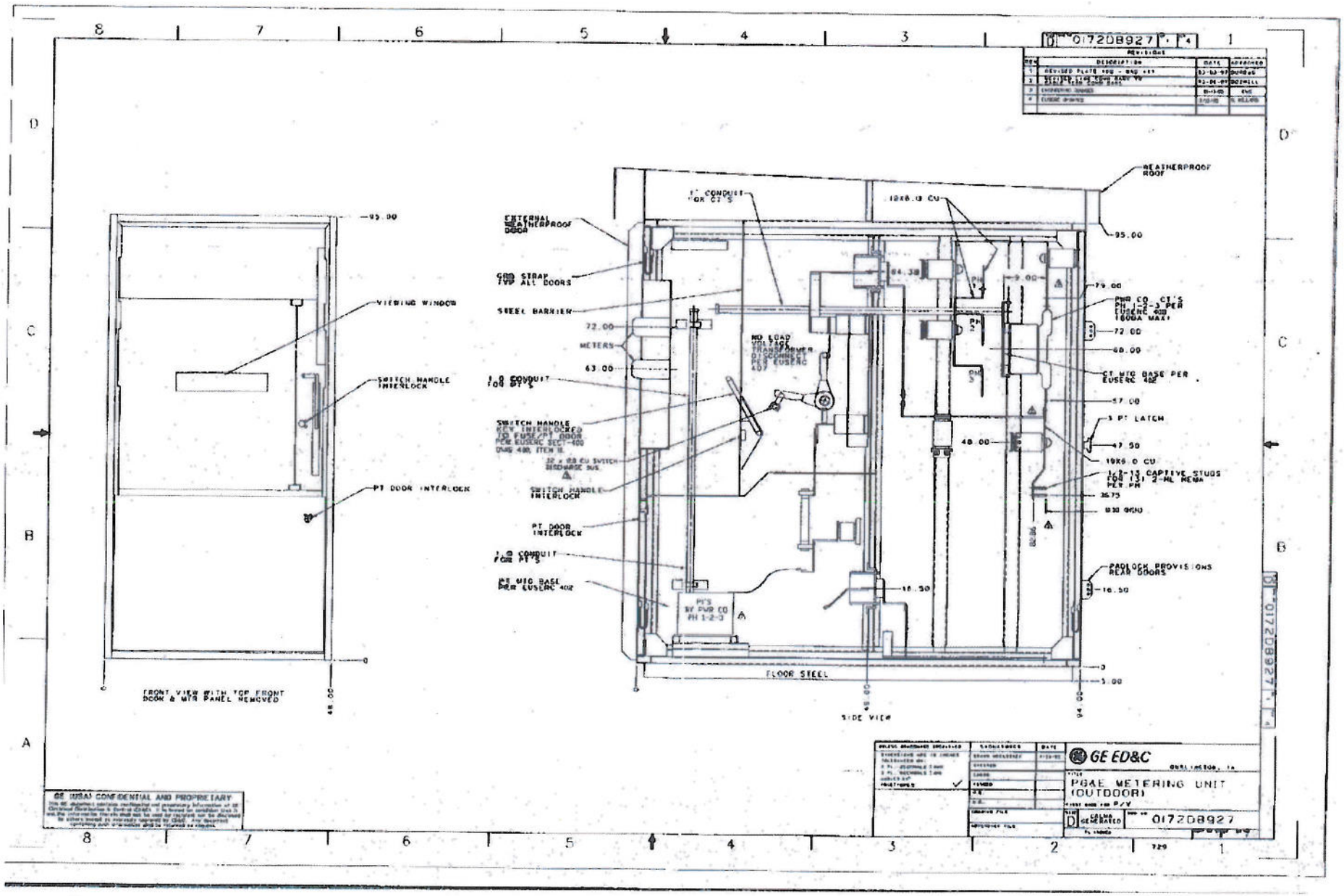
CHECKED BY: MARLETTE | SUMMARY: 0187A1067
ENGINEER: M VENKIT | REQ: 610-99009-3-DUR | SHOP ORDER:971099
DATE: 11/08/05 | APPROVALS | BURLINGTON, IOWA | 0209D4143 SH.NO. 1 OF 1
ISSUED:

