

Ventura Electric Motor Driver Analysis



Southern California Gas Company (SoCalGas)

**VCM EPC
Project No. 132609**

**Contract 5660060833
Report #: E15043-000-55-RP-003**

Issued for Review

**Revision C
10/7/2021**



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prepared for

**Southern California Gas Company (SoCalGas)
VCM EPC
Ventura, CA**

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prepared by

Burns & McDonnell Engineering Company, Inc.

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1.0 BACKGROUND

SoCalGas has requested (through EPC-CC-0004) Burns & McDonnell's (BMcD) assistance in developing a high-level conceptual design to better understand the scope impact of updating the Ventura Compressor Modernization (VCM) scope to switch from natural gas driven reciprocating engine drive compressors to electric motor driven (EMD) compressors. Currently the base scope is to install (4) engine driven reciprocating compressors to deliver a throughput of 160 MMSCFD with space for an additional 5th unit. This report provides an in-depth analysis from switching from engine driven to EMD compressors including:

- Comparison of the different technologies (EMD vs Natural Gas Engine)
- Impacts to overall site layout
- Impacts to support systems (Fuel Gas, Coolant, Lube Oil, Instrument Air, Starting Air)
- Impacts to electrical load, PDC building, electrical infrastructure

Burns & McDonnell reviewed two options. Option 1 was to use two (2) EMD compressors, and two (2) natural gas engine driven compressors. Option 2 is to use four (4) EMD reciprocating compressors.

2.0 TECHNOLOGY COMPARISON

As part of this effort, Burns & McDonnell reached out to two packagers requesting their offerings to meet the design conditions as show in Table 1 below. Each packager was asked to select a motor/engine compressor package to meet the two options described. A summary of the budgetary quotes can be found in Appendix A.

Table 1 - Ventura Plant 2 Design Conditions

	CASE I (Winter - Rated)	CASE I (Summer - Rated)	CASE II (Winter – Min Head)	CASE II (Summer – Min Head)	CASE III (Winter – Min Flow)	CASE III (Summer – Min Flow)
Suction Pressure, psig (At Inlet Flange)	325	450	730	730	325	450
Suction Temperature, deg F	55	80	55	80	55	80
Discharge Pressure, psig (At Outlet Flange)	1000	1000	1000	1000	1000	1000
Design Flow, MMSCFD	30	40	Vendor to provide	Vendor to provide	Vendor to provide	Vendor to provide
Number of Stages	1	1	1	1	1	1

2.1 Electric Motor Driven Compressor Package

Each packager recommended a high-speed reciprocating compressor with mounted electric driver operating at 1200 RPM. These motors would be suitable for installation in Class 1, Div 2, Group D hazardous areas and would be placed in the compressor building with the gas engine driven compressors. These motors would have WP11 enclosure with a power rating of 4160V/3PH/60Hz. These EMDs would be coupled with a VFD to control the speed of each unit as the primary method of changing operating conditions while providing “soft start” capabilities.

It is noted that each packager recommended increasing the horsepower of the proposed electric motor from 2000 HP to 2300 HP which allows for simpler control of the compressors, allows it to

ramp up to speed, and provides the option of shutting down compressors as suction pressure increases.

There was not a significant difference in the footprint of the EMD compressor package compared to the original footprint of the engine driven compressor. The EMD compressor has a slightly smaller overall package size.

2.2 Engine Driven Compressor Package

Each packager offered a 1200 RPM 1900 HP Waukesha S5 engine driven compressor package with a rich-burn, 3-way catalyst to meet the required emission criteria.

3.0 PLOT PLAN IMPACTS

The following section describes the impacts to the Ventura Compressor Modernization plot plan for both option #1 (2 EMDs, 2 Engines) and option #2 (4 EMDs). A conceptual plot plan showing both options can be found in Appendix B. Option 1 includes multiple configurations (1a,1b,1c) including splitting the compressor types into different buildings, as well as hybrid approach combing both technologies into a single building.

Additionally, a cost comparison (Class V – Rough Order of Magnitude estimate) for each option has been provided in Appendix C and is specifically focused on the impacts from switching from all gas driven engines to the various EMD options.

3.1 Station Layout Impacts

Based on the preliminary packager information received, and scaling from the FEED plot plan, switching from engine driven to EMD compressors will have a large impact on layout and space at the facility especially for the two (2) compressor driver types (gas vs. EMD) occupying separate compressor buildings (Option #1). Preliminary information received from both packagers indicate that the EMD compressor skid has a slightly smaller skid footprint as well as less piping and ducting for the combustion and exhaust systems. The EMD compressor skids do not require the exhaust system and jacket water cooling system required on a gas fired engine. Removing these systems frees up space outside the compressor building. Additionally, the CEMs building would no longer be required for the skids that are changed to EMD. From a footprint perspective, this area would be utilized for the VFD Building and VFD Coolers.

3.2 Utility Impacts

With option #2 when all 4 units are EMDs, the engine driven utilities of coolant, fuel gas, or starting air would no longer be required, freeing up additional plot space. The coolant tank and associated pumps, the fuel gas skid and filter, and starting air compressor skid and receiver would be removed from the scope and plot for option #2. Additional required electrical infrastructure would be required for both option # 1 and option #2 including a new substation, this is discussed in more detail in section 4.0 of this report.

3.3 H2 Scope Impacts

The original conceptual design for the VCM Plant 2 project included plot space to install a Hydrogen Production and Storage Facility to produce hydrogen for blending into the fuel gas of

the engine driven compressors. Due to the requirement to add a substation along the southern extents of the property (as described in Section 4.2), the installation of the H2 plant would no longer be feasible with the current space available.

4.0 ELECTRICAL

4.1 Power Requirements

The use of EMD compressors in lieu of natural gas driven compressors will greatly increase the electrical demand on the site. In both options this increase in demand is beyond the current capacity of what Southern California Edison (SCE) can provide to this site with their existing infrastructure, as outlined in section 4.6 of this report. Based on the original VCM FEED scope the site transformer (16.5kV - .48kV, sized by utility) was to be furnished by SCE. For the potential alternate scope outlined in this report, it is assumed that SCE will furnish a primary service of 16.5kV to the site. SCE meters will be installed inside a meter section of a pad mounted, SoCalGas owned and operated reclosure. All electrical equipment downstream of this service will be furnished and installed by the project. The PDC size for either option will remain the same as in the original VCM FEED. Any size variations with the MCCs and other equipment will be determined through further design development.

4.2 New Electrical Substation

Through review of electrical infrastructure for both the hybrid and full electrification approaches for this project, BMcD was advised by SoCalGas that SCE will require implementation of a new substation on the Facility Site (as opposed to a new / retrofit substation offsite). BMcD developed a very high-level concept of an onsite substation, based on historical data, information from previous projects, and general substation technical knowledge. It was assumed that the electrical design would require redundant feeders from SCE (1 primary and 1 backup) to allow the Ventura compressor station to continue operating if one of the feeders was deenergized due to a Public Safety Power Shutoff (PSPS). It was also assumed that each of these are fed from SCE's nearby existing 16.5kV distribution substation, and that feeders would be routed from a to be determined location (external to the Facility Site) to the new substation (within the Facility Site) and each connected through an SCE approved breaker / disconnect switch. These specific circuit breaker / disconnect switches may be controlled by SCE through their own SCADA system. The new SoCalGas substation would include three (3) circuit breakers connected in a ring bus configuration that will provide four terminal positions, two connections to SCE feeders, one spare, and one connected to a new step-down transformer (16.5kV to 4.16kV, 10MVA capacity) and a low voltage switchgear. From this switchgear, electrical power/cabling will be routed via underground ductbank north through the facility to the Power Distribution Center (PDC) installed as a part of the EPC scope of work. The conceptual substation footprint sizing included in this

report are based on a single step-down transformer (no redundant transformer), vehicle access to all major electrical equipment and around the substation site, spacing for a chain link fence and external ground loop at the substation perimeter.

As discussed, this substation sizing is to be treated as a design envelope considering the factors outlined in the preceding paragraph. The next project phase should include a more detailed look at the strategy and philosophy for SCE's routing of the redundant feeders to the new substation, obtain more details around the SCE equipment to be provided within the substation, and specific sizing (and associated spacing) for all major electrical equipment.

Additionally, this concept also assumes that SCE will allow a 10MVA feed from their 16.5kV system. Alternately, in subsequent project phases (and through further coordination with SCE, 33kV or 66kV may be utilized in roughly the same substation footprint as shown in the provided plot plans.

4.3 Major Electrical Equipment (Option 1)

- 27kVAC Pad mounted Reclosure (800A)
- 7.5MVA Primary Oil Filled Transformer (16.5kV – 4.160kV, 3ph-3wire)
- 4160VAC Distribution Switchgear. (1200A, 3ph./3wire)
- 1.5MVA Distribution Oil Filled Transformer (4.16kV - .48kV, 3ph-3wire)
- One (1) VFD Building (15' x 25') w/ supporting equipment.
- Two (2) Variable Frequency Drives (VFD)s with independent refrigerant coolers
- SCE Owned and Operated Substation

4.4 Major Electrical Equipment (Option 2)

- 27kVAC Pad mounted Reclosure (800A)
- 10.0MVA Primary Oil Filled Transformer (16.5kV – 4160kV, 3ph-3wire)
- 4160VAC Distribution Switchgear. (1200A, 3ph./3wire)
- 1.5MVA Distribution Oil Filled Transformer (3.15kV - .48kV, 3ph-3wire)

- Two (3) VFD Buildings (15' x 25') w/ supporting equipment.
- Four (4) Variable Frequency Drives (VFD)s with independent refrigerant coolers
- SCE Owned and Operated Substation

4.5 Electrical Loading

See the tables below for a preliminary load summary for each option.

Table 2 - Electrical Load Summary (Option 1)





 																		
EQUIPMENT LOAD SUMMARY (OPTION 1)																		
SOURCE DESCRIPTION					CONNECTED				RUNNING				RUNNING + 20% SPARE			EQUIPMENT SIZING		Notes
Tag	Description	Type	Voltage	Phase	# Connected Loads	Amps Connected	KVA Connected	KW Connected	# Running Loads	Amps Running	KVA Running	KW Running	Amps Running +20% Spare	KVA Running +20% Spare	KW Running +20% Spare	Bus Size (A)	Breaker Trip (A)	
MCC-1000	MCC	LV MCC	480	3	41	882.3	733.5	667.8	37	490.0	407.4	376.0	588.0	488.8	451.2	1200	800	
MCC-1001	MCC	LV MCC	480	3	40	764.3	635.4	569.0	38	347.3	288.7	259.9	416.7	346.4	311.9	1200	800	
SG-1001	SWGR	LV SWGR	480	3	84	2038.3	1694.6	1513.6	78	1077.6	895.9	805.8	1293.2	1075.1	967.0	3200	1600	MCC-1000 + MCC-1001 + Offic Bldg + Warehouse Bldg + Plant 1 CS
SG-1000	Total Station Load	MV SWGR	4160	3	86	876.3	6313.8	5439.9	80	765.4	5515.1	4732.1	918.5	6618.2	5678.6	2000	TBD	Total Station load at MV Switchboard SG-1000

Table 3 - Electrical Load Summary (Option 2)

 																		
EQUIPMENT LOAD SUMMARY (OPTION 2)																		
SOURCE DESCRIPTION					CONNECTED				RUNNING				RUNNING + 20% SPARE			EQUIPMENT SIZING		Notes
Tag	Description	Type	Voltage	Phase	# Connected Loads	Amps Connected	KVA Connected	KW Connected	# Running Loads	Amps Running	KVA Running	KW Running	Amps Running +20% Spare	KVA Running +20% Spare	KW Running +20% Spare	Bus Size (A)	Breaker Trip (A)	
MCC-1000	MCC	LV MCC	480	3	35	669.0	556.2	503.4	33	313.5	260.7	238.9	376.2	312.8	286.6	1200	800	
MCC-1001	MCC	LV MCC	480	3	40	764.3	635.4	569.0	38	347.3	288.7	259.9	416.7	346.4	311.9	1200	800	
SG-1001	SWGR	LV SWGR	480	3	78	1824.9	1517.2	1349.2	74	901.2	749.3	668.7	1081.5	899.1	802.4	3200	1600	MCC-1000 + MCC-1001 + Offic Bldg + Warehouse Bldg + Plant 1 CS
SG-1000	Total Station Load	MV SWGR	4160	3	82	1492.7	10755.6	9201.8	78	1386.1	9987.6	8521.3	1663.4	11985.2	10225.6	2000	TBD	Total Station load at MV Switchboard SG-1000

4.6 Discussions with Southern California Edison (SCE)

Burns & McDonnell reached out to the electrical utility company (SCE) to determine what is required to acquire the necessary power to accommodate the EMD options. SCE determined that a large amount of work and upgrades would be required. SCE indicated that a paid study that would extend beyond the schedule constraints of this report would be required to better quantify

and define the technical scope and commercial impacts. However, BMcD was able to gather the below information from SCE that outlines the high-level scope and potential challenges:

1. An entire new circuit would need to be installed from the substation to the site. This would include a new Underground (UG) cable route from the substation to the site.
2. An overhaul of the existing system that feeds Olive Street.

To receive any additional information beyond this it would require an Advanced Engineering Fee to engage SCE engineers to determine the path forward. The estimated schedule to complete would be at least 2 years once it is designed, approved, and paid for. The design process will take at least 6 months with a high likelihood of additional time. This timeframe could be further delayed due to environmental issues and/or transmission work that would need to take place. Additionally, to obtain dual circuits a PEGEAR would be required which comes with hefty monthly fees.

Email correspondence between SCE and Burns & McDonnell, as well as requirements for SCE Designs can be referenced in Appendix A.

4.7 Miscellaneous Impacts


- The generator size had remained the same as established in the VCM FEED scope. It has not been resized to accommodate running an EMD. Impacts to generator sizing (if any) will be addressed through further design development.
- Additional electrical service would greatly impact the electrical systems analysis. Arc-Flash, Short Circuit, and Load Flow would need to be revisited through further design development.
- The additional electrical equipment will be protected via Microprocessor controlled Relays (SEL or similar); this will require a Coordination Study to determine appropriate protection settings. This will be accomplished through further design development.
- The control systems will need to be updated through further design development. The compressor UCP's will need to work directly with the VFD UCP's.
- A single utility feed currently exists to power the site. For redundant feed, additional coordination with SCE will be required to determine the electrical equipment needed. This will be accomplished through further design development.

- There will be additional I/O that will be routed to the SCP2 & ESD panels. Impact of additional I/O shall be determined through further design development.



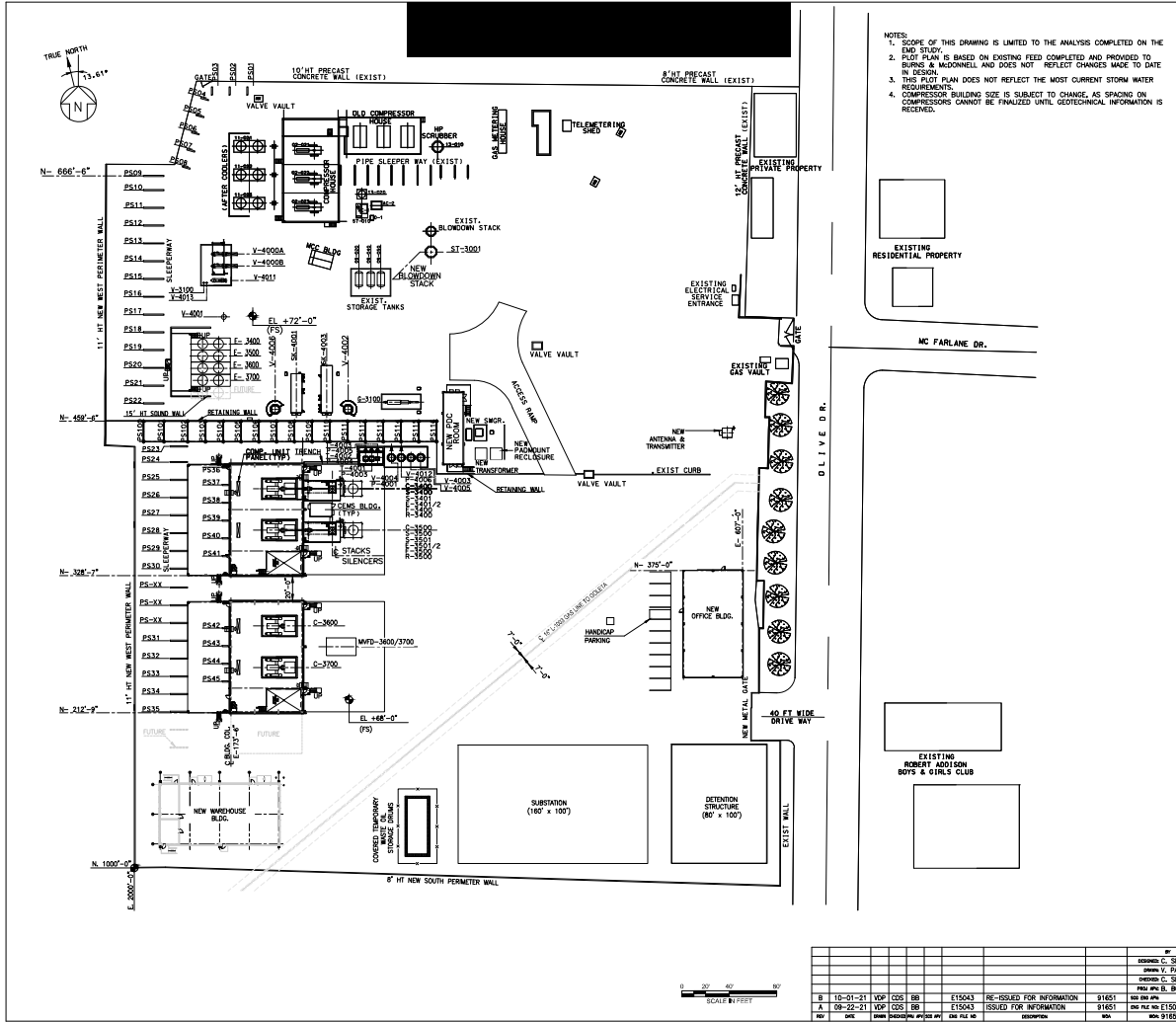
APPENDIX A - TECHNOLOGY COMPARISON



		EMD OPTION BID EVALUATION				
		Owner: SoCalGas	Revision: A	Project Number: 132699	By: BEB	Approval: CDS
Specification No.	Project Description: EMD Option Bid Tab	Neuman & Esser	BMcD Comment	UECompression	BMcD Comment	
Proposal No.						
Quote Date		4/23/2021				
DATA PROVIDED						
PERFORMANCE CALCULATIONS PROVIDED	Requested	YES		YES		
PRELIMINARY P&IDS	Requested	NO		NO		
PRELIMINARY GENERAL ARRANGEMENT	Requested	YES		YES		
MOTOR						
MOTOR HP RATING	1900 HP+	2500 HP		2300 HP		
MOTOR RATED RPM	1200 RPM	1200		1200		
MOTOR VENDOR	By Vendor	TECO		WEG / SIEMENS / TECO / ABB / NIDEC / OTHER		
POWER RATING	4160v	4160V/3ph/6hz		4160V/3ph/6hz		
SKD SIZE	By Vendor	31' x 18'		28.7' x 12.5'		
VFD	Manufacture	TECO VersaBridge - NEMA 1 Medium Voltage 2500 HP		WEG VSD Series MVW3000		
VFD Cooling	Type	Refrigerant Control Unit (RCU)		Cooling Air Cooled		
WINTER CASE (FLOWRATE/HP)	30 MMSCFD / By Vendor	32,016 MMSCFD / 1,937 HP		30,877 MMSCFD / 1,910 HP		
SUMMER CASE (FLOWRATE/HP)	40 MMSCFD / By Vendor	42,363 MMSCFD / 1,961 HP		41,19 MMSCFD / 1,887 BHP		
ENGINE PERFORMANCE						
ENGINE HP RATING	1900 HP+	1900	Need to confirm tolerance and performance guarantees	1900	Need to confirm tolerance and performance guarantees	
ENGINE OPERATING RANGE SPEED	1200 RPM	900 -1200		900 -1200		
ENGINE VENDOR/MODEL	Waukesha	Waukesha L7044 GSI 55		Waukesha L7044 GSI 55		
SKD SIZE	By Vendor	33.3' x 15'		33.3' x 15'		
WINTER CASE (FLOWRATE/HP)	30 MMSCFD / By Vendor	29,458 MMSCFD / 1,828 HP		29,458 MMSCFD / 1,828 HP		
SUMMER CASE (FLOWRATE/HP)	40 MMSCFD / By Vendor	41,356 MMSCFD / 1,898 BHP	Additional derate would be required for +/- 3% on HP	41,356 MMSCFD / 1,898 BHP	Additional derate would be required for +/- 3% on HP	
EMISSIONS						
	NOX: 0.07 gr/bhp-hr	YES RICH BURN WITH 3-WAY CATALYST		YES RICH BURN WITH 3-WAY CATALYST		
	NOX reduction method: 3 way catalyst					
	CO Emissions: 0.60 gr/bhp-hr					
	Particulate Emissions: 0.15 gr/bhp-hr					
COMPRESSOR						
COMPRESSOR RATED FRAME BHP	2500HP+	Info not provided		3680		
COMPRESSOR RATED FRAM RPM	1200RPM	1200		1200		
COMPRESSOR TYPE	By Vendor	NEA - 1SZL320hs		Ariel - KBK/4		
Engine Unit Cost			1900 HP Engine Package		1900 HP Engine Package	
EMD Unit Cost			2500 HP EMD Package		2300 HP EMD Package	
LEAD TIME		48-52 Weeks Ex-Works Houston Packager		42-44 Weeks Ex-Works Colorado Packager		



APPENDIX B – PLOT PLAN



- NOTES:
- SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE END STUDY.
 - PLOT PLAN IS BASED ON EXISTING FEED COMPLETED AND PROVIDED TO BURNS & MCDONNELL AND DOES NOT REFLECT CHANGES MADE TO DATE IN DESIGN.
 - THIS PLOT PLAN DOES NOT REFLECT THE MOST CURRENT STORM WATER REQUIREMENTS.
 - COMPRESSOR BUILDING SIZE IS SUBJECT TO CHANGE AS SPACING ON COMPRESSORS CANNOT BE FINALIZED UNTIL GEOTECHNICAL INFORMATION IS RECEIVED.

