Position	Position	Employee Name	Employee or Consultant	Program or Project	GMA	Prior	2020 Q1 JAN	Q1 FEB	Q1 MAR	Q2 APR	Q2 MAY	Q2 JUN	Q3 JLY	Q3 AUG	Q3 SEP
Ventura Compressor Modernization Project - Staffing Plan EPC															
Accounting	Accountant		E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Project Controls	Cost and Schedule Manager	[redacted]	E	Project	Yes		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Project Controls	Program Lead Cost	[redacted]	E	Project	Yes		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Project Controls	Cost Advisor	[redacted]	C	Project	NA		0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Project Controls	Cost Advisor	[redacted]	C	Project	NA		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Project Controls	Program Lead Scheduler	[redacted]	E	Project	Yes		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Project Controls	Schedule Engineer	[redacted]	C	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Controls	Schedule Engineer	[redacted]	C	Project	NA		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Project Controls	Program Lead Change Control	[redacted]	E	Project	Yes		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Project Controls	Change Control Advisor	[redacted]	E	Project	NA		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Estimating	Estimating Lead	[redacted]	E												
Estimating	Estimator	[redacted]	c												
Project Development	Project Dev Manager	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Development	Project Dev Specialist	[redacted]	C				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Development	Project Dev Engineer	[redacted]	C	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Management	Materials Coordinator	[redacted]	E	Project	NA		0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Project Management	Project Manager - Lead	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Management	Project Manager - II/III	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Management	Project Manager - II	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Management	Project Engineer	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Management	Admin	[redacted]					0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Project Management	Document Control/Procore	[redacted]	E	Project	NA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Supply Management	SCG Supply Management Lead	[redacted]	E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Supply Management	SCG Supply Management Buyers	[redacted]	E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Supply Management	SCG Supply Management Buyers	[redacted]	C	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Engineering	Project Engineering Manager	[redacted]	E	Project	NA										
Engineering	SCG Engineering Discipline Leads - Process		E	Project	NA										
Engineering	SCG Engineering Discipline Leads - Mechanical		E	Project	NA										
Engineering	SCG Engineering Discipline Leads - CSA		E	Project	NA										
Engineering	SCG Engineering Discipline Leads- Elec		E	Project	NA										
Engineering	SCG Engineering Discipline Leads - Inst		E	Project	NA										
Engineering	SCG Quality Discipline Engineers- Piping		E	Project	NA										
Engineering	SCG Engineering Discipline Leads - MQM														
Engineering	AVEVA Support		E	Project	NA										
Environmental	SCG Permitting/Environmental		E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Construction	Construction Mgr	TBD	E	Project	NA			-	-	-	0.50	0.50	0.50	0.50	0.50
Construction	Safety Mgr		E	Project			-	-	-	-	-	-	-	-	-
Construction	Inspector C/S		C	Project			-	-	-	-	-	-	-	-	-
Construction	Inspector Piping/CWI		C	Project			-	-	-	-	-	-	-	-	-
Construction	Inspector E/I		C	Project			-	-	-	-	-	-	-	-	-
Construction	Mech. Inspector		C	Project											
Construction	Field Engineering		C	Project	NA		-	-	-	-	-	-	-	-	-
Construction	Commissioning/Start Up		C	Project					0.50	0.50	0.50	0.50	0.50	0.50	
Construction	Materials/Logistics Coordinator		C	Project											
Construction	QA Manager		C	Project					0.50	0.50	0.50	0.50	0.50	0.50	
SCG District	Field Standby		E	Project											
SCG District	Operations Training		E	Project											
Public Outreach	Affairs Mgr		E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
External Affairs	Affairs Mgr		E	Project	NA		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Lnd Services	Permitting		E	Project			0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