1 | DCN # E05715 D.MARLETTE 11/08/05 | REV

2.0

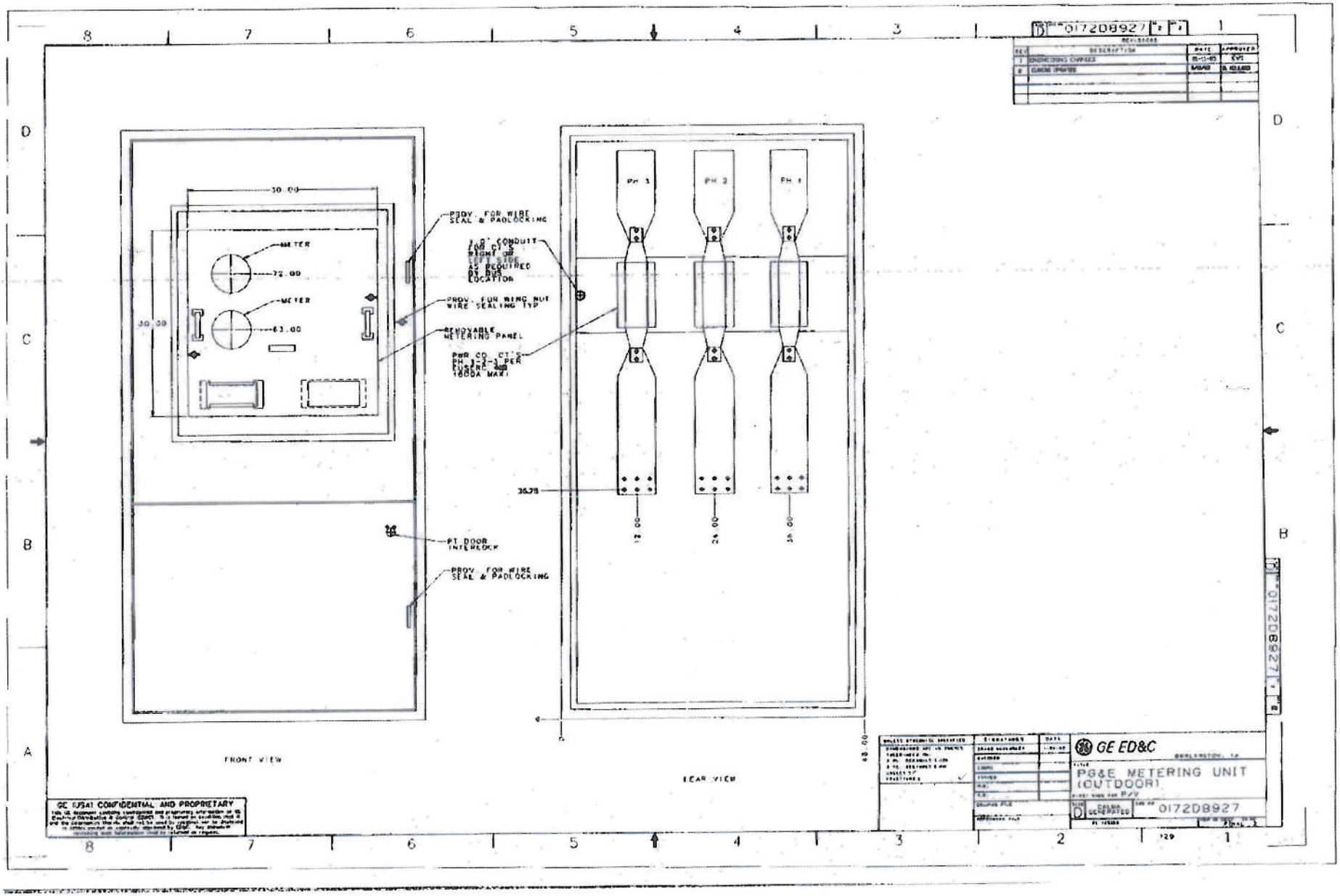
11/8


G.E. SUB. 02
CUST. SUB. MV SWGR
GE CONSUMER & INDUSTRIAL
SEISMIC OUTLINE DRAWING
0209D4144
APPROX CG
CGx = 39.00
CGy = 51.00
CGz = 46.00
DWG #0172D8927
MOUNTING ARRANGEMENT FOR 201
MOUNTING ARRANGEMENT FOR 202
NOTES :
DATE OF TEST = NOV 2005
TEST LOCATION = WYLE LABS, HUNTSVILLE, AL.
MOUNTING TO TABLE
4 x 1/2"-13 GR 5 BOLTS PER STACK
MAJOR COMPONENTS
201--- 2000A BREAKER-- 600 LBS.
201--- PT ROLLOUT-- 400 LBS.
201--- FUSE ROLLOUT-- 200 LBS.
201--- 3 X 10 CPTS-- 350 LBS.
202--- DISC SWITCH -- 300 LBS.
202--- CT DEAD WEIGHT -- 300 LBS.
DATA FOR 5% CRITICAL DAMPING
TOTAL WEIGHT
W = 8,000 LBS
MAXIMUM DEFLECTION AT TOP OF GEAR
dss = 2.5 INCHES
dfb = .82 INCHES
QUALIFIED BY :
TIME HISTORY SHAKE TABLE TEST
IEEE-693-1997 HIGH x 2.5
IBC-2003 Sa=300% SDs=2.0g
RESONANCE FREQUENCIES
fss = 5.1 HZ
ffb = 8.9 HZ
MAXIMUM REATION TO ANY BOLT (DEAD LOAD +/- SEISMIC)
Vss = 3,200 LBS (SHEAR)
Vfb = 3,200 LBS (SHEAR)
Tv = 16,398 LBS (UP)
SEISMIC OUTLINE DRAWING
0209D4144
D-3



017208927
REVISIONS
REV
DESCRIPTION
DATE
APPROVED
VIEWING WINDOW
SWITCH HANDLE INTERLOCK
PT DOOR INTERLOCK
FRONT VIEW WITH TOP FRONT DOOR & MTR PANEL REMOVED
95.00
48.00
EXTERNAL WEATHERPROOF DOOR
GRD STRAP TYP ALL DOORS