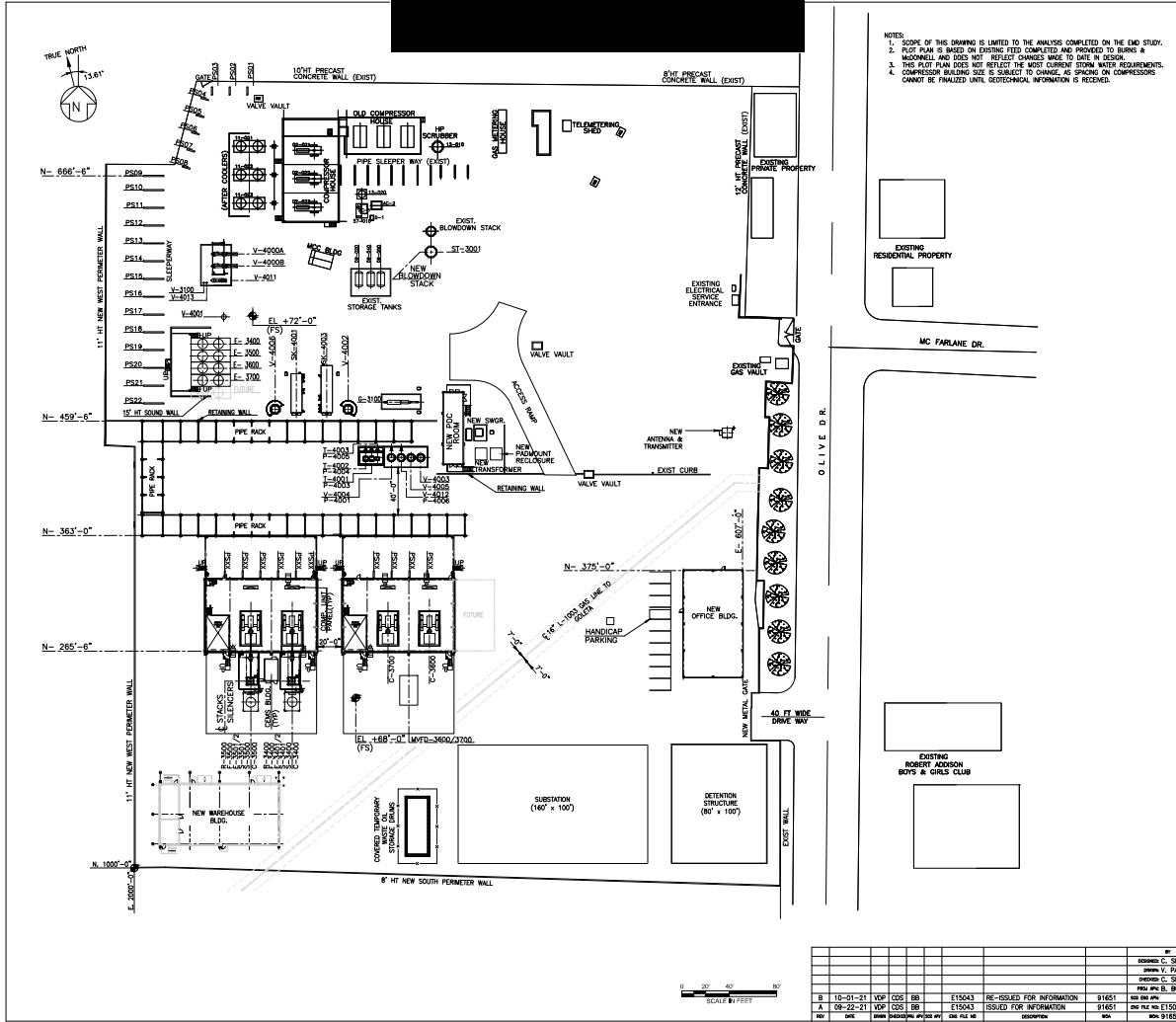
DRAWING NO.	REFERENCE DRAWING DESCRIPTION
33900-3902-D-PIP	OVERALL PLOT PLAN
33900-3906-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN - H2 FEED

EQUIPMENT LIST (NEW)

PACKAGE EQUIPMENT	DESCRIPTION
C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKD
SK-4002	INSTRUMENT AIR COMPRESSOR SKD
SK-1100	EMERGENCY EXHAUSTOR SKD
SK-3001	BLOWDOWN STACK
EXCHANGERS	
E-3400	DISCHARGE COOLER
E-3401/2	AUXILIARY/JACKET WATER COOLERS
E-3500	DISCHARGE COOLER
E-3501/2	AUXILIARY/JACKET WATER COOLERS
E-3600/2	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700/2	DISCHARGE COOLER
E-3701/2	AUXILIARY/JACKET WATER COOLERS
VESSELS	
V-3100	GENERATOR FUEL GAS REGULATOR FILTER
V-4000 A/B	FILTER/SEPARATOR
V-4001	DISCHARGE DRUM
V-4002	STARTING AIR RECEIVER
V-4003	DRY BICE STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRUM
V-4012	COOLANT STORAGE DRUM
V-4013	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OIL WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP
PUMPS	
P-4001	ENGINE OIL CHARGE PUMP
P-4002	COMPRESSOR AREA OIL WASTE TANK PUMP
P-4003	WASTE OIL TANK PUMP
P-4004	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-4005	COOLANT CHARGE PUMP
MISC.	
F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MFD-3600/3700	PTD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3500	EXHAUST SILENCER #2
S-3600	EXHAUST SILENCER #1
S-3700	EXHAUST SILENCER #2

NO.	DATE	BY	CHKD.	APP.	DESCRIPTION
		DESIGNED: C. SLAVIN	09/15/21		
		DRAWN: W. PAUL	09/15/21		
		DESIGNED: C. SLAVIN	09/15/21		
		PROJ. MGR: B. BOUDD	09/15/21		
A	10-01-21	YOP: CDS: BB	E15043	RE-ISSUED FOR INFORMATION	91651
B	09-22-21	YOP: CDS: BB	E15043	ISSUED FOR INFORMATION	91651
REV					

VENTURA COMPRESSOR STATION UPGRADE & MODERNIZATION
OPTION #1A-2 ENGINES, 2 ELECTRIC DRIVERS
PLOT PLAN
33900-3901-D-PIP



NOTES:
 1. SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE END STUDY.
 2. PLOT PLAN IS BASED ON EXISTING FEES COMPLETED AND PROVIDED TO BURNS & MCDONNELL AND DOES NOT REFLECT CHANGES MADE TO DATE IN DESIGN.
 3. THIS PLOT PLAN DOES NOT REFLECT THE MOST CURRENT STORM WATER REQUIREMENTS.
 4. COMPRESSOR BUILDING SIZE IS SUBJECT TO CHANGE AS SPACING ON COMPRESSORS CANNOT BE DETERMINED UNTIL GEOTECHNICAL INFORMATION IS RECEIVED.

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
33900-3902-D-PIP	OVERALL PLOT PLAN
33900-3904-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN - H2 FEED

EQUIPMENT LIST (NEW)

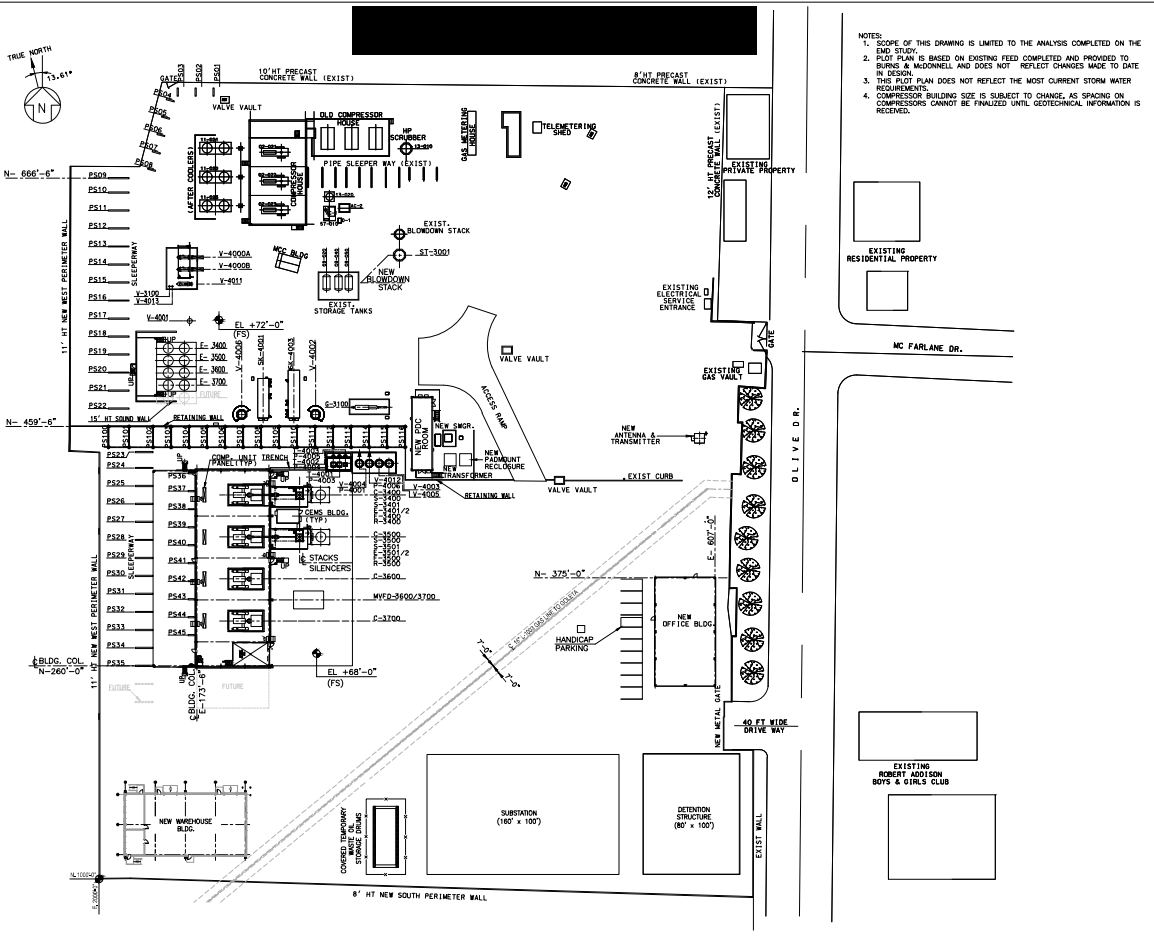
PACKAGE EQUIPMENT	DESCRIPTION
C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	STANDING AIR COMPRESSOR SKD
SK-4003	STANDING AIR COMPRESSOR SKD
SK-100	EMERGENCY EXHAUSTOR SKD
ST-3001	BLOWDOWN STACK
E-3400	DISCHARGE COOLER
E-3401/2	AUXILIARY/JACKET WATER COOLERS
E-3500	DISCHARGE COOLER
E-3501/2	AUXILIARY/JACKET WATER COOLERS
E-3600/1	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700/1	DISCHARGE COOLER
E-3701/2	AUXILIARY/JACKET WATER COOLERS
V-3100	GENERATOR FUEL GAS REGULATOR FILTER
V-4000 A/B	FILTER/SEPARATOR
V-401	DRAINAGE SUMP
V-402	STARTING AIR RECEIVER
V-403	DELY BECK STORAGE DRUM
V-404	ENGINE OIL STORAGE DRUM
V-405	WASTE OIL STORAGE DRUM
V-406	INSTRUMENT AIR RECEIVER
V-407	CONDENSATE TRAP
V-408	COOLANT STORAGE DRUM
V-409	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OIL WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP
P-401	ENGINE OIL CHARGE PUMP
P-402	COMPRESSOR AREA OIL WASTE TANK PUMP
P-403	WASTE OIL TANK PUMP
P-404	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-405	COOLANT CHARGE PUMP
F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MFD-3600/3700	PTD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3500	EXHAUST SILENCER #2
S-3600	EXHAUST SILENCER #1
S-3700	EXHAUST SILENCER #2

NO.	DATE	BY	CHKD.	APP.	DESCRIPTION				
		DEREK C. SLAVIN			09/15/21				
		DEREK C. SLAVIN			09/15/21				
		DEREK C. SLAVIN			09/15/21				
		DEREK C. SLAVIN			09/15/21				
A	10-01-21	YOP	CDG	BB	E15043 RE-ISSUED FOR INFORMATION	91651	REV. 09/15/21		
B	09-22-21	YOP	CDG	BB	E15043 ISSUED FOR INFORMATION	91651	REV. 09/15/21		

VENTURA COMPRESSOR STATION
 UPGRADE & MODERNIZATION
 OPTION #1B-2 ENGINES, 2 ELECTRIC DRIVERS
 PLOT PLAN

DATE: 09/15/21
 SHEET NO. 114
 TOTAL SHEETS: 114

33900-3901-D-PIP



- NOTES:
1. SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE END STUDY.
 2. PLOT PLAN IS BASED ON EXISTING FEED COMPLETED AND PROVIDED TO BURNS & MCDONNELL AND DOES NOT REFLECT CHANGES MADE TO DATE IN DESIGN.
 3. THIS PLOT PLAN DOES NOT REFLECT THE MOST CURRENT STORM WATER REQUIREMENTS.
 4. COMPRESSOR BUILDING SIZE IS SUBJECT TO CHANGE, AS SPACING ON COMPRESSORS CANNOT BE FINALIZED UNTIL GEOTECHNICAL INFORMATION IS RECEIVED.

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
33900-3901-D-PIP	OVERALL PLOT PLAN
33900-3906-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN - H2 FEED

EQUIPMENT LIST (NEW)

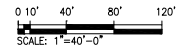
PACKAGE EQUIPMENT	DESCRIPTION
C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKD
SI-4001	STARTING AIR COMPRESSOR SKD
SI-1001	EMERGENCY GENERATOR SKD
SI-3001	BLOWDOWN STACK

EXCHANGERS	DESCRIPTION
E-3401/2	DISCHARGE COOLER
E-3402/2	AUXILIARY/JACKET WATER COOLERS
E-3501/2	DISCHARGE COOLER
E-3502/2	AUXILIARY/JACKET WATER COOLERS
E-3601/2	DISCHARGE COOLER
E-3602/2	AUXILIARY/JACKET WATER COOLERS
E-3701/2	DISCHARGE COOLER
E-3702/2	AUXILIARY/JACKET WATER COOLERS

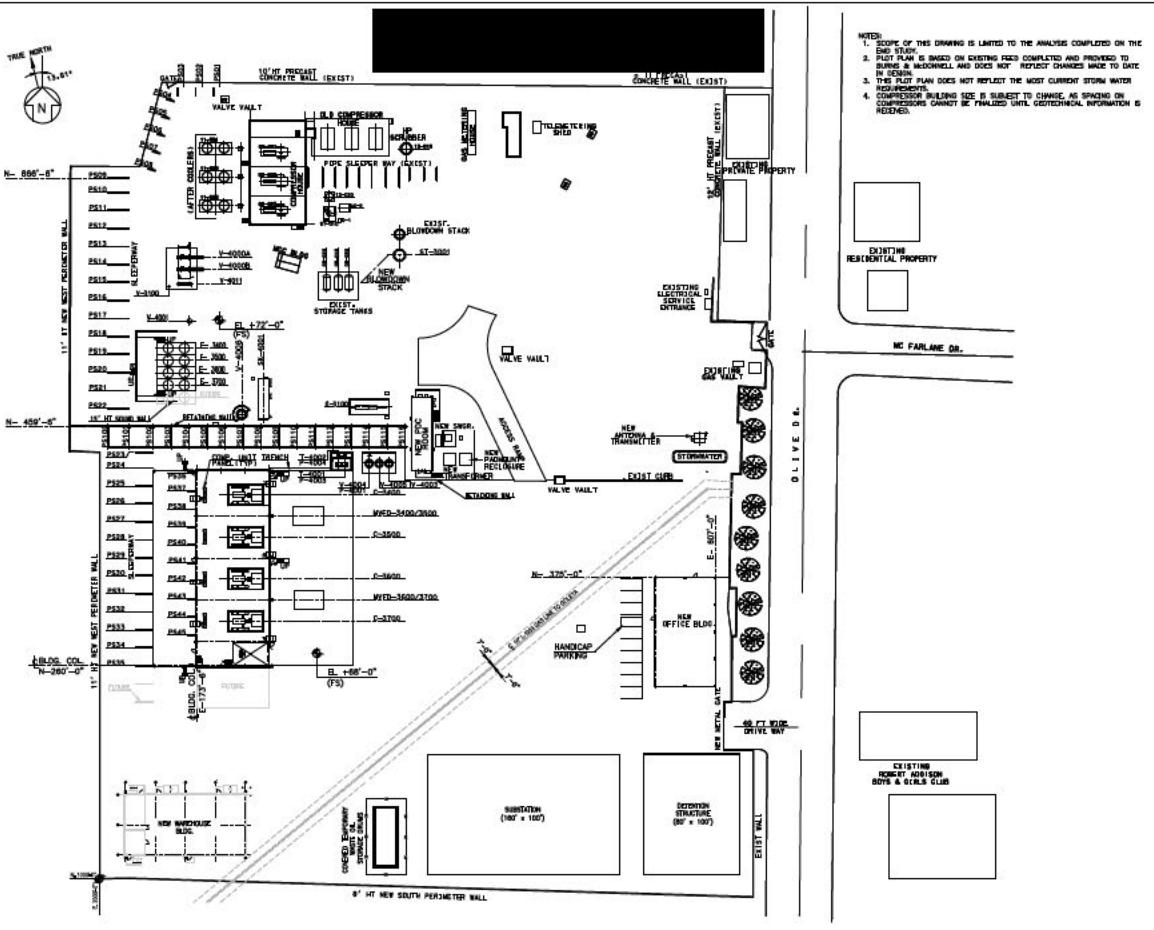
VESSELS	DESCRIPTION
V-3100	GENERATOR FUEL GAS REGULATOR FILTER
V-4000 A/B	FILTER/SEPARATOR
V-4001	DISCHARGE RECEIVER
V-4002	STARTING AIR RECEIVER
V-4003	DRY BICEP STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRUM
V-4012	COOLANT STORAGE DRUM
V-4013	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OIL WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP

PUMPS	DESCRIPTION
P-4001	ENGINE OIL CHARGE PUMP
P-4002	COMPRESSOR AREA OIL WASTE TANK PUMP
P-4003	WASTE OIL TANK PUMP
P-4004	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-4005	COOLANT CHARGE PUMP

MISC.	DESCRIPTION
F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MFD-3600/3700	PTD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3500	INLET SILENCER #1
S-3600	EXHAUST SILENCER #2
S-3700	INLET SILENCER #2



NO.	DATE	BY	CHKD.	DESCRIPTION									
		DESIGNED: C. SLAVIN	10/06/21										
		DRAWN: W. PAUL	10/06/21										
		DESIGNED: C. SLAVIN	10/06/21										
		PROJ. MGR: B. BOUDD	10/06/21										
A	10-06-2021	TOP	1003	BB	E15043	ISSUED FOR INFORMATION	91651	REV. 01/01/21	DATE: 10/06/21	SCALE: 1"=40'-0"	VENTURA COMPRESSOR STATION UPGRADE & MODERNIZATION OPTION #1C-2 ENGINES, 2 ELECTRIC DRIVERS PLOT PLAN	33900-3901-D-PIP-1C	A



- NOTES:
1. SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE END STUDY.
 2. PLOT PLAN IS BASED ON EXISTING RECORDS COMPLETED AND PROVIDED TO BUREAU & RECORDS AND DOES NOT REFLECT CHANGES MADE TO DATE IN RECORD.
 3. THIS PLOT PLAN DOES NOT REFLECT THE MOST CURRENT STORM WATER REQUIREMENTS.
 4. COMPRESSOR BUILDING SIDE IS SUBJECT TO CHANGE, AS SPACING ON COMPRESSORS CANNOT BE FINALIZED UNTIL GEOTECHNICAL INFORMATION IS RECEIVED.