Total Dedicated PCM PC Staff		**Count**		**15.3**	**15.3**	**16.3**	**16.3**	**16.8**	**16.8**	**16.8**	**16.8**	**15.8**
SEU Employees		Count		10.6	10.6	10.6	10.6	11.1	11.1	11.1	11.1	11.1
SEU Contractors		Count		4.7	4.7	5.7	5.7	5.7	5.7	5.7	5.7	4.7
	Rate $/MH	**Total Dedicated PCM PC Costs**	**Cost**	**$ 167,518**	**$ 226,757**	**$ 226,757**	**$ 247,637**	**$ 247,637**	**$ 253,727**	**$ 253,727**	**$ 253,727**	**$ 253,727**	**$ 232,847**
	$70.00	SEU Employees	Cost	$ 99,283	$ 128,621	$ 128,621	$ 128,621	$ 128,621	$ 134,711	$ 134,711	$ 134,711	$ 134,711	$ 134,711
	$120.00	SEU Contractors	Cost	$ 68,235	$ 98,136	$ 98,136	$ 119,016	$ 119,016	$ 119,016	$ 119,016	$ 119,016	$ 119,016	$ 98,136

Hours per Year
Hours per Month

Based on opm.gov for computing hourly rates of pay

	Previous	2017
SEU Employees	$	99,283.00
SEU Contractors	$	68,235.00

								2021									
Q4	Q4	Q4	Q1	Q1	Q1	Q2	Q2	Q2	Q3	Q3	Q3	Q4	Q4	Q4	Q1	Q1	Q1
OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.30	0.30	0.30	0.30	0.30	0.30	1.00											
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.25	0.25	0.25	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.10	0.10	0.10										0.25	0.25	0.25
0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-	-	-	-	-	-		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
-	-	-	-	-	-												0.50
-	-	-	-	-	-												-
-	-	-	-	-	-												-
-	-	-	-	-	-										1.00	1.00	1.00
						0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	1.00	1.00	1.00
						1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
															1.00	1.00	1.00
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

16.0	**16.0**	**16.0**	**15.6**	**15.6**	**15.6**	**17.7**	**17.2**	**17.2**	**17.6**	**17.6**	**17.6**	**17.6**	**17.6**	**17.6**	**20.3**	**20.3**	**20.8**
11.1	11.1	11.1	11.2	11.2	11.2	11.8	11.3	11.3	11.7	11.7	11.7	11.7	11.7	11.7	12.9	12.9	12.9
4.9	4.9	4.9	4.4	4.4	4.4	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	7.4	7.4	7.9
$ 237,023	**$ 237,023**	**$ 237,023**	**$ 227,801**	**$ 227,801**	**$ 227,801**	**$ 266,429**	**$ 260,339**	**$ 260,339**	**$ 265,211**	**$ 265,211**	**$ 265,211**	**$ 265,211**	**$ 265,211**	**$ 265,211**	**$ 311,756**	**$ 311,756**	**$ 322,196**
$ 134,711	$ 134,711	$ 134,711	$ 135,929	$ 135,929	$ 135,929	$ 143,237	$ 137,147	$ 137,147	$ 142,019	$ 142,019	$ 142,019	$ 142,019	$ 142,019	$ 142,019	$ 157,244	$ 157,244	$ 157,244
$ 102,312	$ 102,312	$ 102,312	$ 91,872	$ 91,872	$ 91,872	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 123,192	$ 154,512	$ 154,512	$ 164,952

2022									2023								
Q2	Q2	Q2	Q3	Q3	Q3	Q4	Q4	Q4	Q1	Q1	Q1	Q2	Q2	Q2	Q3	Q3	Q3
APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-																	
-																	
-																	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-
-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
					1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
														0.50	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
															3.00	3.00	3.00
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

20.8	**21.3**	**21.3**	**22.3**	**22.3**	**24.3**	**24.3**	**24.3**	**24.3**	**23.8**	**23.8**	**23.8**	**23.8**	**23.8**	**24.3**	**25.8**	**25.8**	**25.8**
12.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	16.4	16.4	16.4
7.9	7.9	7.9	8.9	8.9	10.9	10.9	10.9	10.9	10.4	10.4	10.4	10.4	10.4	10.9	9.4	9.4	9.4
$ 322,196	**$ 328,286**	**$ 328,286**	**$ 349,166**	**$ 349,166**	**$ 390,926**	**$ 390,926**	**$ 390,926**	**$ 390,926**	**$ 380,486**	**$ 380,486**	**$ 380,486**	**$ 380,486**	**$ 380,486**	**$ 390,926**	**$ 396,146**	**$ 396,146**	**$ 396,146**
$ 157,244	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 163,334	$ 199,874	$ 199,874	$ 199,874
$ 164,952	$ 164,952	$ 164,952	$ 185,832	$ 185,832	$ 227,592	$ 227,592	$ 227,592	$ 227,592	$ 217,152	$ 217,152	$ 217,152	$ 217,152	$ 217,152	$ 227,592	$ 196,272	$ 196,272	$ 196,272