STEEL BARRIER
METERS
72.00
63.00
1.0 CONDUIT FOR PT'S
SWITCH HANDLE KEY INTERLOCKED TO FUSE/PT DOOR PER EUSERC SECT-400 DWG 400, ITEM 11
SWITCH HANDLE INTERLOCK
PT DOOR INTERLOCK
1.0 CONDUIT FOR PT'S
PT MTG BASE PER EUSERC 402
PT'S
NO LOAD VOLTAGE TRANSFORMER DISCONNECT PER EUSERC 407
1" CONDUIT FOR CT'S
19X6.0 CU
84.38
9.00
PH 1
PH 2
PH 3
48.00
16.50
FLOOR STEEL
SIDE VIEW
WEATHERPROOF ROOF
79.00
PWR CO CT'S PH 1-2-3 PER EUSERC 400 (600A MAX)
68.00
CT MTG BASE PER EUSERC 402
57.00
3 PT LATCH
47.50
19X6.0 CU
1/2-13 CAPTIVE STUDS FOR (3) 2-HL HEMA PER PH
36.75
PADLOCK PROVISIONS REAR DOORS
16.50
5.00
GE (USA) CONFIDENTIAL AND PROPRIETARY
GE ED&C
PG&E METERING UNIT (OUTDOOR)
P/V
D
CALMA GENERATED
017208927

10/11



017208927
REVISIONS
REV
DESCRIPTION
DATE
APPROVED
1
ENGINEERING CHANGES
2
EUROPE UPDATES
30.00
METER
72.00
METER
63.00
30.00
PROV. FOR WIRE SEAL & PADLOCKING
1.0" CONDUIT FOR CT'S RIGHT OR LEFT SIDE AS REQUIRED BY BUS LOCATION
PROV. FOR WING NUT WIRE SEALING TYP
REMOVABLE METERING PANEL
PWR CO. CT'S PH 1-2-3 PER EUSERC 400 (600A MAX)
PT DOOR INTERLOCK
PROV. FOR WIRE SEAL & PADLOCKING
PH 3
PH 2
PH 1
36.75
12.00
24.00
36.00
0
48.00
FRONT VIEW
REAR VIEW
GE ED&C
BURLINGTON, IA
PG&E METERING UNIT (OUTDOOR)
D
CALMA GENERATED
017208927
GE (USA) CONFIDENTIAL AND PROPRIETARY

11/11