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
33900-3902-D-PP	ORIGINAL PLOT PLAN
33900-3902-E-PP	EQUIPMENT LAYOUT
33900-3902-F-PP	EQUIPMENT LAYOUT PLAN - 1# BLDG

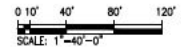
- EQUIPMENT LIST (NEW)
- COMPRESSORS
- C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR
 - C-3900 GAS COMPRESSOR

- COOLERS
- C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER
 - C-3900/2 EXHAUST COOLER

- VALVES
- V-4000 A/B EXHAUST COOLER
 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER
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 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER
 - V-4000 EXHAUST COOLER

- PUMPS
- P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER
 - P-4000 EXHAUST COOLER

- WELLS
- W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER
 - W-4000 EXHAUST COOLER



NO.	DATE	BY	CHKD.	APP.	DESCRIPTION
1	08/15/21	ANDREW C. SLAUGH	ANDREW C. SLAUGH		ISSUED FOR INFORMATION
2	08/17/21	ANDREW C. SLAUGH	ANDREW C. SLAUGH		ISSUED FOR INFORMATION
3	08/17/21	ANDREW C. SLAUGH	ANDREW C. SLAUGH		ISSUED FOR INFORMATION
4	08/17/21	ANDREW C. SLAUGH	ANDREW C. SLAUGH		ISSUED FOR INFORMATION

VENTURA COMPRESSOR STATION
UPGRADE & MODERNIZATION
OPTION #2-4 ELECTRIC DRIVERS
PLOT PLAN

33900-3902-D-PIP



APPENDIX C – COST ESTIMATE



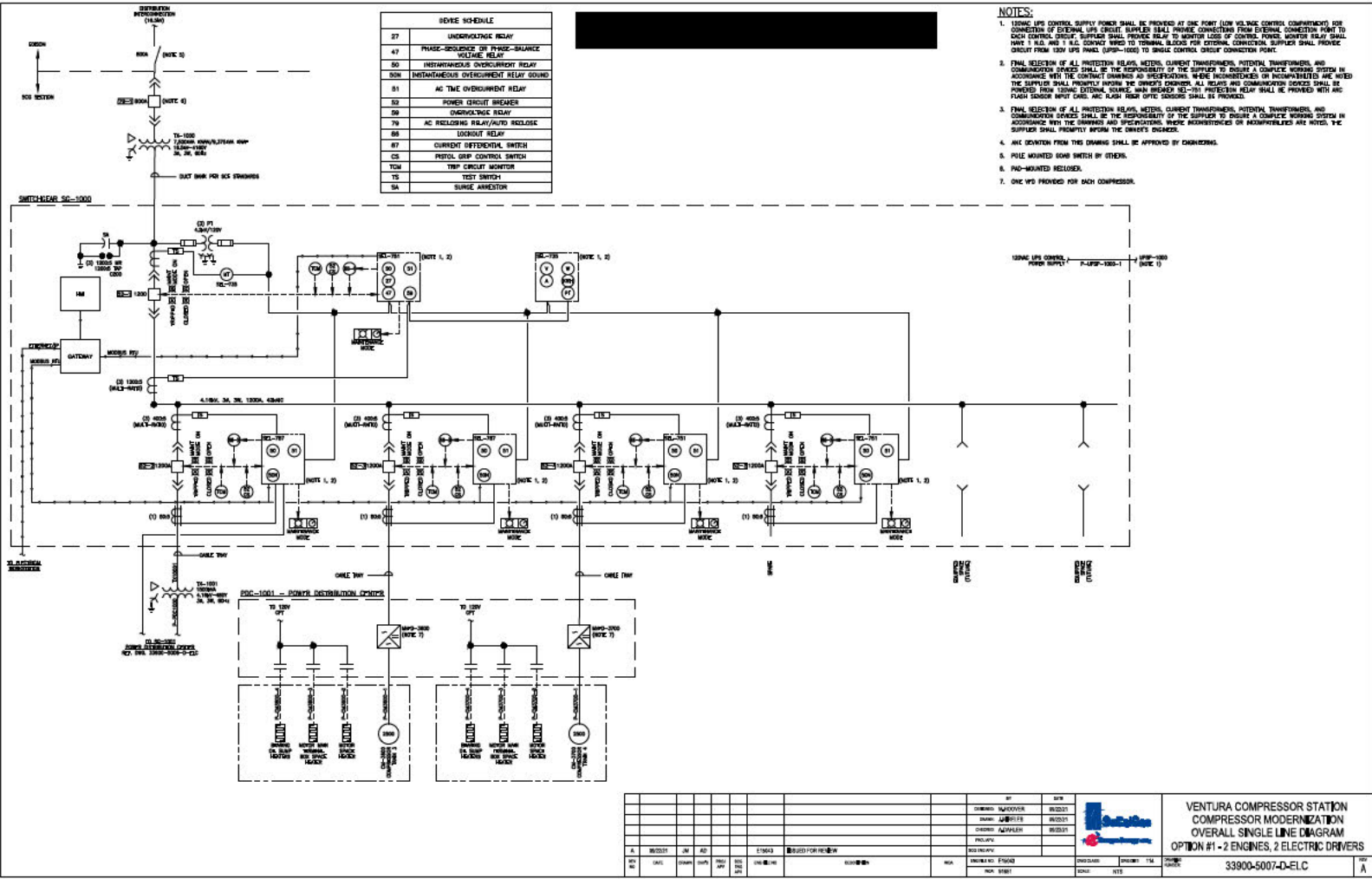
Scope		Base Scope		Option 1		Option 2	
		(4) Natural Gas Engines		(2) Engines, (2) EMDs		(4) EMDs	
Equipment & Material	Unit Cost	QTY	Total	QTY	Total	QTY	Total
Engine Compressor Package ¹	\$	4	\$	2	\$	0	\$ -
EMD Compressor Package ²	\$	0	\$	2	\$	4	\$
VFD w/ Coolers	\$	0	\$	2	\$	4	\$
VFD Building	\$	0	\$	1	\$	2	\$
Starting Air Compressor/Receiver	\$	1	\$	1	\$	0	\$
Coolant Storage Drum	\$	1	\$	1	\$	0	\$
Coolant Drain Sump	\$	1	\$	1	\$	0	\$
Coolant Charge Pump	\$	1	\$	1	\$	0	\$
New Transformer (10MVA)	\$	0	\$	0	\$	1	\$
New Transformer (7MVA)	\$	0	\$	1	\$	0	\$
Reclosure	\$	0	\$	1	\$	1	\$
CEMS Building	\$	2	\$	1	\$	0	\$
Utility Piping Lot	\$	1	\$	0.5	\$	0	\$
TOTAL MECH/ELEC EQ COST			\$		\$		\$
Construction / Indirects	Unit Cost	QTY	Total	QTY	Total	QTY	Total
ROM Factor (Eq Cost *2.5)			\$		\$		\$
Misc. Cost	Unit Cost	QTY	Total	QTY	Total	QTY	Total
Additional Engineering (ROM)	\$	0	\$ -	1	\$	1	\$
SCE T-Line Improvements ³	\$	0	\$ -	1	\$	1	\$
			\$		\$ -		\$ -
Cost Comparison (ROUNDED)			\$		\$		\$
Delta from Base Scope(ROUNDED):			Baseline		\$		\$
Total Install Cost (ROM) (ROUNDED)			\$		\$		\$
(Base Scope + Delta)			\$		\$		\$

- Notes:
1. Engine Compressor Package estimate based on quote provided from NEA for the 1900 HP Waukesha Engine Package
 2. EMD Compressor Package estimate based on quote provided from NEA for the 2500 HP Motor Driven Package
 3. Cost to upgrade SCE's system for the additional power requirements is a ROM estimate and must be confirmed with SCE to be considered accurate

Estimating Methodology
 AACE Class V estimate (Concept Screening)
 Base scope - Original VCM EPC project TIC (based on BMD's Exhibit B-2-1 Schedule of Values)
 Mechanical and Electrical equipment costs - budgetary pricing received from equipment manufacturers
 Translation of equipment cost to TIC (including construction/indirects) - equipment costs * 2.5 Lang Factor
 Direct equipment and factored cost comparison between Base Scope and the two (2) provided options to derive the ROM delta for those specific scopes
 Applied the delta to the Base Scope TIC (Exhibit B-2-1 SOV) to develop the ROM TIC for Options #1 and #2.



APPENDIX D – ONE LINE

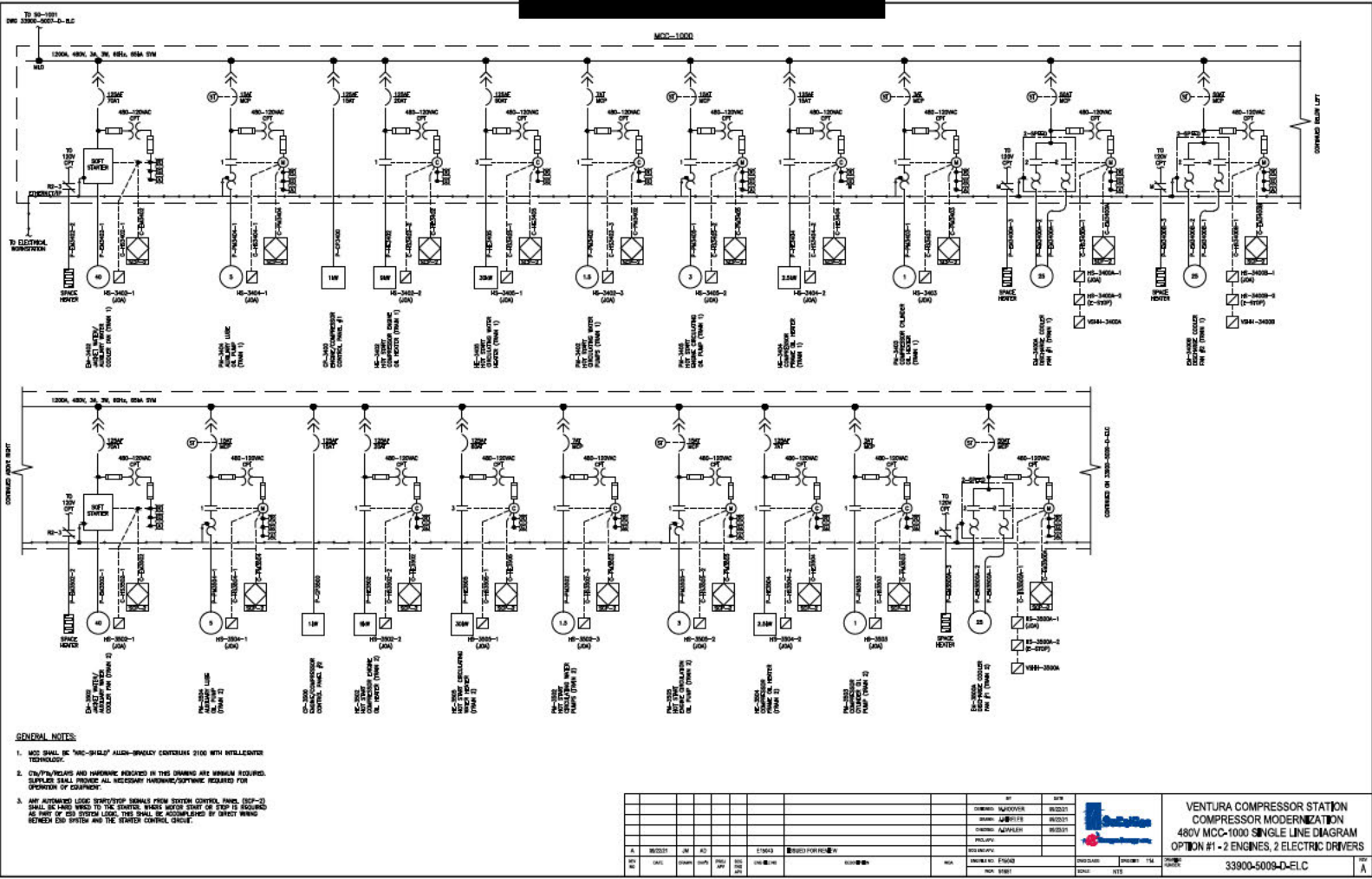


DEVICE SCHEDULE	
27	UNDERVOLTAGE RELAY
47	PHASE-SEQUENCE OR PHASE-BALANCE VOLTAGE RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	INSTANTANEOUS OVERCURRENT RELAY SOUND
51	AC TIME OVERCURRENT RELAY
52	POWER CIRCUIT BREAKER
59	OVERHEATING RELAY
79	AC RELOADING RELAY/AUTO RECLOSE
88	LOCKOUT RELAY
87	CURRENT DIFFERENTIAL SWITCH
CS	CONTROL GRIP CONTROL SWITCH
TCM	TRIP CIRCUIT MONITOR
TS	TEST SWITCH
SA	SURGE ARRESTOR

- NOTES:**
1. 15kV UPS CONTROL SUPPLY POWER SHALL BE PROVIDED AT ONE POINT (LOW VOLTAGE CONTROL COMPARTMENT) FOR CONNECTION OF EXTERNAL UPS CREDIT. SUPPLIER SHALL PROVIDE CONNECTION FROM EXTERNAL CONNECTION POINT TO EACH CONTROL CIRCUIT. SUPPLIER SHALL PROVIDE RELAY TO MONITOR LOSS OF CONTROL. POWER MONITOR RELAY SHALL HAVE 1 A.C. AND 1 D.C. CONTACT WIRING TO TERMINAL BLOCK FOR EXTERNAL CONNECTION. SUPPLIER SHALL PROVIDE CREDIT FROM 15kV UPS PANEL (UPS-1000) TO SINGLE CONTROL CIRCUIT CONNECTION POINT.
 2. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATIONS DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO DESIGN A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCONGRUITIES ARE NOTED THE SUPPLIER SHALL PROMPTLY NOTIFY THE OWNER'S ENGINEER. ALL RELAYS AND COMMUNICATIONS DEVICES SHALL BE PROVIDED FROM EXTERNAL SOURCE. WHEN PROVISION IS-700 PROTECTION RELAY SHALL BE PROVIDED WITH A.C. FLASH SENSOR INPUT CARD. A.C. FLASH RISK OPTIC SENSORS SHALL BE PROVIDED.
 3. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATIONS DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO DESIGN A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCONGRUITIES ARE NOTED, THE SUPPLIER SHALL PROMPTLY NOTIFY THE OWNER'S ENGINEER.
 4. A.C. CONTACT FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.
 5. POLE MOUNTED SWIM SWITCH BY OTHERS.
 6. PAD-MOUNTED RELOADER.
 7. ONE W/D PROVIDED FOR EACH COMPRESSOR.

REVISIONS		BY		DATE	
		DESIGNED	JACQUES	08/22/21	
		DRAWN	JACQUES	08/22/21	
		CHECKED	JACQUES	08/22/21	
		APPROVED			
A	08/22/21	JM	AD	08/22/21	08/22/21 FOR REVIEW
NO	DATE	DESIGN	APP	DATE	BY

PROJECT NO.	33900-5007-D-ELC
PROJECT NAME	VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION OVERALL SINGLE LINE DIAGRAM OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS
PROJECT LOCATION	
PROJECT OWNER	
PROJECT ENGINEER	
PROJECT MANAGER	
PROJECT SUPERVISOR	
PROJECT COORDINATOR	
PROJECT ASSISTANT	
PROJECT CONTACT	



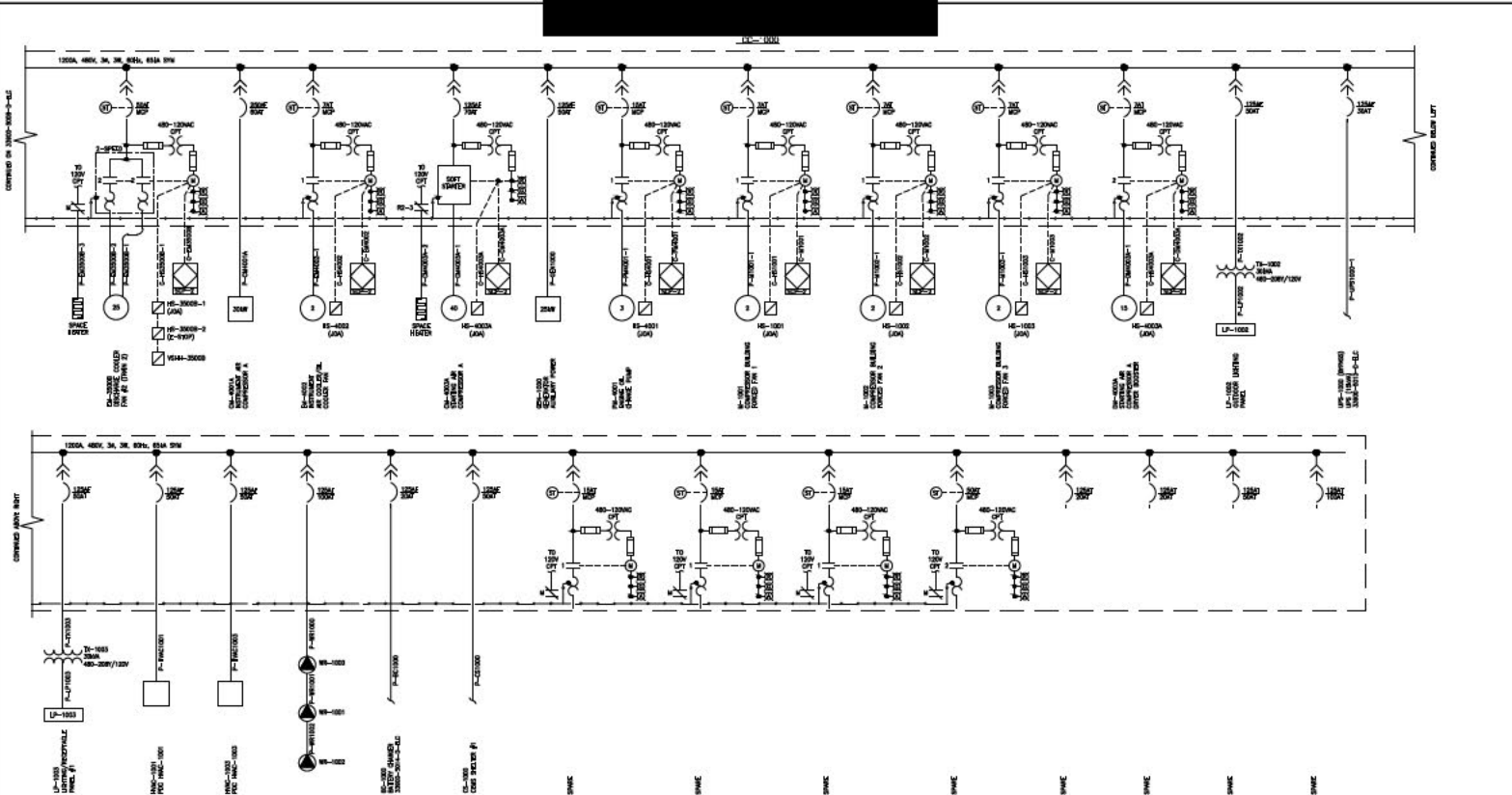
- GENERAL NOTES:**
- MCC SHALL BE "MCC-SINGLE" ALIGN-SINGLE CENTERED 2100 WITH MIDDLE CENTER TECHNOLOGY.
 - CONNECTIONS AND HARDWARE REQUIRED IN THIS DIAGRAM ARE MISSING REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
 - ANY REQUIRED LOGIC INPUT/OUTPUT SIGNALS FROM SYSTEM CONTROL PANEL (SCP-1) SHALL BE LAID WIRE TO THE CENTER. HARD WIRE START OR STOP IS REQUIRED AS PART OF ESD SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE CENTER CONTROL CHOOSE.

NO.	DATE	BY	CHKD	APP'D	DESCRIPTION
A	06/20/21	JM	AD		ISSUED FOR REVIEW
B					
C					
D					
E					
F					
G					
H					
I					
J					
K					
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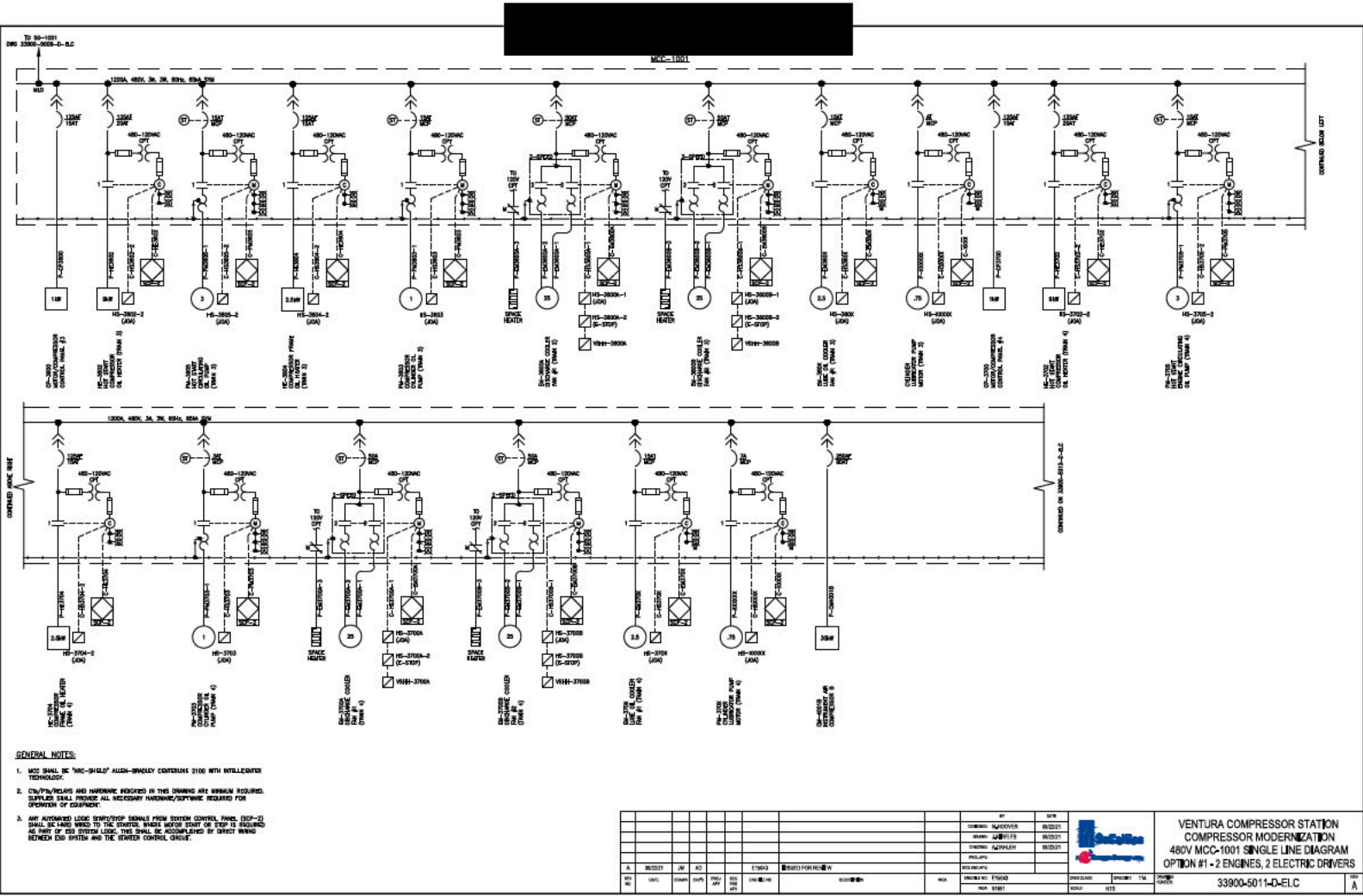
VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 480V MCC-1000 SINGLE LINE DIAGRAM
 OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

33900-5009-D-ELC



- GENERAL NOTES:**
- MCC SHALL BE "MCC-SINGLE" ALIGN-SINGLE CENTERED 2100 WITH MIDDLE CENTER TECHNOLOGY.
 - CONDUIT/RUNWAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
 - ANY REQUIRED LOGIC (STEP/STEP SIGNALS FROM SYSTEM CONTROL PANEL (SCP-1)) SHALL BE LAID WIRE TO THE CENTER. WIRE MOTOR START OR STOP IS REQUIRED AS PART OF ICS SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ICS SYSTEM AND THE CENTER CONTROL CHIEF.