			2024													
Q4	Q4	Q4	Q1	Q1	Q1	Q2	Q2	Q2	Q3	Q3	Q3	Q4	Q4	Q4		
OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC	Demobilized (Y/N)	Comments
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
1.00	1.00	1.00	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80		
0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
1.00	1.00	1.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50		
0.50	0.50	0.50														
0.50	0.50	0.50														
0.25	0.25	0.25	0.25	0.25	0.25											
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.00	1.00	1.00	0.50	0.50	0.50	0.50	0.50	0.50								
1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-		
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	-		
1.00	1.00	1.00	1.00	1.00	1.00	0.50										
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00								
1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-		
3.00	3.00	3.00	3.00	3.00	3.00											
0.50	0.50	0.50	0.50	0.50												
0.50	0.50	0.50	0.50	0.50												
0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50								

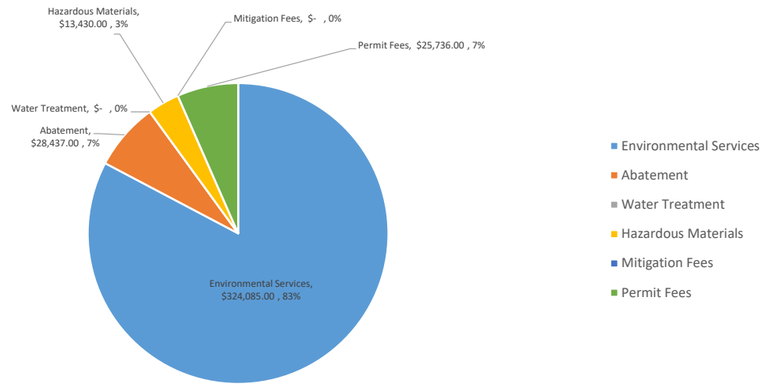
25.8	**25.8**	**25.8**	**23.4**	**23.4**	**21.4**	**17.7**	**16.2**	**16.2**	**12.7**	**12.7**	**12.7**	**12.7**	**12.7**	**12.7**	1156.9
16.4	16.4	16.4	15.2	15.2	14.2	11.0	10.0	10.0	9.5	9.5	9.5	9.5	9.5	9.5	738.6
9.4	9.4	9.4	8.2	8.2	7.2	6.7	6.2	6.2	3.2	3.2	3.2	3.2	3.2	3.2	418.3
$ 396,146	**$ 396,146**	**$ 396,146**	**$ 356,474**	**$ 356,474**	**$ 323,414**	**$ 273,389**	**$ 250,769**	**$ 250,769**	**$ 182,039**	**$ 182,039**	**$ 182,039**	**$ 182,039**	**$ 182,039**	**$ 182,039**	**$ 17,729,643**
$ 199,874	$ 199,874	$ 199,874	$ 185,258	$ 185,258	$ 173,078	$ 133,493	$ 121,313	$ 121,313	$ 115,223	$ 115,223	$ 115,223	$ 115,223	$ 115,223	$ 115,223	**$ 8,995,539**
$ 196,272	$ 196,272	$ 196,272	$ 171,216	$ 171,216	$ 150,336	$ 139,896	$ 129,456	$ 129,456	$ 66,816	$ 66,816	$ 66,816	$ 66,816	$ 66,816	$ 66,816	**$ 8,734,104**