REV		BY	DATE		VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION 480V MCC-1000 SINGLE LINE DIAGRAM OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS
A		DESIGNED BY	08/22/21		
B		DRAWN BY	08/23/21		
C		CHECKED BY	08/23/21		
D		APPROVED BY			
E		PROJECT			
F		DESCRIPTION			
G		ISSUE NO.			
H		ISSUE DATE			
I		ISSUE BY			
J		ISSUE FOR			
K		ISSUE NO.			
L		ISSUE DATE			
M		ISSUE BY			
N		ISSUE FOR			
O		ISSUE NO.			
P		ISSUE DATE			
Q		ISSUE BY			
R		ISSUE FOR			
S		ISSUE NO.			
T		ISSUE DATE			
U		ISSUE BY			
V		ISSUE FOR			
W		ISSUE NO.			
X		ISSUE DATE			
Y		ISSUE BY			
Z		ISSUE FOR			

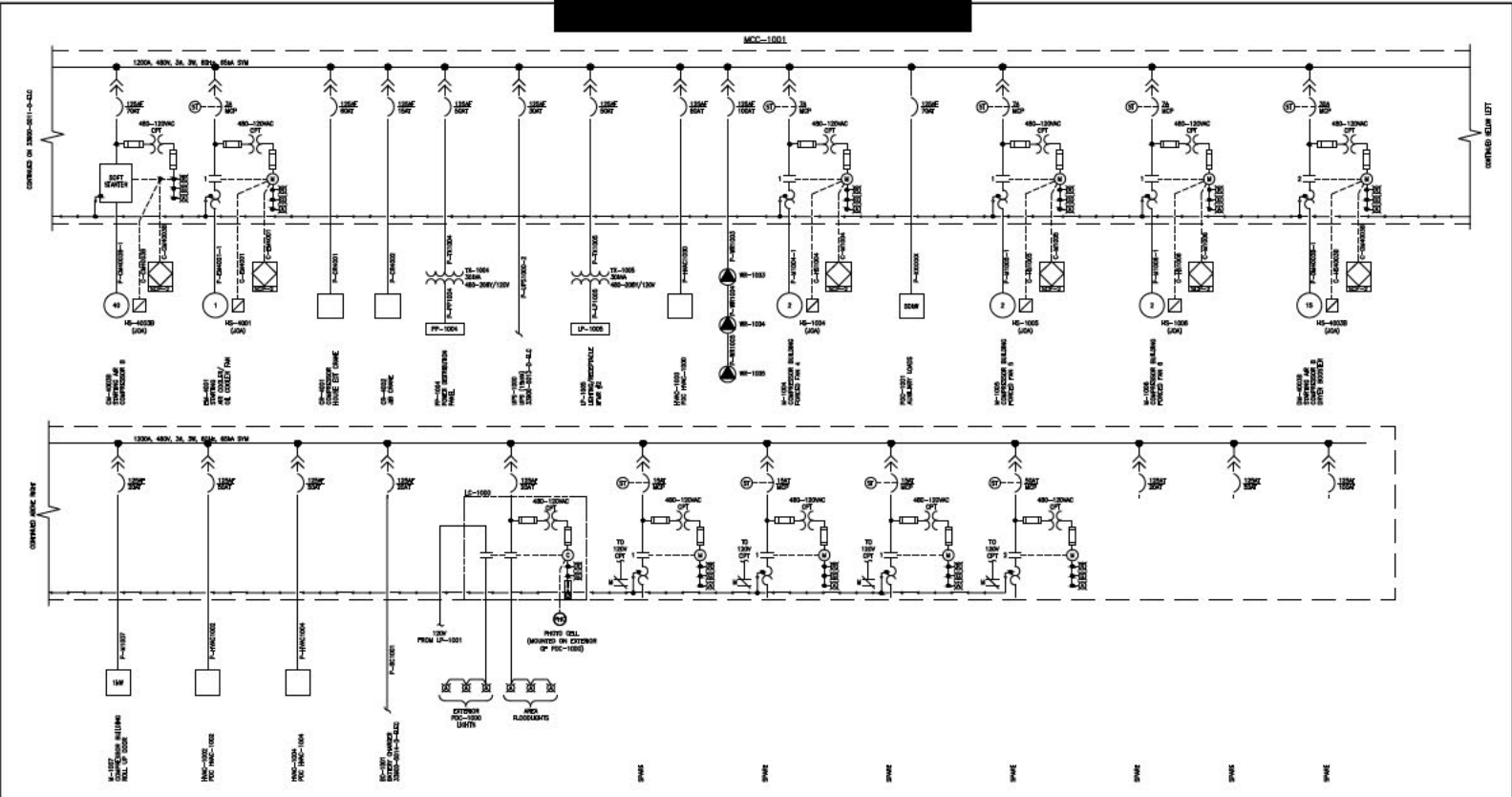


GENERAL NOTES:

- MCC SHALL BE "MCC-SINGLE" ALIGN-SINGLELY CONTAINERS 2100 WITH MIDDLE CENTER TERMINALS.
- CONDUITS/RINGS AND HARDWARE REQUIRED AS THIS DRAWING ARE MISSING REQUIRED SUPPLIES SHALL PROVIDE ALL NECESSARY HARDWARE/SUPPLIES REQUIRED FOR CORRECTION OF CONDUITS.
- ANY REQUIRED LOGIC/INTERLOCK SIGNALS FROM SYSTEM CONTROL PANEL (SCP-1) SHALL BE LAID WIRE TO THE CENTER, WHERE MOTOR START OR STOP IS REQUIRED AS PART OF ESD SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE CENTER CONTROL PANEL.

NO.	DATE	BY	CHKD.	APP'D.	REVISION
A	06/23/21	JM	AD		ISSUED FOR REVIEW
B					
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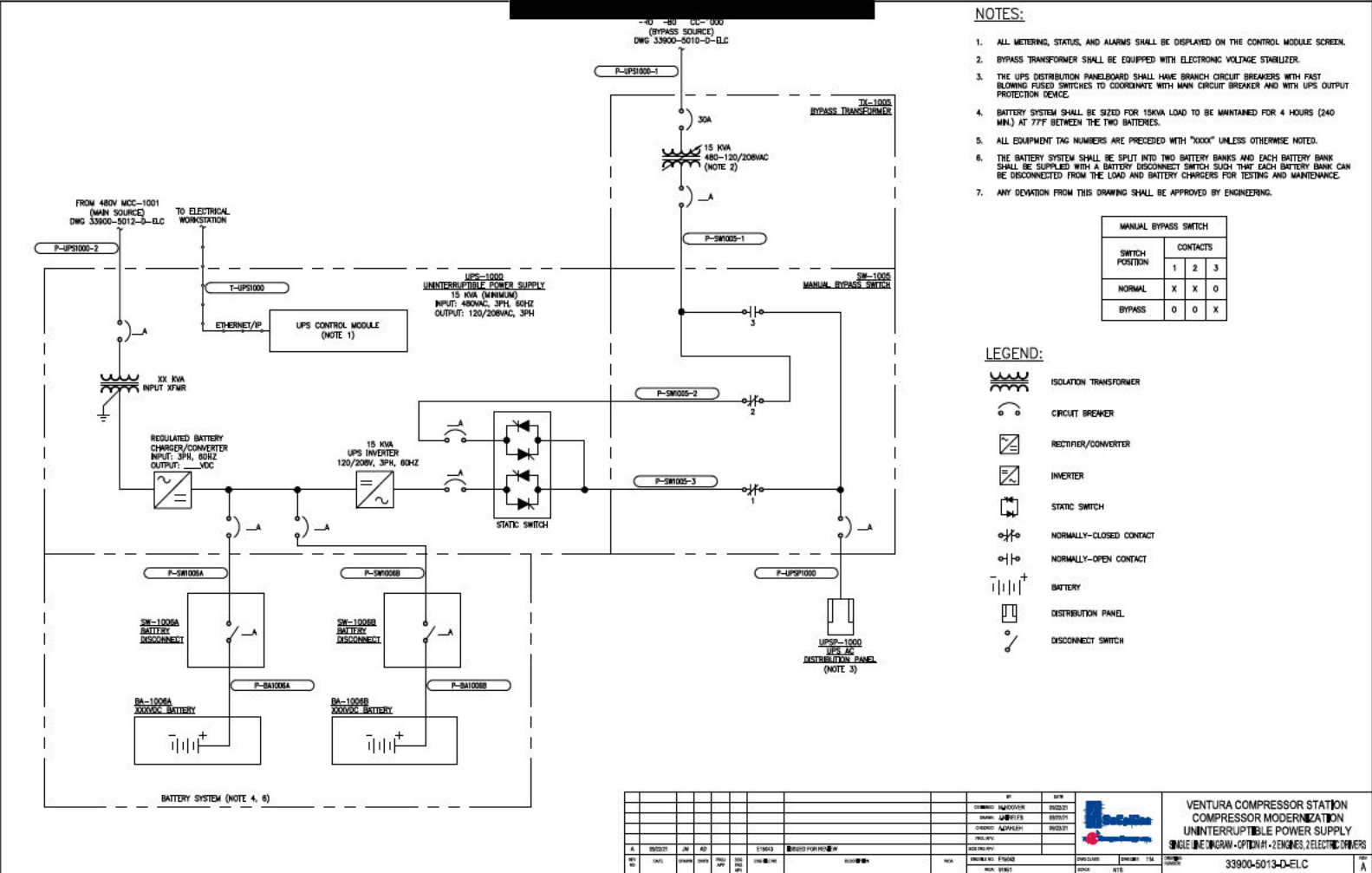

VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 480V MCC-1001 SINGLE LINE DIAGRAM
 OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS
 33900-5011-D-ELC



- GENERAL NOTES:**
- MCC SHALL BE "MID-SHAFT" ALLEN-BRADLEY CATALOG # 2100 WITH INTELLIGENT TECHNOLOGY.
 - CONTRACTOR SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
 - ALL AIRWAYS SHALL BE KEPT CLEAR FROM OVERHEAD TRAYS. (SEE 300-C) SHALL BE TAID WIRING TO THE STARTER, WIRING MOTOR START OR STOP IS REQUIRED AS PART OF THE SYSTEM ASSEMBLY. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE STARTER CONTROL CIRCUIT.

REVISION		BY	DATE
		DESIGNED: MCDONNELL	08/22/21
		DRAWN: J. B. JONES	08/23/21
		CHECKED: J. B. JONES	08/23/21
		PROJECT:	
PROJECT:		VENTURA COMPRESSOR STATION	
DRAWING NO: 33900-5012-D-ELC		SHEET NO: 1/1	
SCALE:		DATE: 08/23/21	

VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 480V MCC-1001 SINGLE LINE DIAGRAM
 OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS



NOTES:

1. ALL METERING, STATUS, AND ALARMS SHALL BE DISPLAYED ON THE CONTROL MODULE SCREEN.
2. BYPASS TRANSFORMER SHALL BE EQUIPPED WITH ELECTRONIC VOLTAGE STABILIZER.
3. THE UPS DISTRIBUTION PANELBOARD SHALL HAVE BRANCH CIRCUIT BREAKERS WITH FAST BLOWING FUSED SWITCHES TO COORDINATE WITH MAIN CIRCUIT BREAKER AND WITH UPS OUTPUT PROTECTION DEVICE.
4. BATTERY SYSTEM SHALL BE SIZED FOR 15KVA LOAD TO BE MAINTAINED FOR 4 HOURS (240 MIN.) AT 77F BETWEEN THE TWO BATTERIES.
5. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED WITH "XXXX" UNLESS OTHERWISE NOTED.
6. THE BATTERY SYSTEM SHALL BE SPLIT INTO TWO BATTERY BANKS AND EACH BATTERY BANK SHALL BE SUPPLIED WITH A BATTERY DISCONNECT SWITCH SUCH THAT EACH BATTERY BANK CAN BE DISCONNECTED FROM THE LOAD AND BATTERY CHARGERS FOR TESTING AND MAINTENANCE.
7. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

MANUAL BYPASS SWITCH			
SWITCH POSITION	CONTACTS		
	1	2	3
NORMAL	X	X	0
BYPASS	0	0	X

LEGEND:

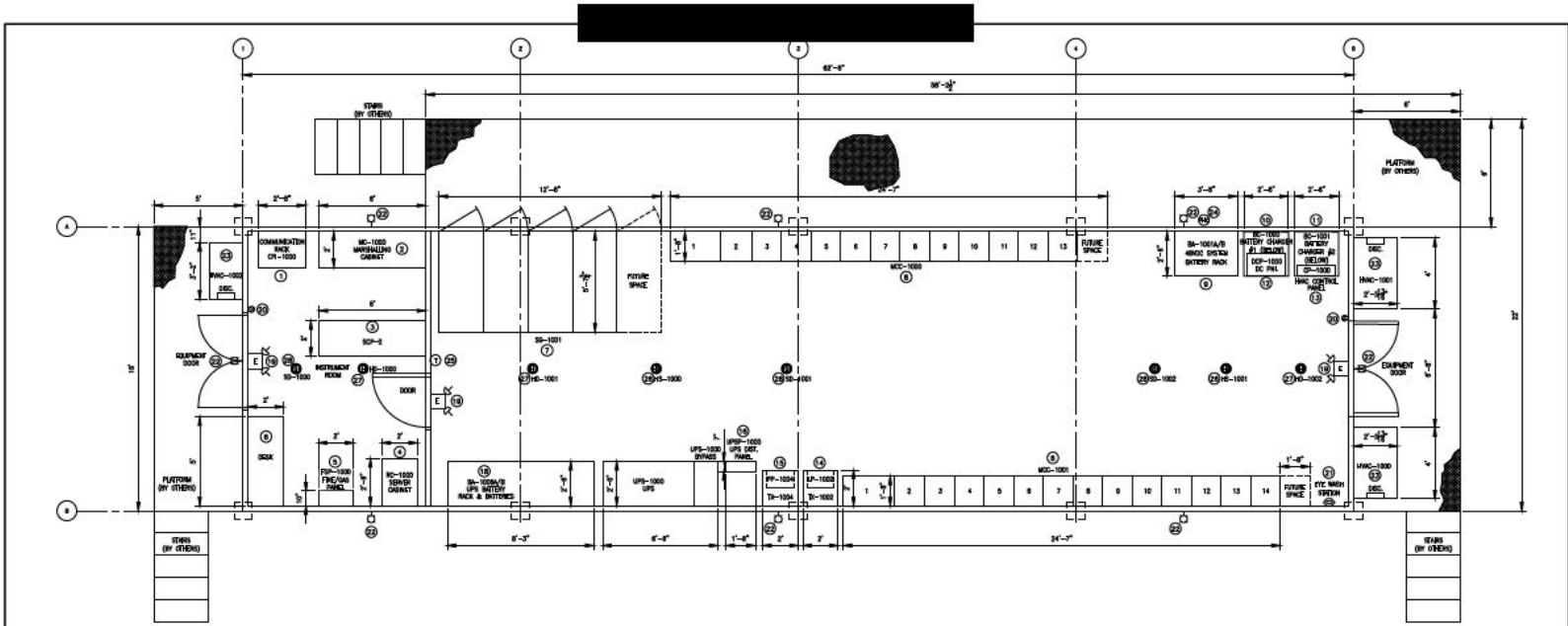
- ISOLATION TRANSFORMER
- CIRCUIT BREAKER
- RECTIFIER/CONVERTER
- INVERTER
- STATIC SWITCH
- NORMALLY-CLOSED CONTACT
- NORMALLY-OPEN CONTACT
- BATTERY
- DISTRIBUTION PANEL
- DISCONNECT SWITCH

REVISION		BY	DATE

DATE:	11/08/2017
TIME:	10:15
PROJECT:	33900-5013-D-ELC
SCALE:	1:1

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
UNINTERRUPTIBLE POWER SUPPLY
SINGLE LINE DRAWING - OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

33900-5013-D-ELC



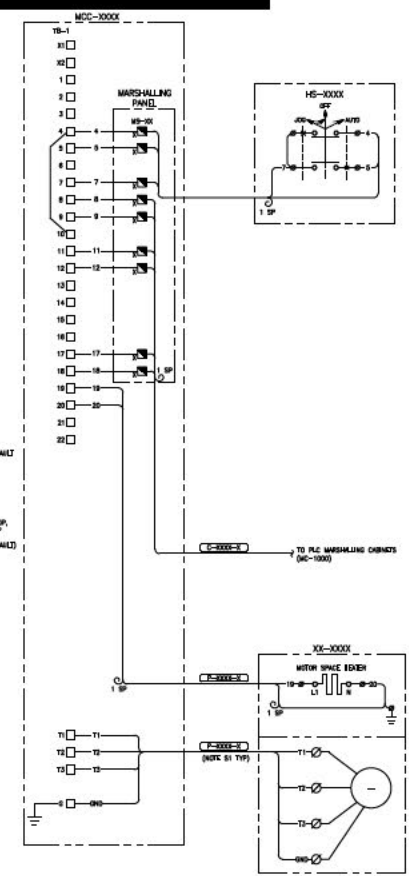
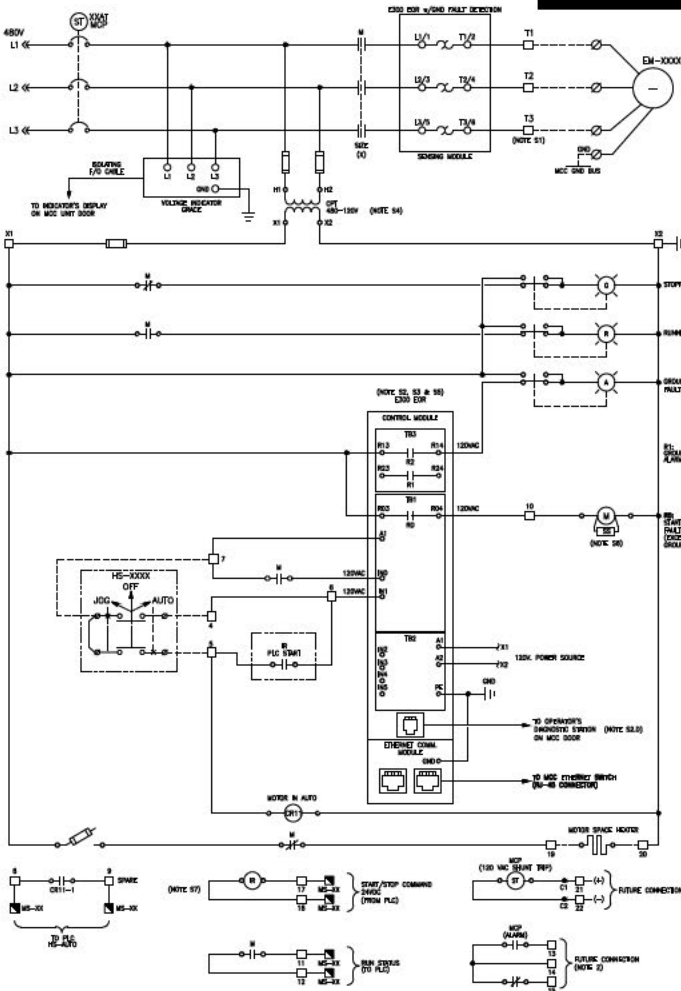
- NOTES:**
1. PRE-FABRICATED BUILDING COMPLETE WITH LIGHTING, RECEPTACLES AND HVAC TO BE PROVIDED AS PART OF CONTRACT 035-40.
 2. BLAZING AND EQUIPMENT DIMENSIONS ARE PRELIMINARY. VENDOR TO PROVIDE FINAL EQUIPMENT LAYOUT WITH ALL ACTUAL VENDOR DATA AND SUBMIT FOR APPROVAL. DRAWING SCALE: UNLESS OTHERWISE NOTED.
 3. MINIMUM CEILING HEIGHT SHALL BE A MINIMUM OF 10'-0".
 4. BLAZING SHALL BE INSTALLED ON PANS APPROXIMATELY 4' ABOVE GROUND (BY OTHERS).
 5. ROADS TO BE SPECIFICALLY DESIGNATED BY OTHERS.
 6. RECORDING AND RECORDING FIELD POWER CABLES FROM THE MCC'S AND OTHER SHALL BE BOTTOM AND/OR TOP ENTRY.
 7. SUPPLIER SHALL PROVIDE CABLE TRAY AROUND TOP MEMBER OF PREC-1000 FOR DISTRIBUTION OF SIGNAL, CONTROL, AND POWER WIRING. SUPPLIER SHALL PROVIDE SEPARATE CABLE TRAY FOR POWER (480V/208V) AND INSTRUMENTATION & CONTROL WIRING. CABLE TRAY SHALL BE ALUMINUM LINED THE SIZE OF ROAD SPACING AND 1" UNLESS OTHERWISE NOTED.
 8. ALL MEMBER CONDUITS SHALL BE PROVIDED WITH METALLIC INNERLATE. ALL RECEPTACLES SHALL BE PROVIDED WITH GROUND INTERRUPTERS.
 9. REFER TO PREC-1000 ELECTRICAL EQUIPMENT LIST (FORM 85-03-002) FOR PURCHASE, INSTALL, MAINT. RESPONSIBILITIES. SUPPLIER SHALL BE RESPONSIBLE FOR PROVIDING MISCELLANEOUS ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM.
 10. SUPPLIER SHALL REFER TO PREC-1000 OWNER GENERAL. SUPPLIER SHALL PROVIDE POWER FOR ALL SUPPLIER PROVIDED EQUIPMENT INCLUDING, BUT NOT LIMITED TO, THOSE REQUIRED BY THE Gantt SCHEDULE. SUPPLIER SHALL PROVIDE CONTROL AND COMMUNICATION CIRCUITS AS INDICATED IN THE Gantt SCHEDULE. SUPPLIER SHALL PROVIDE POWER FOR OTHER SUPPLIER EQUIPMENT AS INDICATED IN THE Gantt SCHEDULE.
 11. CONTROL PANEL, SCF-2 AND WIRING CABINET MC-1000 SHALL HAVE TOP ENTRY WIRING.
 12. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR THE CONTROL PANEL AND WIRING CABINET. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR FUTURE MCC. FUTURE MCC CUTOUTS SHALL BE SIZED ON THE DIMENSIONS OF TRUCK AND TRUCK SPACING.

- LEGEND:**
- Ⓧ E EMERGENCY EXIT UNIT WITH BATTERY PACK
 - ⓐ FIRE EXTINGUISHER
 - Ⓢ EYE WASH
 - Ⓜ HEAT DETECTOR - RATE OF RISE TYPE. OPENS WHEN REACHES TEMPERATURE SET POINT OF 80°F.
 - Ⓢ SMOKE DETECTOR - PHOTO ELECTRIC TYPE WITH ALARM AND TALKS RELAYS WITH FORM 85 CONTACTS. THE OPEN ON ALARM OR LOSS OF POWER, 24VDC.
 - Ⓜ HYDROGEN SENSOR
 - Ⓢ PHOTOCELL
 - Ⓣ THERMOCOAST

BY		DATE	DESCRIPTION		
DESIGNED	MARCOVOS	06/20/21			
DRAWN	LIMPLELES	06/20/21			
CHECKED	ALVARADO	06/20/21			
PROJECT					
VENTURA COMPRESSOR STATION					
COMPRESSOR MODERNIZATION					
PDC BUILDING - EQUIPMENT ARRANGEMENT					
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS					
NO.	DATE	BY	APP.	DESCRIPTION	REVISION
1	06/20/21	JM	MD	E15843	ISSUED FOR REVIEW
2	06/20/21	JM	MD	E15843	ISSUED FOR REVIEW
3	06/20/21	JM	MD	E15843	ISSUED FOR REVIEW

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
PDC BUILDING - EQUIPMENT ARRANGEMENT
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

33900-5030-D-ELC



DRAWING NO.	REFERENCE DRAWING IDENTIFICATION
000-0-00	ELECTRICAL SCHEMATIC SYMBOLS & ABBREVIATIONS
XXXX-000-0-01	SINGLE LINE DIAGRAM

- GENERAL NOTES:**
- CONTROL SIGNALS TO/FROM E300 EOR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
 - INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MCP IN THE OFF/NON-TRIPPED POSITION.
 - MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
 - JOA POSITION: HOLDING THE JOA SWITCH IN JOG POSITION WILL START THE MOTOR. RELEASING JOA WILL SPRING-RETURN THE SELECTOR SWITCH BACK TO OFF POSITION, AND MOTOR WILL STOP.
 - OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
 - AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). WHILE JOA IS IN AUTO POSITION, THE MOTOR MAY START (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
 - EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXX".
 - ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

- NOTES TO MCC SUPPLIER:**
- REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED IUC SIZE.
 - ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-WIRE CONTROL WITH FEEDBACK AS FOLLOWS:
 - OUTPUT RELAY "TR" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINAL "IN1", AND NO FAULTS ARE DETECTED BY THE E300 EOR.
 - OUTPUT RELAY "TR" SHALL OPEN WHEN 120VAC CONTROL VOLTAGE IS NOT PRESENT AT INPUT TERMINAL "IN1", OR WHEN A FAULT (OTHER THAN GROUND FAULT) IS DETECTED BY THE E300 EOR.
 - OUTPUT RELAY "IN" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN THE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAY "TR" ON A GROUND FAULT.
 - DOOR-MOUNTED DIAGNOSTIC STATION SHALL DISPLAY ANY FAULT DETECTED BY THE E300 EOR, AND SHALL BE USED TO RESET ANY FAULT AFTER IT HAS CLEARED.
 - ALL E300 FOR PARAMETERS' STATUS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE (BUT ARE NOT LIMITED TO) MOTOR READY, RUNNING, FAILED TO RUN, AT FAULT, FAULT'S TYPE, ETC.
 - CONTROL POWER TRANSFORMER (OPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.
 - LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.
 - SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.
 - PROVIDE 24VDC INTERPOSING CONTROL RELAY.
 - ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHIELD-STATE).

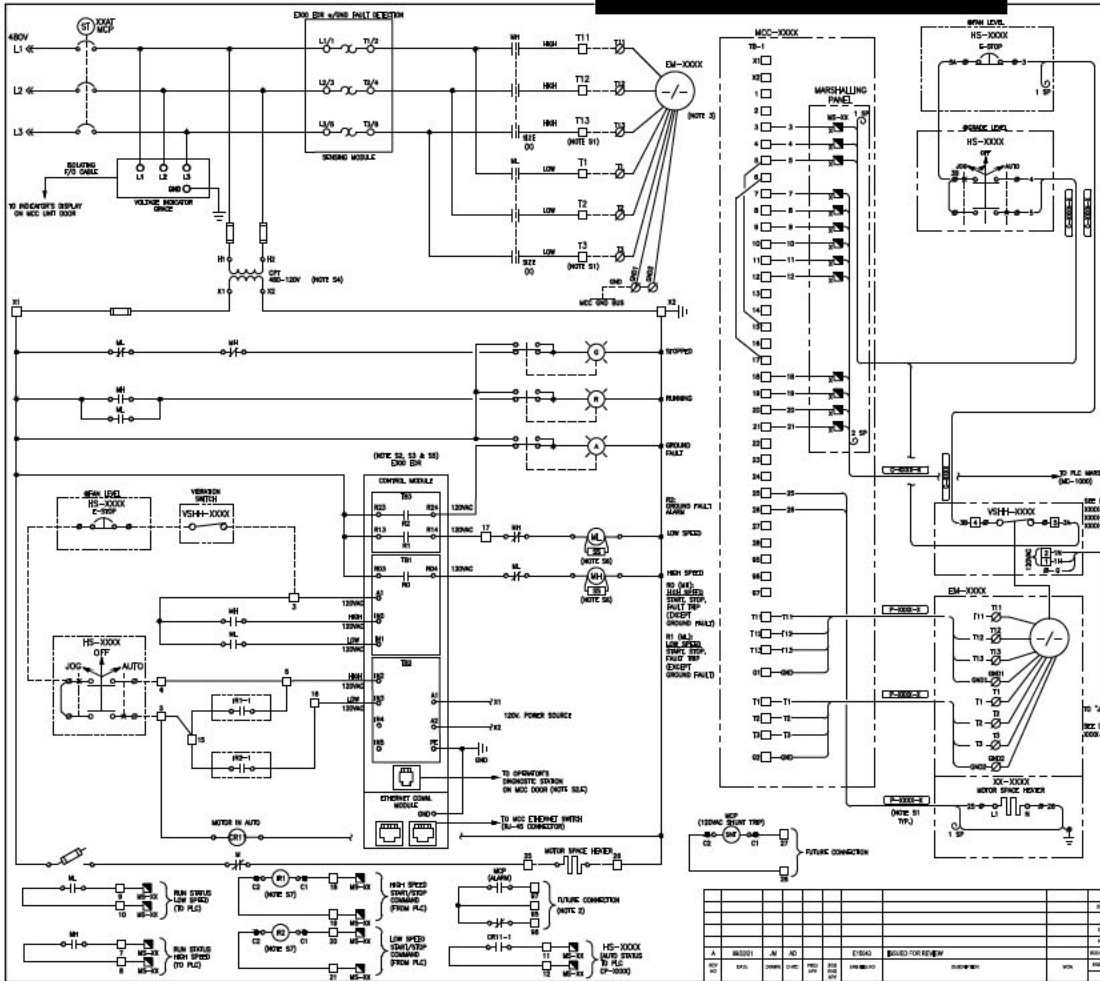
- LEGEND:**
- MCC STARTER CABLE TERMINALS
 - MCC MARSHALLING CABLE TERMINALS
 - PLC MARSHALLING CABLE TERMINALS

NO.	DATE	BY	CHKD	APP'D	DESCRIPTION
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VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 TYPICAL ONE-SPEED MOTOR SCHEMATIC AND WIRING DIAGRAM
 OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

33900-5040-D-ELC



REVISED BY	REVISION DESCRIPTION
0001-01-01	ELECTRICAL DESIGN ENGINEER, CHECKER & APPROVER
0000-0000-0-0-0	SINGLE LINE DRAWING

GENERAL NOTES:

- CONTROL SIGNALS TO/FROM E300 EDR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
- INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MOP IN THE OFF/NON-TRIPPED POSITION.
- TWO SPEED, TWO WINDING, VARIABLE TORQUE MOTOR IS RATED AT XX/XXHP, XX/XX RPM.
- MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
 - JOG POSITION: HOLDING THE JOA SWITCH IN JOG POSITION WILL START THE MOTOR AT LOW SPEED. RELEASING JOA WILL SPRING-RETURN THE SELECTOR SWITCH BACK TO OFF POSITION, AND MOTOR WILL STOP.
 - OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED, SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
 - AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). JOA IS IN AUTO POSITION MUST START THE MOTOR IMMEDIATELY (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
- EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXXX".
- ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

- REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.
- ALLOW-UNLATCHED E300 EDR SHALL BE CONFIGURED/PROGRAMMED FOR 2-SPEED, 2-WIRE CONTROL AS FOLLOWS:
 - OUTPUT RELAYS "R0" OR "R1" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINALS "I02" OR "I03" RESPECTIVELY, AND NO FAULTS ARE DETECTED BY THE E300 EDR. OUTPUT RELAYS "R0" AND "R1" SHALL NOT BE CLOSED AT THE SAME TIME, SWITCHING FROM HIGH SPEED OUTPUT RELAY "R0" TO LOW SPEED OUTPUT RELAY "R1" SHALL NOT TAKE PLACE UNTIL THREE MINUTES TIME DELAY HAVE ELAPSED FROM THE TIME THAT OUTPUT RELAY "R0" HAS OPENED, SWITCHING FROM LOW SPEED OUTPUT RELAY "R1" TO HIGH SPEED OUTPUT RELAY "R0" WITHOUT TIME DELAY IS ALLOWED.
 - OUTPUT RELAYS "R0" OR "R1" SHALL OPEN WHEN 120VAC CONTROL VOLTAGE IS NOT PRESENT AT INPUT TERMINALS "I02" OR "I03" RESPECTIVELY, OR WHEN A FAULT (OTHER THAN GROUND FAULT) IS DETECTED BY THE E300 EDR.
 - OUTPUT RELAY "R02" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EDR, AND PERSISTS FOR MORE THAN FIVE SECONDS. E300 EDR SHALL NOT TRIP OUTPUT RELAYS "R0" OR "R1" ON A GROUND FAULT.
 - EACH OF THE TWO MOTOR WINDINGS SHALL HAVE A DIFFERENT OVERLOAD SETTING AS PER NEC REQUIREMENTS. EACH OVERLOAD SETTING SHALL BE ACTIVATED WHEN ITS RESPECTIVE OUTPUT RELAY IS CLOSED, I.E. "R0" OR "R1".
 - DOOR-MOUNTED DIAGNOSTIC STATION SHALL DISPLAY ANY FAULT DETECTED BY THE E300 EDR, AND SHALL BE USED TO RESET ANY FAULT AFTER IT HAS CLEARED.
- ALL E300 EDR PARAMETERS' STATUS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE (BUT ARE NOT LIMITED TO) MOTOR READY, RUNNING, FAILED TO RUN, AT FAULT, FAULTS TYPE, ETC.
- CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.
- LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EDR.
- SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE 24VDC INTERPOSING CONTROL RELAY.
- ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SELF STATE).

LEGEND:

- MOP SWITCH CIRCUIT TERMINALS
- MCC MARSHALLING CABINET TERMINALS
- PLC MARSHALLING CABINET TERMINALS

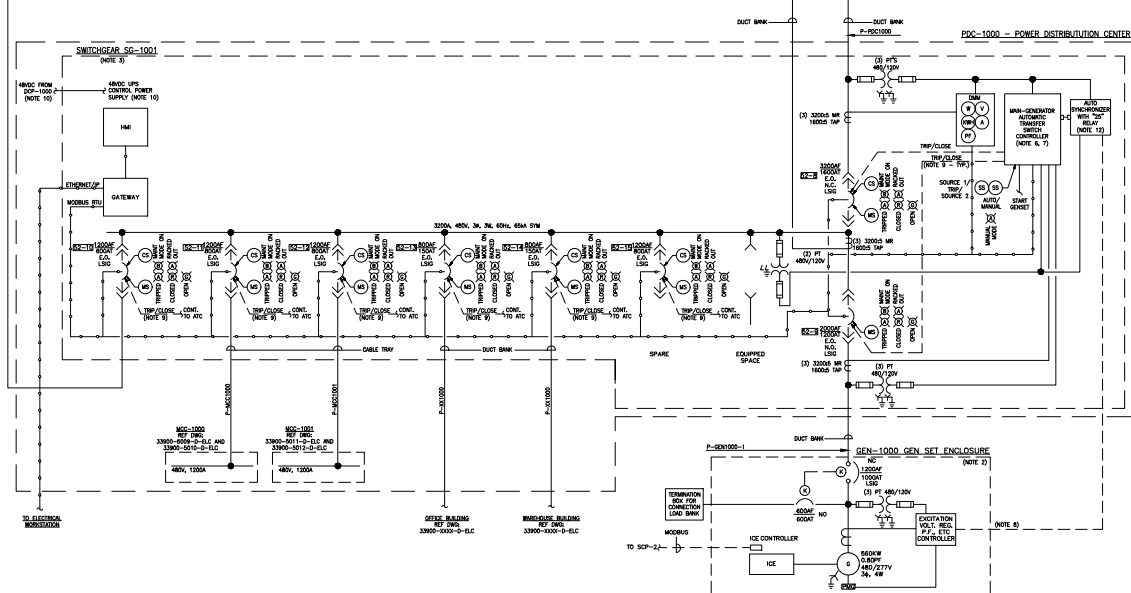
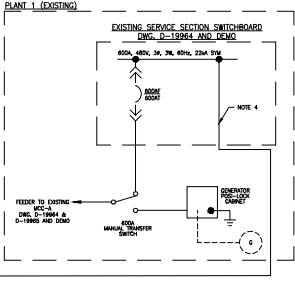
NO.	DATE	BY	CHKD	APP'D	DESCRIPTION
A	08/20/21	JM	ND	E1563	ISSUED FOR REVIEW
REV	DATE	BY	CHKD	APP'D	DESCRIPTION

PROJECT NO.	015643	DATE	08/20/21
PROJECT NAME	VENTURA COMPRESSOR STATION	DESIGNER	JM
CLIENT	VENTURA	CHECKER	ND
SCALE	AS SHOWN	APPROVER	E1563
DATE	08/20/21	PLANT NO.	015643
BY	JM	REV	0
CHKD	ND	DATE	08/20/21
APP'D	E1563	SCALE	AS SHOWN
DATE	08/20/21	PROJECT NO.	015643
BY	JM	PROJECT NAME	VENTURA COMPRESSOR STATION
CHKD	ND	CLIENT	VENTURA
APP'D	E1563	SCALE	AS SHOWN
DATE	08/20/21	PLANT NO.	015643

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
TYPICAL TWO-SPEED MOTOR SCHEMATIC AND WIRING DRAWING
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

33900-604-1-D-E1-C

SYMBOL	DESCRIPTION
UR	UNDERVOLTAGE RELAY
DM	DIGITAL MULTI METER
SST	SOLID STATE TRIP
CB	CIRCUIT BREAKER
AS	AUTO SELECTIVE CONTROL/TRANSFER RELAY
SS	SELECTOR SWITCH
CS	PISTOL GRIP CONTROL SWITCH
MS	MAINTENANCE MODE SELECTOR SWITCH
PC	PULSE CONTACTOR
VR	VOLTAGE RELAY



- NOTES:**
- FULL AND NEUTRAL SECTIONS FOR SIZE REQUIREMENTS.
 - GENERATOR CONTROL PANEL SUPPLIED WITH GENERATOR.
 - ALL BREAKERS SHALL BE ELECTRICALLY OPERATED WITH MICROPROCESSOR BASED TRIP UNIT.
 - ABANDON EXISTING SERVICE AND RUN NEW FEEDER TO FEED EXISTING FACILITY (PLANT 1).
 - POWER CABLES ARE 600V, ALUMINUM INSULATION (DASH-3), PVC JACKET, TYP TO-04.
 - AUTOMATIC TRANSFER SWITCH SCHEME SHALL BE PROVIDED AND SHALL HAVE THE FOLLOWING CHARACTERISTICS:
 A. OPERATE AS OPEN TRANSFER SWITCH IF THE PRIMARY POWER SOURCE FAILS. EVENT OCCURS, THE SOURCE 2 BREAKER IS CLOSED AND SOURCE 1 BREAKER IS OPENED.
 B. OPERATE AS CLOSED TRANSFER SWITCH WHEN THE PRIMARY SOURCE HAS BEEN RESTORED. THE GENERATOR SOURCE SHALL BE DISCONNECTED BY FREQUENCY, POWER AND VOLTAGE MONITORING AND THIS CHECK SHALL BE SYNCHRONIZED. THE ATS CONTROLLER SHALL PARALLEL THE TWO LIVE SOURCES TEMPORARILY WITH A BRANDED TRANSFER INTERLOCKING TIME.
 - MAIN BREAKER (S2-8) AND GENERATOR BREAKER (S2-9) SHALL INCLUDE ELECTRICAL INTERLOCKS TO PREVENT UNWARRANTED PARALLELING OF THE POWER SOURCES.
 - SIGNAL TO GENERATOR CONTROLLER TO ADJUST GENERATOR VOLTAGE, FREQUENCY AND PHASE ANGLE TO MATCH UTILITY POWER.
 - ATS CONTROLLER SHALL PROVIDE TIME-BASED LOAD ADDING OF SWITCHGEAR FEEDER BREAKERS UPON TRANSITION TO GENERATOR POWER TO STAVE HIGH-INRUSH LOADS AND AVOID REVERSE VOLTAGE OF GENERATOR. LOAD SEQUENCING SHALL BE PER THE FOLLOWING TABLE.

BREAKER TAG	LOAD DESCRIPTION	LOAD SEQUENCE
S2-10	EXISTING PLANT 1	LOAD SHED
S2-11	MCC-1000	1
S2-12	MCC-1001	2
S2-13	OFFICE BLDG	3
S2-14	WAREHOUSE BLDG	4
S2-15	SPARE	LOAD SHED

10. 480V UPS CONTROL SUPPLY POWER CIRCUITS SHALL BE PROVIDED FOR CONNECTION OF SWGR TO EXTERNAL UPS.

11. NAME SELECTION OF ALL PROTECTION DEVICES, VECTOR CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENGINEER A COMPLETE WIRING SYSTEM IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. THESE INSTRUMENTS AND COMPONENTS ARE NOTED. THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER.

12. SUPPLIER SHALL PROVIDE AUTOMATIC ENGINEERING (FIELD) PROTECTIVE AUTOMATIC ENGINEER SHALL PROVIDE AUTOMATIC SYNCHRONIZATION OF GENERATOR TO LIVE UTILITY BUS DURING THE CLOSED TRANSITION BACK TO THE PRIMARY SOURCE AND SHALL BE INSTALLED WITH THE 600-900.

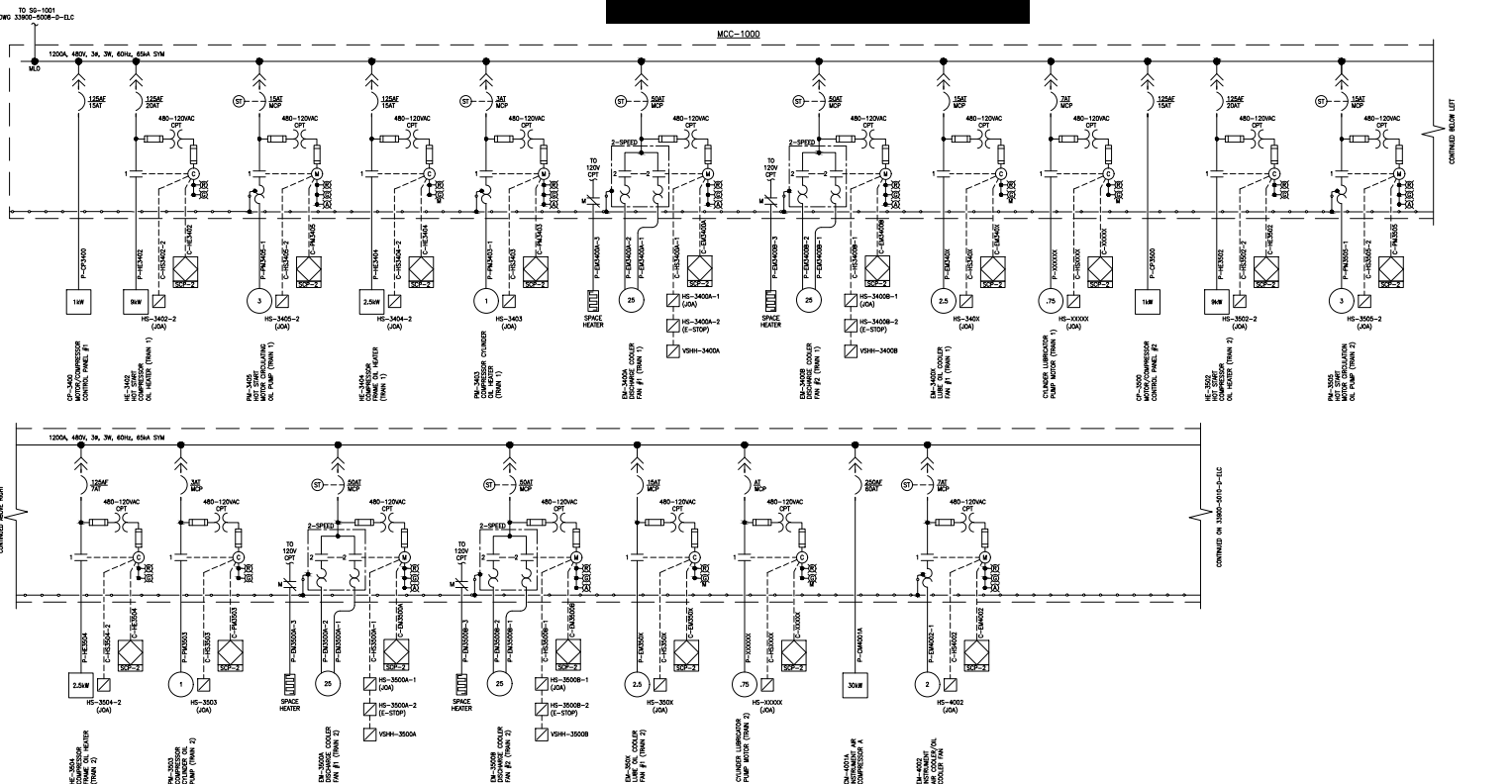
13. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

LOAD SUMMARY				
EQUIPMENT	KVA	WATT	BUS SIZE (A)	BREAKER TRIP (A)
MCC-1000	238.9	260.7	315.5	1200
MCC-1001	259.9	288.7	347.3	1200
SG-1001	668.3	746.3	901.2	2000
SG-1000	882.1	988.4	1206.1	2000
+2X02 SPARE	10225.8	11895.2	1483.4	-

DATE	BY	CHKD	APP'D	REV
02/22/21	JZ	AD	E:10603	02/22/21
02/22/21	AD	AD	02/22/21	02/22/21
02/22/21	AD	AD	02/22/21	02/22/21

VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 OVERALL SINGLE LINE DIAGRAM
 OPTION #2 - 4 ELECTRIC DRIVERS

DATE	BY	CHKD	APP'D	REV
02/22/21	JZ	AD	E:10603	02/22/21
02/22/21	AD	AD	02/22/21	02/22/21
02/22/21	AD	AD	02/22/21	02/22/21



GENERAL NOTES:

- MCC SHALL BE "MIC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
- CT/PT/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
- ANY AUTOMATED LOGIC START/STOP SIGNALS FROM STATION CONTROL PANEL (SCP-2) SHALL BE HARD WIRED TO THE STARTER, WHERE MOTOR START OR STOP IS REQUIRED AS PART OF ESD SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE STARTER CONTROL CIRCUIT.

NO.	DATE	BY	CHKD	APP'D	DESCRIPTION
1	09/22/11	JW	AD		ISSUED FOR REVIEW
2	09/22/11	DAW	DAW		
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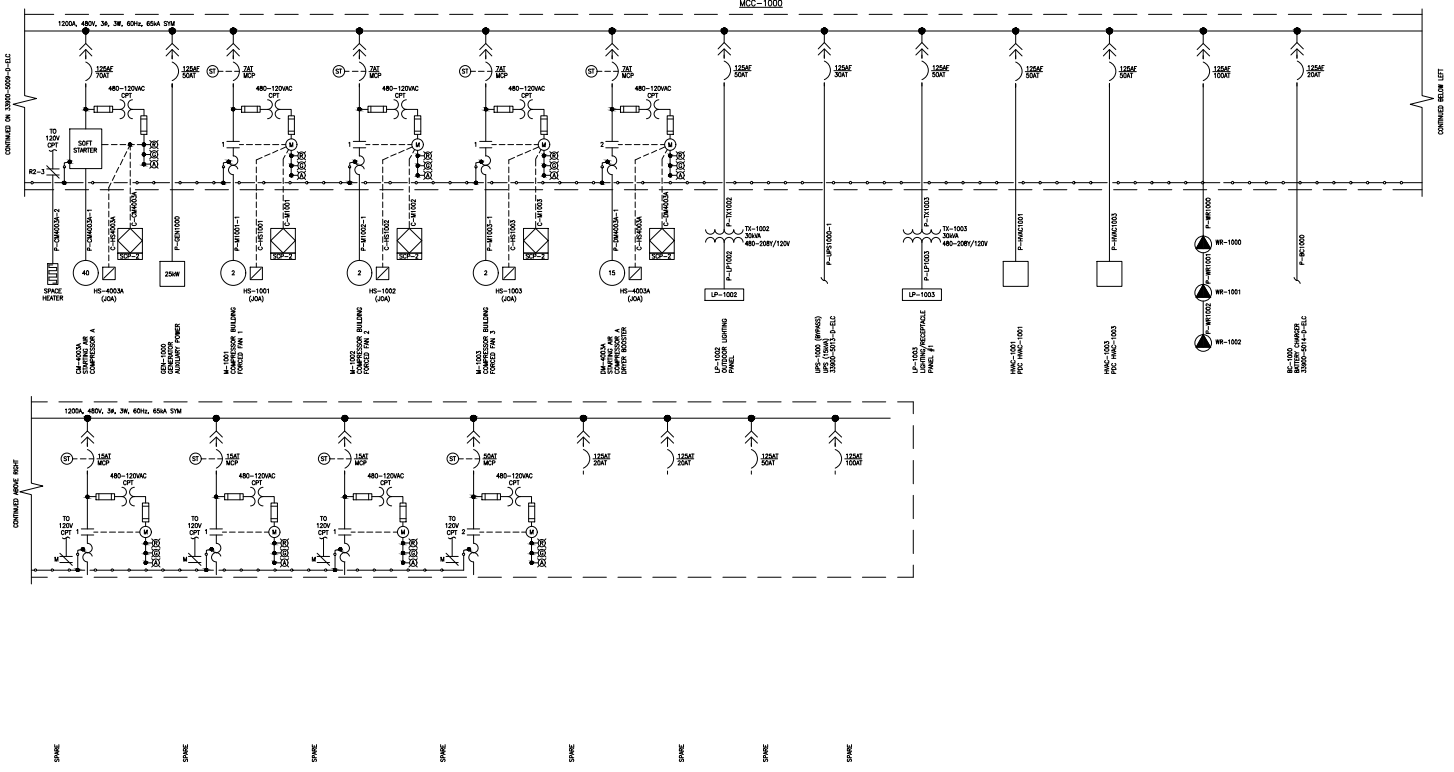


VENTURA ENGINEERING
 VENTURA COMPRESSION
 ENGINEERING
 480V MCC-1000 SINGLE LINE DIAGRAM
 OPTION #2 - 4 ELECTRIC DRIVERS

33900-5009-D-ELC



MCC-1000



- GENERAL NOTES:**
- MCC SHALL BE "MCC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
 - CT/PT/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
 - ANY AUTOMATED LOGIC START/STOP SIGNALS FROM STATION CONTROL PANEL (SCP-2) SHALL BE HARD WIRED TO THE STARTER, WHERE MOTOR START OR STOP IS REQUIRED AS PART OF ESD SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE STARTER CONTROL CIRCUIT.

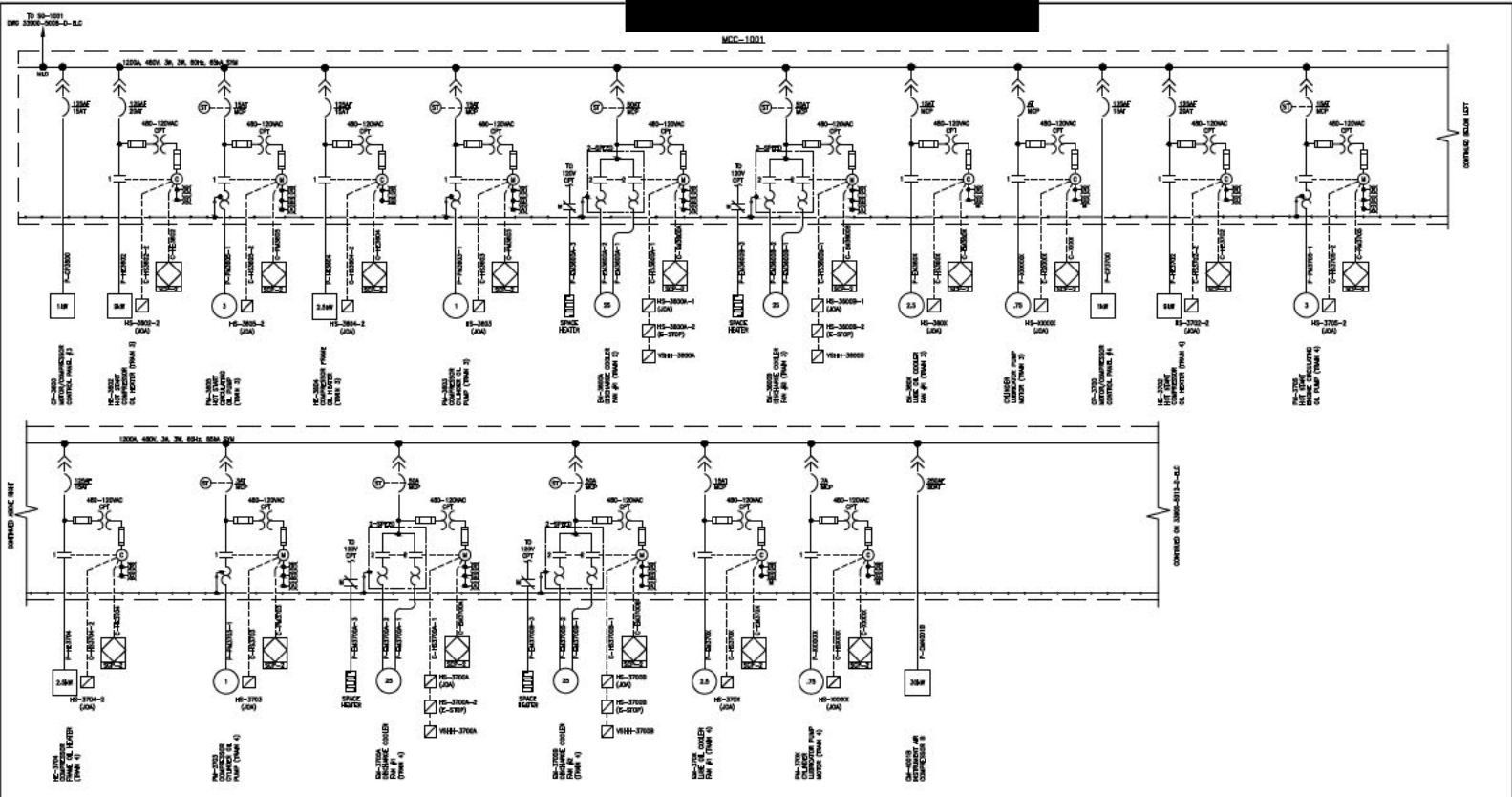
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VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 480V MCC-1000 SINGLE LINE DIAGRAM
 OPTION #2 - 4 ELECTRIC DRIVERS

33900-5010-D-ELC

MCC-1001



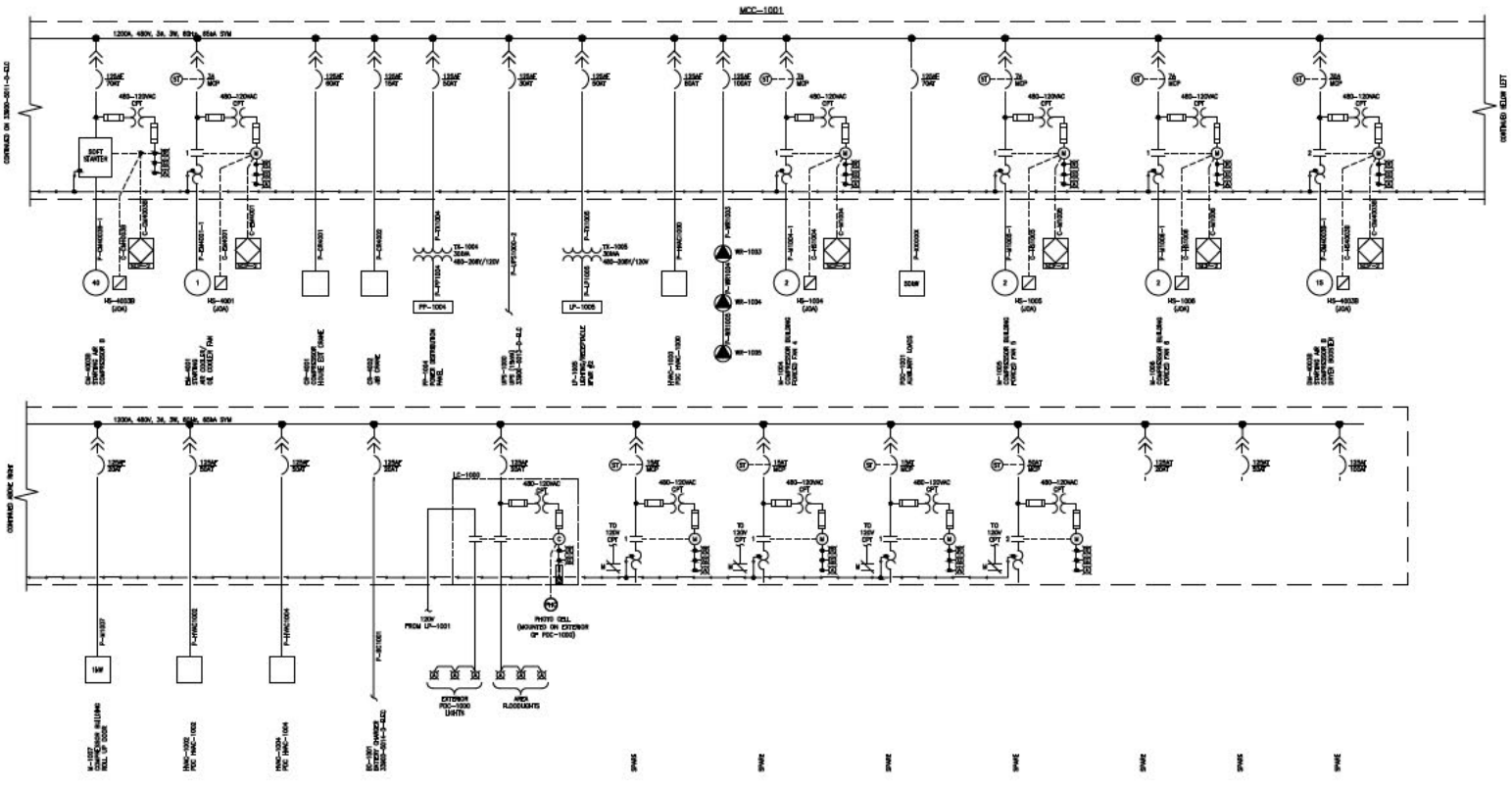
- GENERAL NOTES:**
- MCC SHALL BE "MCC-SINGLE" ALIGN-SINGLELY CONTAINERS 2100 WITH INTERLOCKER TECHNOLOGY.
 - CONDUITS/PANELS AND HARDWARE REQUIRED IN THIS DRAWING ARE MISSING REQUIRED SUPPLIES SHALL PROVIDE ALL NECESSARY HARDWARE/SUPPLIES REQUIRED FOR OPERATION OF CONTAINER.
 - ANY REQUIRED LOGIC INPUT/OUTPUT SIGNALS FROM SYSTEM CONTROL PANEL (SCP-1) SHALL BE LAID WIRE TO THE CENTER, WHERE MOTOR START OR STOP IS REQUIRED AS PART OF ESD SYSTEM LOGIC. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN ESD SYSTEM AND THE CENTER CONTROL PANEL.

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VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 480V MCC-1001 SINGLE LINE DIAGRAM
 OPTION #2 - 4 ELECTRIC DRIVERS

33900-5011-D-ELC

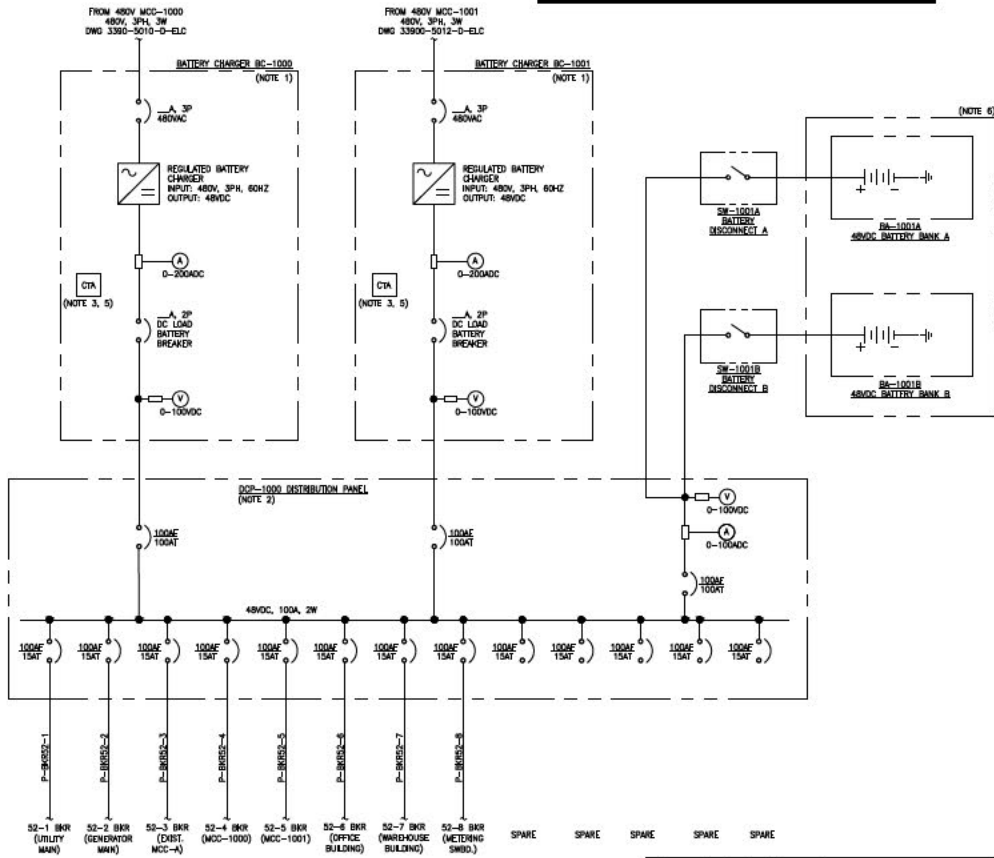
MCC-1001



- GENERAL NOTES:**
- MCC SHALL BE "THRO-START" ALLEN-BRADLEY CATALOG # 2100 WITH INTELLIGENT TECHNOLOGY.
 - CONTRACTOR SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
 - ALL APPROVED LOGS/START/STOP SIGNALS FROM SYSTEM CONTROL PANEL (SCM-C) SHALL BE WIRED INTO THE STARTER WIRING MOTOR START OR STOP IS REQUIRED AS PART OF THE SYSTEM LOGS. THIS SHALL BE ACCOMPLISHED BY DIRECT WIRING BETWEEN THE SYSTEM AND THE STARTER CONTROL CIRCUIT.

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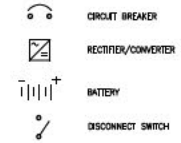
VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
480V MCC-1001 SINGLE LINE DIAGRAM
OPTION #2 - 4 ELECTRIC DRIVERS
 33900-5012-D-ELC



NOTES:

1. ALL METERING, STATUS, AND ALARMS SHALL BE DISPLAYED ON THE CONTROL MODULE SCREEN.
2. ALL CIRCUIT BREAKERS SHALL BE 2 POLE BREAKERS.
3. CTA - COMMON TROUBLE ALARM SHALL BE DISPLAYED ON THE FRONT OF THE BATTERY CHARGER ENCLOSURE. CTA SIGNAL SHALL HAVE (2) N.C. CONTACTS FOR EXTERNAL WIRING.
4. EQUIPMENT AND CABLE TAG NUMBERS ARE PRECEDED BY "XXXX" UNLESS OTHERWISE NOTED.
5. COMMON TROUBLE ALARM (CTA) SHALL BE WIRED TO STATION P.L.C.
6. THE BATTERY SYSTEM SHALL BE SPLIT INTO TWO BATTERY BANKS AND EACH BATTERY BANK SHALL BE SUPPLIED WITH A BATTERY DISCONNECT SWITCH SUCH THAT EACH BATTERY BANK CAN BE DISCONNECTED FROM THE LOAD AND BATTERY CHARGERS FOR TESTING AND MAINTENANCE.
7. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

LEGEND:

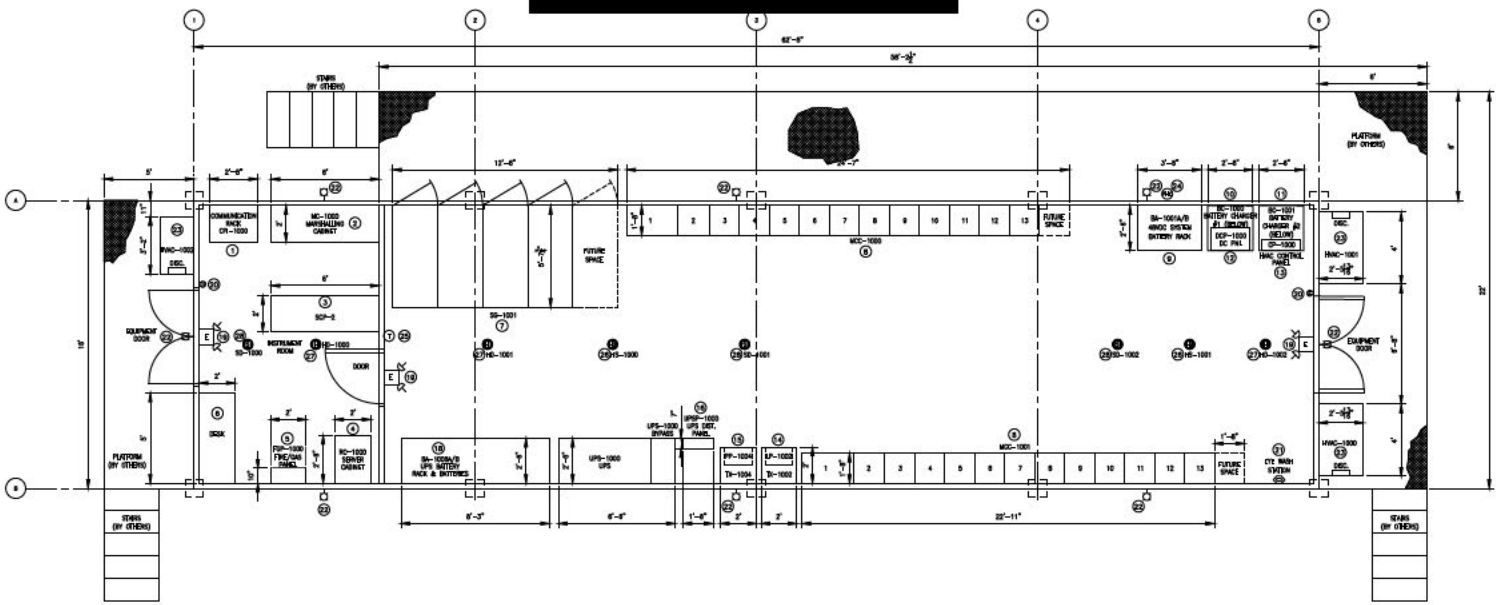


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VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
48 VDC - SINGLE LINE DIAGRAM
OPTION #2 - 4 ELECTRIC DRIVERS

33900-5014-D-ELC



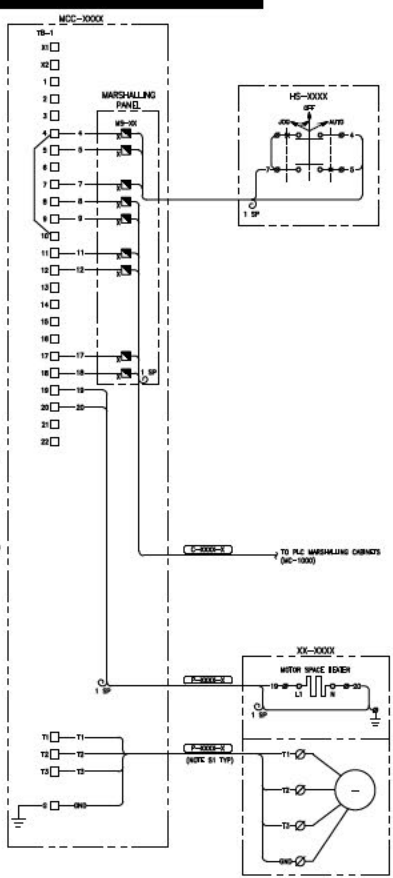
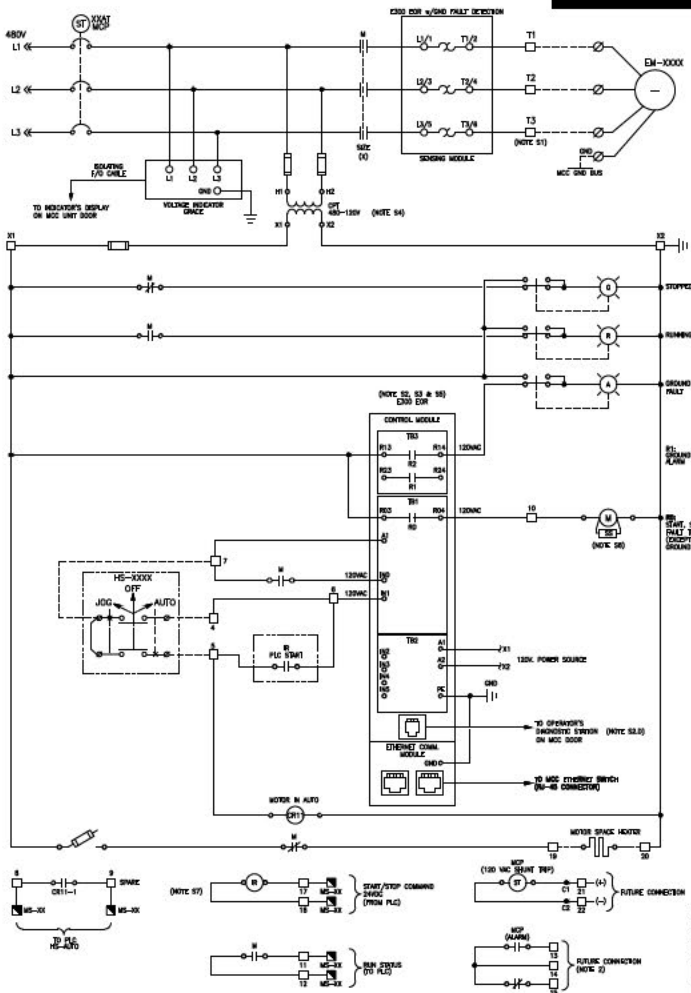
- LEGEND:**
- ⊠ EMERGENCY EXIT UNIT WITH BATTERY PACK
 - ⊠ FIRE EXTINGUISHER
 - ⊠ EYE WASH
 - ⊠ HEAT DETECTOR - RATE OF RISE TYPE. OPENS WHEN REACHES TEMPERATURE SET POINT OF 80°F.
 - ⊠ SMOKE DETECTOR - PHOTO ELECTRIC TYPE WITH ALARM AND TALKS RELAYS WITH FORM 2 CONTACTS. THE OPEN ON ALARM OR LOSS OF POWER, 24VDC.
 - ⊠ HYDROGEN SENSOR
 - ⊠ PHOTOCELL
 - ⊠ THERMOCOIL

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VENTURA COMPRESSOR STATION
 COMPRESSOR MODERNIZATION
 PDC BUILDING - EQUIPMENT ARRANGEMENT
 OPTION #2 - 4 ELECTRIC DRIVERS

33900-5030-D-ELC



DRAWING NO.	REFERENCE DRAWING IDENTIFICATION
0201-0-020	ELECTRICAL SCHEMATIC, PANELS & ASSEMBLYS
XXXX-XXXX-0-02	SINGLE LINE DIAGRAM

- GENERAL NOTES:**
- CONTROL SIGNALS TO/FROM E300 EOR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
 - INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MCP IN THE OFF/NON-TRIPPED POSITION.
 - MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
 - JOA POSITION: HOLDING THE JOA SWITCH IN JOG POSITION WILL START THE MOTOR. RELEASING JOA WILL SPRING-RETURN THE SELECTOR SWITCH BACK TO OFF POSITION, AND MOTOR WILL STOP.
 - OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
 - AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). WHILE JOA IS IN AUTO POSITION, THE MOTOR MAY START (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
 - EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXX".
 - ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

- NOTES TO MCC SUPPLIER:**
- REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED IUC SIZE.
 - ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-WIRE CONTROL WITH FEEDBACK AS FOLLOWS:
 - OUTPUT RELAY "TR0" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINAL "IN1", AND NO FAULTS ARE DETECTED BY THE E300 EOR.
 - OUTPUT RELAY "TR0" SHALL OPEN WHEN 120VAC CONTROL VOLTAGE IS NOT PRESENT AT INPUT TERMINAL "IN1", OR WHEN A FAULT (OTHER THAN GROUND FAULT) IS DETECTED BY THE E300 EOR.
 - OUTPUT RELAY "IN1" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN THE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAY "TR0" ON A GROUND FAULT.
 - DOOR-MOUNTED DIAGNOSTIC STATION SHALL DISPLAY ANY FAULT DETECTED BY THE E300 EOR, AND SHALL BE USED TO RESET ANY FAULT AFTER IT HAS CLEARED.
 - ALL E300 FOR PARAMETERS' STATUS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE (BUT ARE NOT LIMITED TO) MOTOR READY, RUNNING, FAILED TO RUN, AT FAULT, FAULT'S TYPE, ETC.
 - CONTROL POWER TRANSFORMER (OPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.
 - LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.
 - SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.
 - PROVIDE 24VDC INTERPOSING CONTROL RELAY.
 - ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHIELD-STATE).

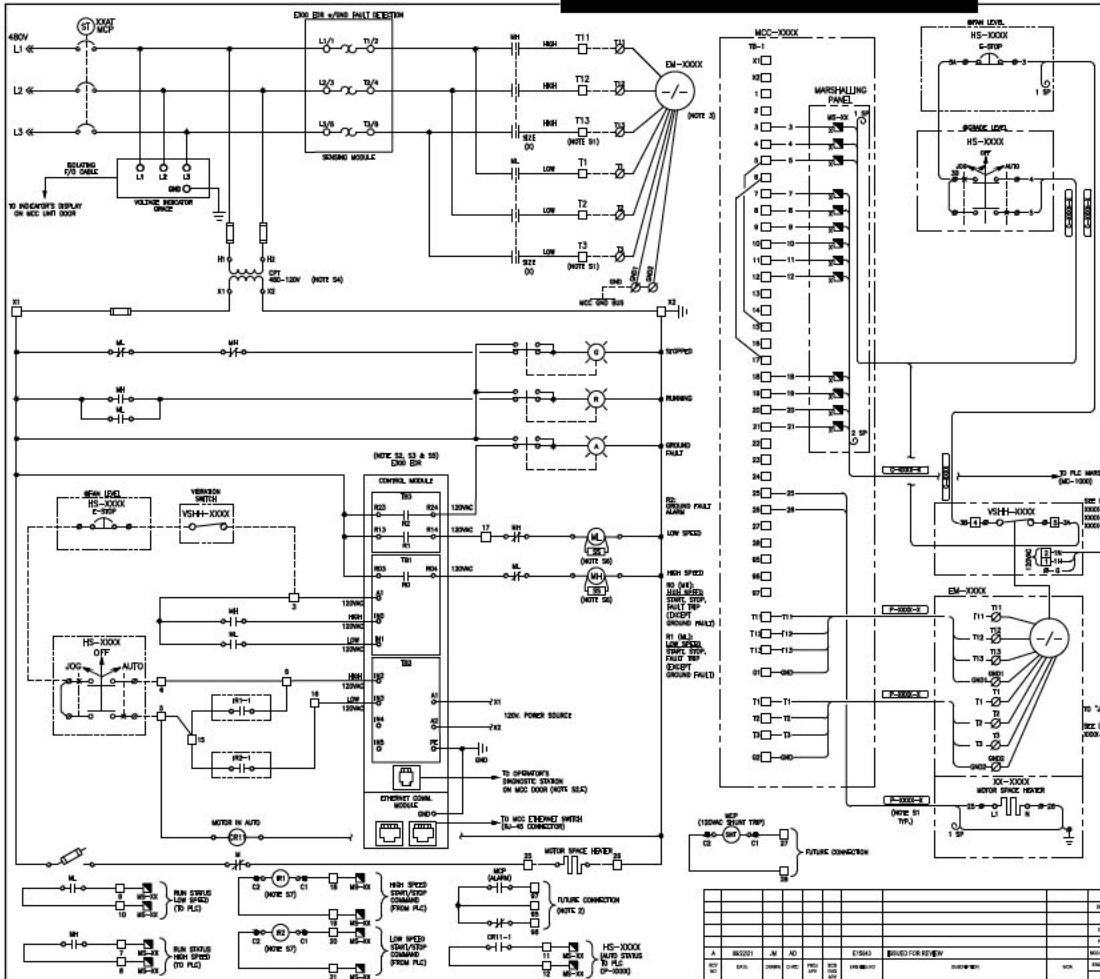
- LEGEND:**
- MCC STARTER CABLE TERMINALS
 - MCC MARSHALLING CHERRY TERMINALS
 - PLC MARSHALLING CHERRY TERMINALS

REVISIONS		DATE	BY	CHKD	APP'D	REV
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PROJECT NO.	0201-0-020	DATE	06/04
PROJECT NAME	VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION		
PROJECT LOCATION	TYPICAL ONE-SPEED MOTOR - SCHEMATIC AND WIRING DIAGRAM		
PROJECT NO.	0201-0-020	DATE	06/04
PROJECT NAME	VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION		
PROJECT LOCATION	TYPICAL ONE-SPEED MOTOR - SCHEMATIC AND WIRING DIAGRAM		
PROJECT NO.	0201-0-020	DATE	06/04
PROJECT NAME	VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION		
PROJECT LOCATION	TYPICAL ONE-SPEED MOTOR - SCHEMATIC AND WIRING DIAGRAM		

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
TYPICAL ONE-SPEED MOTOR - SCHEMATIC AND WIRING DIAGRAM
OPTION #2 - 4 ELECTRIC DRIVERS

33900-040-D-ELC



REVISION NO.	DESCRIPTION	DATE
001-1-01	ELECTRICAL SCHEMATIC CHECKS & REVISIONS	
0001-000-0-0-0	SINGLE LINE DRAWING	

GENERAL NOTES:

- CONTROL SIGNALS TO/FROM E300 EDOR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
- INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MCP IN THE OFF/NON-TRIPPED POSITION.
- TWO SPEED, TWO WINDING, VARIABLE TORQUE MOTOR IS RATED AT XX/XXHP, XX/XX RPM.
- MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JCA) SELECTOR SWITCH IS AS FOLLOWS:
 - JOG POSITION: HOLDING THE JCA SWITCH IN JOG POSITION WILL START THE MOTOR AT LOW SPEED. RELEASING JCA WILL SPRING-RETURN THE SELECTOR SWITCH BACK TO OFF POSITION, AND MOTOR WILL STOP.
 - OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
 - AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). JOG IS IN AUTO POSITION MUST START THE MOTOR IMMEDIATELY (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
- EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXX".
- ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

- REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.
- ALLOW-UNUSUALLY E300 EDOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-SPEED, 2-WIRE CONTROL AS FOLLOWS:
 - OUTPUT RELAYS "R0" OR "R1" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINALS "IN2" OR "IN3" RESPECTIVELY, AND NO FAULTS ARE DETECTED BY THE E300 EDOR. OUTPUT RELAYS "R0" AND "R1" SHALL NOT BE CLOSED AT THE SAME TIME. SWITCHING FROM HIGH SPEED OUTPUT RELAY "R0" TO LOW SPEED OUTPUT RELAY "R1" SHALL NOT TAKE PLACE UNTIL THREE MINUTES TIME DELAY HAVE ELAPSED FROM THE TIME THAT OUTPUT RELAY "R0" HAD OPENED. SWITCHING FROM LOW SPEED OUTPUT RELAY "R1" TO HIGH SPEED OUTPUT RELAY "R0" WITHOUT TIME DELAY IS ALLOWED.
 - OUTPUT RELAYS "R0" OR "R1" SHALL OPEN WHEN 120VAC CONTROL VOLTAGE IS NOT PRESENT AT INPUT TERMINALS "IN2" OR "IN3" RESPECTIVELY, OR WHEN A FAULT (OTHER THAN GROUND FAULT) IS DETECTED BY THE E300 EDOR.
 - OUTPUT RELAY "R0" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EDOR, AND PERISTS FOR MORE THAN FIVE SECONDS. E300 EDOR SHALL NOT TRIP OUTPUT RELAYS "R0" OR "R1" ON A GROUND FAULT.
 - EACH OF THE TWO MOTOR WINDINGS SHALL HAVE A DIFFERENT OVERLOAD SETTING AS PER MCC REQUIREMENTS. EACH OVERLOAD SETTING SHALL BE ACTIVATED WHEN ITS RESPECTIVE OUTPUT RELAY IS CLOSED, I.E. "R0" OR "R1".

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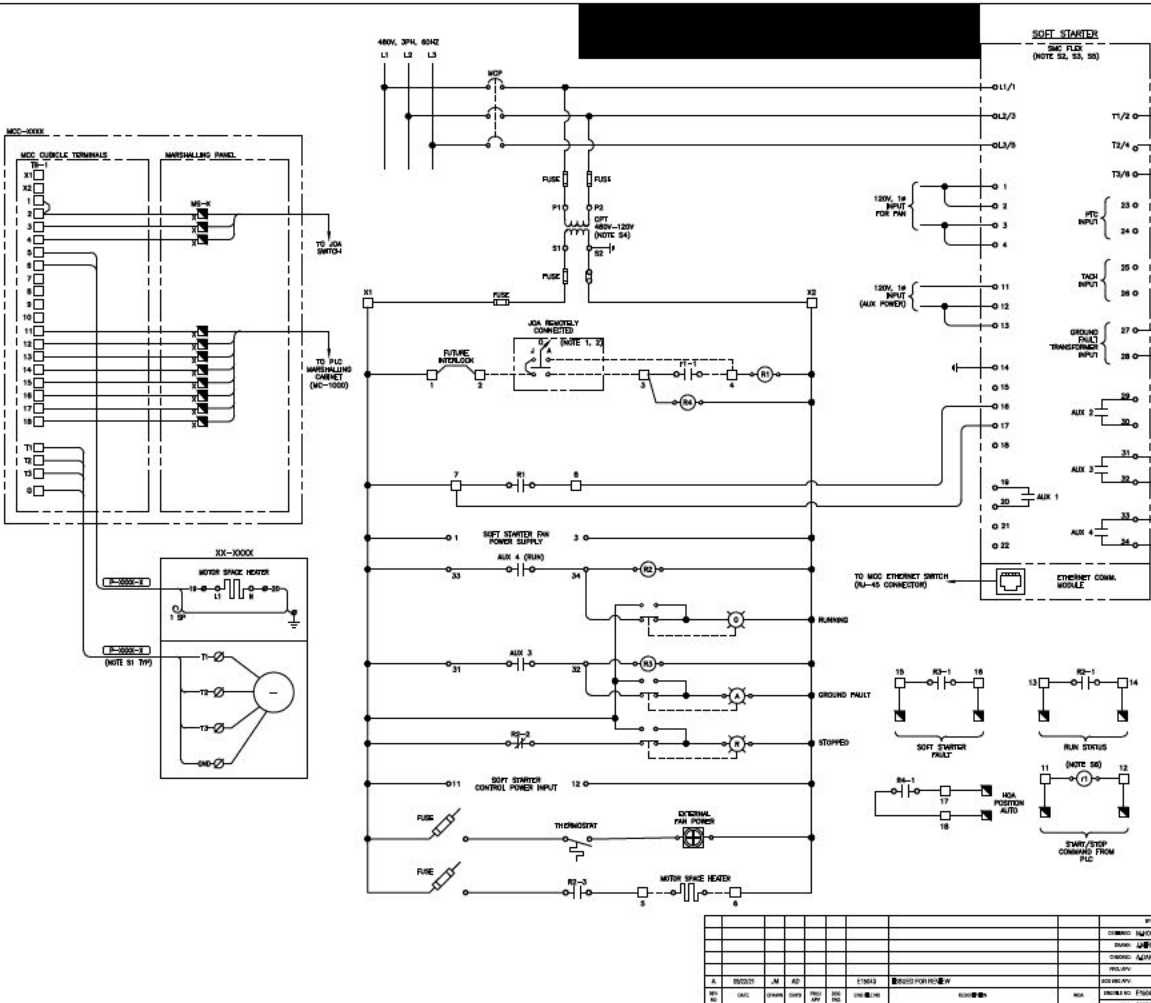
- MCC SWITCH CIRCUIT TERMINALS
- MCC MARSHALLING CABINET TERMINALS
- PLC MARSHALLING CABINET TERMINALS

NO.	DATE	BY	CHKD	APP'D	DESCRIPTION
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08/20/21	08/20/21	08/20/21	ND
08/20/21	08/20/21	08/20/21	E15643

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
TYPICAL TWO-SPEED MOTOR-SCHEMATIC AND WIRING DIAGRAM
OPTION #2 + 4 ELECTRIC DRIVERS

33900-604-1-D-E-L-C



DRAWING NO.	REVISION DRAWING DESCRIPTION
0071-0-020	ELECTRICAL SCHEMATIC DRAWING, PANELS & ASSEMBLERS
XXXX-000-0-02	SINGLE LINE DIAGRAM

SOFT STARTER
SAC FILED
(NOTE 52, 53, 55)

11/1
12/3
13/9

17/2
18/A
19/B

(NOTE 51)

HP
P-XX

100V, 1A INPUT FOR FWD
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100V, 1A INPUT FOR REV
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EXTERNAL BYPASS
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LEGEND:

- MCC STARTER CLINIC TERMINALS
- REMOTE TERMINAL BLOCKS (SOFT START)
- R 120V RELAY
- △ 240V RELAY
- MCC MARSHALLING PANEL TERMINALS
- FLC MARSHALLING CABINET TERMINALS

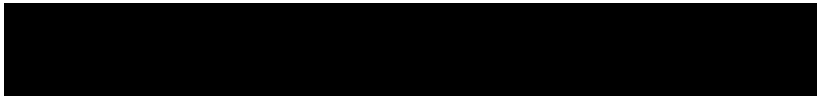
- GENERAL NOTES:**
- CONTRACTOR SHALL PROVIDE AND INSTALL JUA (JOB-OFF-AUTO) SWITCH AT THE PUMP MOTOR AND FIELD ROUTE "AUTO" SIGNALS TO PLC AND CONTROL WIRING BACK TO MOTOR CONTROLLERS.
 - MOTOR CONTROL FUNCTIONALITY OF THE JOB-OFF-AUTO (JOB) POSITION SWITCH IS AS FOLLOWS:
A. JOB POSITION HOLDING THE JUA SWITCH IN JOB POSITION WILL START THE MOTOR, RELEASING JUA WILL STOP-RETURN THE SELECTOR SWITCH BACK TO OFF POSITION AND MOTOR WILL STOP.
B. OFF POSITION WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED WITHIN "OFF" POSITION FROM OTHER JOB OR AUTO WILL STOP THE MOTOR.
C. AUTO POSITION WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REQUESTED FROM PLC, WHILE JUA IS IN AUTO POSITION MOTOR START THE MOTOR IMMEDIATELY OF REMOTE-START COMMAND FROM PLC IS ACTIVE.

- NOTES TO MCC SUPPLIER:**
- REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LWD SIZE.
 - ALLEN-BRADLEY SAC FILED SOFT STARTER CONFIGURED FOR 3-Phase CONTROLLED WITH CORE BALANCE CURRENT TRANSFORMERS AND GROUND FAULT ALARM.
 - ALL SAC FILED PARAMETER SETTINGS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE, BUT ARE NOT LIMITED TO: MOTOR RELAY, RUNNING PAUSE TO RUN, AT FAULT, FAULT'S TYPE, ETC.
 - CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.
 - LATEST PARAMETER VERSION SHALL BE PROVIDED IN THE SAC FILED SOFT STARTER.
 - PROVIDE 240V INTERLOCKING CONTROL RELAY.
 - ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (HALF-STOP).

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VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
TYPICAL SOFTSTART - SCHEMATIC AND WIRING DIAGRAM
OPTION #2 - 4 ELECTRIC DRIVERS

33900-5042-D-ELC



APPENDIX E – SCE CORRESPONDENCE

[REDACTED]

From: [REDACTED]@sce.com>
Sent: Wednesday, August 25, 2021 10:53 AM
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: (External):RE: (External):RE: Upgrade service at 1555 N Olive St, Ventura

Good morning [REDACTED] -
I have forwarded your questions to my Field Engineering department.
Once they research and get back with some answers, I will pass those along to you.
Thanks – Wendy



[REDACTED]
SCE Planning Senior Specialist
10060 Telegraph Rd. Ventura 93004
Office: [REDACTED]
Fax: [REDACTED]

From: [REDACTED]@burnsmcd.com>
Sent: Wednesday, August 25, 2021 6:48 AM
To: [REDACTED]@sce.com>
Cc: [REDACTED]@burnsmcd.com>; [REDACTED]@burnsmcd.com>; [REDACTED]@sce.com>
Subject: (External):RE: (External):RE: Upgrade service at 1555 N Olive St, Ventura

***** EXTERNAL EMAIL - Use caution when opening links or attachments *****

Good morning [REDACTED]

In response to your question below, SoCalGas is managing the specific issue you note.
As SoCalGas' engineering contractor, BMcD is responsible for development of a conceptual design at this site for which the information we are requesting remains a critical component to understanding the technical feasibility.

Thank you for your time and please let me know if you have any questions.

[REDACTED]
[REDACTED]@burnsmcd.com

From: [REDACTED]@sce.com>
Sent: Tuesday, August 24, 2021 3:56 PM
To: [REDACTED]@burnsmcd.com>
Cc: [REDACTED]@burnsmcd.com>; [REDACTED]@burnsmcd.com>; Laura Wilson [REDACTED]@sce.com>
Subject: RE: (External):RE: Upgrade service at 1555 N Olive St, Ventura

Hi Joe -

[REDACTED]

I was reading about this project in the Ventura daily newspaper this morning! It sounded like this location was probably not going to work for So Cal Gas Co – did the newspaper get it wrong?

-Wendy



[REDACTED]
SCE Planning Senior Specialist
10060 Telegraph Rd. Ventura 93004

Office: [REDACTED]

Fax: [REDACTED]

From: [REDACTED]@burnsmcd.com>

Sent: Tuesday, August 24, 2021 2:14 PM

To: [REDACTED]@sce.com>

Cc: [REDACTED]@burnsmcd.com>; [REDACTED]@burnsmcd.com>

Subject: (External):RE: Upgrade service at 1555 N Olive St, Ventura

Importance: High

***** EXTERNAL EMAIL - Use caution when opening links or attachments *****

[REDACTED]

Thank you so much for the email with information. I am in the process of reviewing the documents and will reply with all the information when it is completed.

(I copied my Project Engineer and Electrical Engineer on this email as well)

In the mean time I was hoping to get some questions answered, at least as much as possible. At this stage I am not really looking for costs but feasibility.

1. Per our discussion the other day you indicated that it would not be a problem for this site to receive power that would consume a total of 10,000HP motor loads (VFD) with out there being an issue with the neighborhood power (this may include upgrades to the line/substation/etc at our cost). Would you confirm this is correct?
2. We are looking for complete redundance on this site as power is essential. Are dual feeds (from different sources) doable? (N+1) redundancy?
 - a. What would be the closest "second" source?

I also understand that it is impossible to provide a timeline as there are so many possibilities on what would need to be done, but would it be possible to get a "time-scale" based off of a few assumptions and your experience with the below scope of work scenarios as provided. (these are Post 3-4 month planning as you indicated)

1. Scenario 1: If it is determined that there is sufficient capacity on the existing 16kV line, what would an estimated time be to complete acquiring this service for the following 2 cases?
 - a. Meter is on the 16kV (we own the 16-4.16kV transformer)
 - b. Meter is on secondary of Utility owned 16 – 4.16kV transformer)
2. Scenario 2: If it is determined that line upgrades (aka increasing ACSR/ Upgrading Substation Transformer) would be required. From the nearest substation to the site, what would be the estimated time this would take to complete?
3. If it is required that a new OH line would need to be installed to the site from nearest substation, what would the estimated time to completion be?

[REDACTED]

I understand again that these scenarios may be difficult to estimate but any ballpark time, based off your experience, would help us a lot.

-Thank you

Please reach out if you have any questions or would like to talk it through.

[REDACTED]
[REDACTED]@burnsmcd.com
[REDACTED]

From: [REDACTED]@sce.com>
Sent: Thursday, August 19, 2021 11:11 AM
To: [REDACTED]@burnsmcd.com>
Subject: Upgrade service at 1555 N Olive St, Ventura

Hi [REDACTED] –

In order to give us an idea of the upgrades that will be required to serve the additional load at 1555 N Olive St, please complete and return the attached Customer Project Information Sheet and the proposed new load, motors and voltage desired.

I will relay that information over to my Field Engineering department and they will let us know the scope of the upgrades needed to serve this new load.

I am attaching the entire NEW/UPGRADE SERVICE Requirements package and info below, in case you do decide to proceed with this upgrade. The information will all need to be submitted in order for me to design the upgrade, but we can wait to see what Engineering comes back with before you make that decision and compile all this info.

TIME FRAMES:

I can begin designing your project once you have submitted all required documents (see below). After I receive all documents, there is a 3 - 4 month turnaround time to receive a FINAL MAP that is approved for construction. The FINAL map is what you will provide to contractors for the bidding process. After all requirements have been met (payment, easements, etc.) there is an additional 1 month scheduling window before SCE begins your project.

REQUIRED DOCUMENTS:

- Surveyed, scaled site plan with the following requirements:
 - Accepted scales are 1"= 10' up to 1" = 60', Engineering Scale
 - Property lines and streets (your property and neighboring properties)
 - Center line of streets with centerline stationing
 - Any existing easements
 - Any existing underground/overhead utilities (gas, water, phone, etc.)
 - Footprint of building(s)
 - Existing transformer and meter room/panel
 - Proposed Edison source with structure number shown
 - Proposed transformer and meter room/panel
 - Proposed primary and service duct paths
- Address sequence list for any existing/proposed meters at site
- Grant Deeds and contact information (Name, Address and phone #) for property owner
- Load Schedule
- Number of units and square footage of each unit, proposed A/C units and sizes
- Electrical Single Line
- Panel size, including voltage requested

- [REDACTED]
- Switchgear specs from the manufacturer (must be submitted to the planner for approval PRIOR to purchasing your new panel)
 - Completed Customer Project Information Sheet
 - A PDF file: of the site plans, in the scaled format mentioned above.
 - An AutoCAD file: (in .dwg format) of the site plans, either burned on a disc or e-mailed to the planner (see attached CAD Requirements). Drawings submitted must be provided in a single file and per the AutoCAD standards provided by SCE. Provide a minimum of 1 hard copy of site plans (2' x 3') along with the CAD file.

CUSTOMER RESPONSIBILITIES:

In addition to submitting the required documents above, the customer is responsible for:

- Trenching
- Backfill
- Installation of conduits and structures per SCE specifications (except where there are energized primary conductors - SCE will handle any energized connections)
- Obtaining inspection by city building and safety department on all meter panels
- Labeling all meter sockets with assigned address in permanent manner

SCE RESPONSIBILITIES:

- Installation of all primary and service cable
- Installation of all equipment to serve your new load (transformers, switches, etc.)
- Installation of all meters

I look forward to working with you on your project.

[REDACTED]



[REDACTED]
SCE Planning Senior Specialist
10060 Telegraph Rd. Ventura 93004
Office: [REDACTED]
Fax: [REDACTED]



Dear Customer:

Thank you for allowing Southern California Edison to assist you with your electrical needs.

I am responsible for the design of the electrical system to serve your new project. I am committed to completing your project in a timely and economical manner, and to meet your design and construction time frames. I intend to communicate with you on a regular basis. If you need to contact me for any reason, you may do so via either of the following methods:


Office:  E-mail: @sce.com

I have indicated below the plans and information necessary to proceed with the electrical design for your project. Please provide me with the following information at your earliest convenience:

Item	Qty	Needed Plans	Item	Qty	Needed Information
X	1	Attached Customer/Project Information Sheet		1	Assessor Parcel map
X	1	Site/Plot (scaled)	X	1	Copy of Grant Deed/ Title Report
X	1	Street Improvement (if applicable)		2	Recorded Tract Maps
X	1	Grading and Elevation (if applicable)	X	1	Attached Design Option Letter (signed)
	1	Sewer and Storm Drain	X	1	EUSERC Drawings
X	1	Load Schedules and Panel Drawings		1	Street Light Authorization Letter (signed)
	1	Landscape, Sprinkler, Pedestal Locations		1	Address Sequence list
X	1	Street Light Plan (if applicable)	X	1	Digital CAD file (requirements attached)

Once I receive the above information, I will provide you with a schedule for completion of the electrical design and installation of your project.

Sincerely,


Service Planner
10060 Telegraph Road
Ventura, CA 93004



DEAR CUSTOMER:

Welcome to Southern California Edison Company. This letter is intended to answer some of the questions you may have concerning electrical service to your project.

It is important that you submit the attached customer questionnaires complete with all information requested (a Parcel map, Plot Plan, etc.) Please submit a complete package to your Edison Service Planner as soon as possible so as to provide electric service in a timely manner.

Southern California Edison Company requires an average of 6 weeks to engineer an approved work order, acquire material, and schedule the work. In the event permits or rights-of-way are necessary, additional time may be required.

Other requirements are:

- ❖ ***PROPERTY LINES MUST BE STAKED PRIOR TO PLANNER FIELDING YOUR JOB SITE.***
- ❖ ***YOUR ADDRESS AND/OR NAME MUST BE CLEARLY POSTED.***

PERMANENT SERVICE:

1. Apply for service by calling our 24 hour line: (800) 655-4555 at least one week before final inspection.
2. Post your address (visible from the street) in a permanent fashion. Temporary signs or those made with felt pens are not acceptable.
3. Notify planner three weeks prior to final inspection.
4. Obtain final inspection from appropriate governmental agency. They will notify Edison of the inspection and your meter will be set in three to five working days providing work order is complete or no work order is required.
5. If you have requested an underground service (or your project is underground), contact the SCE Inspector for your job with 48 hours notice for trench inspection.
6. If your project is changed in any manner, it is your responsibility to notify Edison. The time required to obtain material is critical; therefore, if your project is delayed or accelerated, please contact us immediately.

TEMPORARY SERVICE:

1. In the event you will require or request temporary power for construction, you must speak with a Service Planner. Temporary power will not be provided without prior Service Planner approval.
2. If you require temporary service, you will need to discuss the billing procedures and time required to construct our facilities with your Service Planner.

PAYMENTS ACCEPTED BY CHECK OR MONEY ORDER ONLY

Please feel free to contact your Service Planner if you have any further questions.

Thank you for your cooperation.

Customer/Project Information Sheet

Date Received by SCE: _____

Individual or Business Name: <small>(Customer / Developer – Tract DBA or LLC)</small>		
Address:	Email Address:	
City:	State:	Zip Code:
Attn:	Phone No:	
Legal Contact: <small>(Individual responsible for signing contract, paying fees and receiving potential refunds)</small>		
Address:		Email Address:
City:	State:	Zip Code:
Primary Field / Site Superintendent / Job Contact:		
Relationship to Project:		Phone No:
E-mail Address:		FAX No:
Project Address:		
City:	State:	Zip Code:
TG Map # or GPS	Major Cross Street:	

Detailed Project Information

Residential: <input type="checkbox"/>	Commercial: <input type="checkbox"/>	Industrial: <input type="checkbox"/>	Agricultural: <input type="checkbox"/>
Service Requested:		Overhead: <input type="checkbox"/>	Underground: <input type="checkbox"/>
Tract:	Lot(s)	Indoor Cultivation <input type="checkbox"/>	
Mixed-Light Cultivation <input type="checkbox"/>			
Is this project subject to Buy America Compliance? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temporary Service Required: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Approximate start work date for SCE crews:		Your Construction Start Date:	
Approximate date you would like the job completed and energized:			
Scope of Project:			
Panel Size (amps):		Service Voltage/Phase:	
Total Tons of A/C:	Total # of A/C Units:	Largest A/C Unit (tons):	
Total HP of Pumps:	Total # of Pump Units:	Largest Pump (HP):	
Installing Gas or Electric	Heater	Water Heater	Stove
Clothes Dryer:	Gas Meter to be Installed at Property:		Oven:
Square Footage of Buildings (if multiple buildings give all footages): <small>Homes over 5000 sq. ft. larger lots require a Load Schedule. Please contact your electrician for assistance.</small>			
Solar or Generation Equipment to be installed (If yes, please attach additional descriptions/specifications): Yes <input type="checkbox"/> No <input type="checkbox"/>			
Electric Vehicle:	<input type="checkbox"/> Charge Station	<input type="checkbox"/> Plug-In Electric Vehicle (PEV)	EV Panel Size & Voltage:
EV Main breaker rating:	Will the new panel serve any load other than the EV load?		Number of Ports:
kW of each Port:	Will there be load-side management?	Future EV expansion or growth at the site?	



Applicant Design Option Letter

**APPLICANT DESIGN OPTION FOR
DISTRIBUTION AND/OR SERVICE EXTENSIONS
LETTER OF AUTHORIZATION**

TO SOUTHERN CALIFORNIA EDISON COMPANY (SCE)

Applicant understands that for facilities designed in accordance with SCE’s Rules 13, 15, and/or 16, the Applicant can elect:

- Option (1) SCE to design the distribution and/or service extension; or
- Option (2) A Competitive Bidding Procedure for the distribution and/or service extension design.

Under **Option (1)** above, SCE completes the project design. SCE’s design costs are included in the total project cost to serve subject to refund / allowance. Under **Option (2)** above, Competitive Bidding, Applicant shall receive a bid amount from SCE and secure Competitive Bids from Qualified Designers for the *design* of the distribution and/or service extension. The SCE bid amount provided will be used as the job-specific cost estimate for design services. Either SCE or a Qualified Designer can design the distribution line and/or service extension under Option (2). The Applicant should have a thorough understanding of the Applicant Design Terms and Conditions prior to choosing Option (2) – Competitive Bid. Copies are available upon request.

If Applicant elects SCE to design the distribution and/or service extension and then later secures a third-party Qualified Designer under Option (2) Competitive Bidding, Applicant shall pay to SCE any and all costs incurred by SCE for design work already performed as a result of Applicant originally requesting SCE’s design.

Regardless of the design option chosen, all speculative projects are subject to the advance collection of engineering fees.

******* Applicant understands the above Options and hereby elects the following by **initialing** the Option selected:

- _____ Option (1) Design by SCE
- _____ Option (2) Competitive Bidding for Applicant Design

The elected Option is for the distribution line and/or service extension to be located at and/or described as follows:

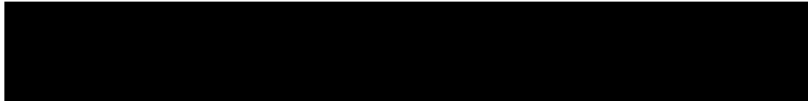
******* Applicant understands that by signing below, additional charges may apply if SCE incurs interim design costs as a result of Applicant first electing Option (1) and subsequently securing a third-party Qualified Designer and electing Option (2).

Applicant (Print or Type)

Title (Print or Type)

Signature

Date



TEMPORARY POWER INFORMATION SHEET

Proposed Address for Temporary Power: _____ City/Zip: _____

Nearest Cross Street to Project: _____

Name/Address of Party to Receive BILLING: _____

Customer Applying for Temporary Power (Name): _____

Mailing Address: _____

Daytime and Message Telephone Numbers: _____ / _____

Name of Temporary Power Contractor: _____

Is Temporary Power Source Overhead (_____) or Underground (_____) _____

Number of the nearest Overhead Power Pole: _____ **Underground Transformer:** _____

What is the proposed date to begin Temporary Service: _____

What is the voltage you are requesting: _____ Single Phase (_____) or Three Phase (_____) _____

What will be the connected Load: _____ What will be the demand Load: _____

IMPORTANT

**** CHECK OR MONEY ORDER ONLY ****

You must speak with a Service Planner for the Southern California Edison Company prior to signing a contract and paying fees for Temporary Power. You must obtain written or "On-Line" authorization for Temporary Power from your SCE Service Planner. You are also required to obtain a permit for Temporary Power from Building and Safety for the appropriate Governmental entity (City, County, State) prior to applying to Edison. Often, Building and Safety will issue an address other than your building address for your Temporary Power. This can cause delays. You will also need to provide to Southern California Edison a letter from the Owner/Builder who requires Temporary Power stating that the above-named Temporary Power Contractor is the authorized agent of the Owner/Builder and as such, will be responsible to ensure that all electrical requirements and specifications have been or will be met. WE CANNOT, UNDER ANY CIRCUMSTANCES, ACCEPT MONEY OR CONTRACT FROM ANY PARTY REQUESTING TEMPORARY POWER WITHOUT THE PRIOR WRITTEN OR "ON LINE" APPROVAL OF YOUR SERVICE PLANNER.

FOR EDISON USE ONLY - DO NOT WRITE BELOW THIS LINE

Planner Initials Authorizing Temporary Power: _____ Date Authorized: _____

Not Authorized - Planner must first field check job: _____

Temporary Power is Overhead: _____ Underground: _____ Single Phase : _____ Three Phase: _____

Fees: _____ Additional Notes: _____



Southern California Edison CAD File Requirements

To our valued customers:

SCE employees develop project base maps from digital files supplied by our customers. The process of reviewing and performing clean-up of these files takes time and effort, and directly impacts our ability to turn around a product to our customers in a reasonable time frame.

In support of our commitment to continuous improvement, SCE has established a set of requirements for digital file submission. It is the customer's responsibility to submit files that comply with these requirements and to ensure the files provided contain the most accurate and current information available.

The attached requirements list identifies the layer name and color to use for each entity within the submitted CAD file. SCE requires all related files for a single project be submitted as one comprehensive file.

Submitted files that do not meet the listed requirements or that contain cross-referenced drawings (XREF's) are subject to rejection.

Thank you for your efforts in assuring the information provided meets the requirements included.



STANDARD DIGITAL FILE REQUIREMENTS:

Drawings submitted must be provided in a single file and per the AutoCAD standards listed in the AutoCad File Requirements section of this document.

The following information, if available, must be displayed on separate layers:

*Required layer name for the item per Table 1-1 is enclosed in brackets.

- Street Right Of Way lines *[RW]*
- Property Lines, Tract Boundaries, Assessment District, Easements, and Boundary lines for the city, county, etc. *[BOUNDARY]*
- Street names – specify “private street, government entities such as” if applicable; specify governing entity when applicable (County Road, State Highway, etc) *[TEXT-STREET]*
- Street width dimensions *[DIMENSIONS]*
- Street Centerline and Centerline Stationing on all streets. Centerline Stationing should not be broken and should show reference stationing at street intersection. *[CL]*
Note: Wet utilities stationing is not required.
- Lot, Tract or Parcel numbering *[TEXT-LOTS]*
- Existing SCE Underground structures and existing OH poles *[ELECTRIC]*
- Existing SCE Underground conduits *[COND-EX]*
- Existing SCE Overhead Conductors *[OH-EX]*
- Building Outlines on separate layer – file must show exterior walls, doors, and windows only (no interior walls) *[BUILD]*
- Building Numbers where applicable (i.e. Apartments and Commercial) *[BUILD]*
Note: Also show Electrical Room when panel is located inside the building as well as the preferred structure placement
- Meter Locations *[BUILD]*
- Driveways *[DWY]*
- Sidewalks *[SW]*
- Walkways *[WALK]*
- Curbs *[CURB]*
- Gutter *[GUTTER]*
- Edge of pavement *[EP]*

- Driveway aprons [WALK]
- Walls – i.e. decorative walls, retaining walls, etc. [WALL]
- Fences or fence lines [FENCE]
- Trash enclosures where applicable. Trash enclosures are usually shown in areas such as apartments where they would affect structure and/or trench placement. [Per customer layer name]
- Landscape obstructions that need to be considered for proper electrical planning [LANDSCAPE]
- Vicinity Map [MISC]
- North Arrow and Scale Bar [DECAL]
- Detailed Street Cross Sections (if available) [DECAL]
- Topography [TOPO]
- Location of any future or proposed utility, building and/or structure locations labeled accordingly (if available.)

Location of all other utilities, etc. as applicable including proposed and existing:

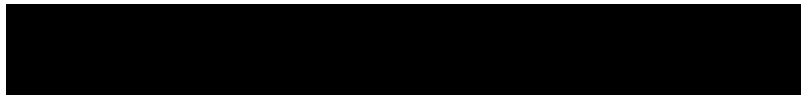
- Catch basins (separate layer from storm drains) [SD]
- Storm drains (separate layer from catch basins) [CB]
- Cable TV [CATV]
- Fire Hydrants [FH]
- Gas [GAS]
- Manholes [MH]
- Oil [OIL]
- Railroad [RAILROAD]
- Sanitary Sewer [SEWER]
- Telephone [TEL]
- Traffic Control /Traffic Signal [TS]
- Water [WATER]
- Existing utility, service and street poles [per customer name]

NOTES:

1. Show utility lines eight inches (8") or wider to full width with size and material indicated.
2. Storm drain lines should be dashed, all others continuous.
3. Do not show utility lines smaller than 8" in full width, but size and material should be indicated.

The AutoCAD File Requirements are listed below as well as the Layer Descriptions for each layer. These requirements must be followed to ensure consistency with regard to digital files submitted by customers.

- No X-Refs or Nested X-Refs (External Referenced Drawings)

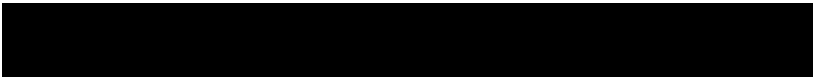


- Drawings **must** only be in a single file with entities separated by layers per Table 1-1
- Drawing Scale must be 1'-1' AutoCAD Engineering Unit (decimal), not Architectural scale
- No 3rd Party Software Entities such as Express Tools “Acad Proxy Entities” (Note: Software provided with AutoCad but not supported by Autodesk)
- Images such as Bitmap, JPEG, PDF, etc., should be added using “Copy” from Microsoft Photo Editor and then a “PasteClip” into the active model drawing or an active viewport. That will ensure that the graphic is embedded in the drawing and not referenced to as the AutoCAD “Image” command does. Do not add images using the AutoCAD “Image” command.
- No duplicate base objects
- No “TextMask” due to potential plotter incompatibility.

Entities must be separated by layers per SCE AutoCad Layering Standard. However, for instances where a drawing is converted from Microstation to AutoCAD, a layer legend which indicates the firm’s layer name and description may be provided in lieu of SCE’s Layering Standard.

TABLE 1-1

Layer Descriptions	Layer Names (UPPERCASE)	Layer Color
Sheet setup & Title Block Border	BASE	7
Buildings	BUILD	131
Boundaries - City, County, etc.	BOUNDARY	10
Cable TV	CATV	157
Catch basin	CB	157
Center Line of Streets & Stationing	CL	1
SCE existing conduits	COND-EX	11
Curbs	CURB	10
Driveway (not including aprons)	DWY	221
Edison Decals	DECAL	7
Edison Decals	DECALS	157
Easement	EASEMENT	7
SCE underground structures or OH poles	ELECTRIC	11
Edge of Pavement	EP	10
Fence	FENCE	157
Fire Hydrant	FH	35
Gas Line	GAS	157
Gutter	Gutter	35
Hatching - Buildings, etc.	HATCH	131
Landscape	LANDSCAPE	157



Manhole	MH	157
Match lines	MATCHLINE	252
Oil Line	OIL	157
SCE existing overhead lines	OH-EX	11
Property line, Lot Lines	PL	2
Railroad	RR	7
Right-of-Way Lines	RW	2
Slope	SLOPE	157
Storm drain (Separate CB Lay)	SD	157
Sanitary Sewer	SEWER	157
Sidewalk & Driveway Aprons	SW	35
Telephone	TEL	157
Topography	TOPO	157
Traffic Signals	TS	157
Walkway & Driveway Aprons (SEPARATE)	WALK	35
Walls	WALL	5
Water	WATER	157
Misc. Vicinity Maps, Hatching, etc.	MISC	7
All other existing non-SCE conduits	APPROPRIATE LAYER	11
<i>TEXT RELATED</i>		
TEXT - STREET NAMES	TEXT-STREET	7
TEXT - Lot Numbers	TEXT-LOTS	7
Text - Misc.	TEXT	7
DIMENSIONING - AutoCAD related with DIM	DIMENSION	7



CREATE AMAZING.

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