Version 1.1 10/18/17

Project Detail Item Description	Description/Value	Notes/Assumptions
Project Name	Ventura Compressor Modernization	Cost estimate only includes modernization project. Communication relocation, building demo, soil remediation, and decommissioning existing Plant 1 are not included. Assume no CEQA/NEPA documents or other environmental studies/surveys are needed.
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Modernization	
Diameter (inches)	NA	
Length (ft)	NA	
Pre Const. Planning Support Duration (weeks)	104	Assumes 26 months based on Flour's schedule dated 12/20/2019
Construction Duration (weeks)	92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019
Water Treatment Duration (Months)	NA	Assumes new pipe and potable water for any hydrotests. No treatment needed.
Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Costs	**Total**	**Total Hours**
Environmental Services	$ 324,085.00	
Abatement	$ 28,437.00	
Water Treatment	$ -	
Hazardous Materials	$ 13,430.00	
Mitigation Fees	$ -	
Permit Fees	$ 25,736.00	
TOTAL ENVIRONMENTAL COSTS (Purchased Services):	**$ 391,688.00**	
Internal Labor	$ 911,040	**12,888**
Total	**$ 1,302,728**	

Costs starting 1/1/2020 through close out



Instructions for Summary Sheet - Please data enter general project details in the table above (See Columns C and D). This information will then be populated in the other tabs. The pie chart is auto populated.

General i**nstructions for all worksheets** - If a cell is shaded light or dark gray, do not data enter anything into the cell; these cells are meant to be left blank and/or they have formulas. Assumptions and/or information sources should be entered for each line item of cost. In addition, each worksheet tab has a place to enter the date the estimate was prepared along with the name of the estimator. If the estimator is a contractor, please also enter company name. See additional instructions on each worksheet tab, where applicable.

ENVIRONMENTAL SERVICES: $ 324,085 **INTERNAL SOCALGAS LABOR: $ 911,040**

Date Prepared: 1/23/2020

Estimator's Name: Alana McKean

Project	Description/Value		Notes/Assumptions	
County	Ventura			
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Modernization			
Diameter (inches)	NA			
Length (ft)	NA			
Pre Const. Planning Support Duration (weeks)		104	Assumes 26 months based on Flour's schedule dated 12/20/2019	26
Construction Duration (weeks)		92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019	23
Water Treatment Duration (Months)	NA		Assumes new pipe and potable water for any hydrotests. No treatment needed.	
Abatement Duration (days)		10	Assume 10 tie-ins 1 day of abatement per tie in.	
Water Volume (gallons)			Volume of water unknown at this time.	
Source Water (potable/non-potable)	Potable		Assume potable water will be used.	
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground		Assume water will be discharged to land for dust control or compaction.	

Part 1: Internal Environmental Services and/or Engineering Analysis Center (EAC) Labor

Instructions: Enter total number of hours for Internal SoCalGas Labor expected for the job in Column G. Please note that Engineering Analysis Center assists with sampling.

Description	Hours	Estimated Average Hourly Rate	Cost	Assumptions: $90 and hour rate for internal labor
Major Projects Enviro Mgmt (Lead/Mgr)	988	$80.00	$ 79,040.00	5 hours per week during planning and 5 hours per week during construction. 8 hours for close out
Enviro Proj Mgr	3,960	$70.00	$ 277,200.00	20 hours per week during planning and 20 hour per week during construction. 40 hours for close out
Enviro Specialist	7,840	$70.00	$ 548,800.00	5 SMEs, 8 hours per week during planning and 8 hours per week during construction/ or 1 dedicated SME 40 hrs per week.
EAC	100	$60.00	$ 6,000.00	Assume 10 site visits (10 hour days) for sampling of water/soils/waste etc.
Other			$ -	
Total	**12,888**		**$ 911,040.00**	

Part 2 - Professional Consulting Services By Task

Instructions: Projects are limited to at total of 5 Tasks (do not add tasks). For each predesignated task number, provide a description/title for task. Once task description is defined, then use the drop down menu to select the resources that will be used to complete the task and enter notes and assumptions in Column H. Notes and assumptions must be documented. The number of standard hours and overtime hours, if applicable should be entered in Columns D and E, respectively. Expenses and equipment rentals should be captured in Part 3 of this worksheet. Please note that labor hour rates can not be changed.

Task 1: Air Permitting				**$ 55,000**	Inculdes consulting support for permitting, public notfication fees, and consultant support for public meetings/hearings. Per Karin Fickerson.
Task 2: Focused high level review and Permit Execution Plan				**$ 12,956**	Rincon SOW and RFCS dated 1/24/2020

Task 3: Detailed env review and final permit execution plan				**$ 50,000**	Assume no CEQA/NEPA documents or other environmental studies/surveys are needed.

Task 4: SWPPP Development and Support		**-**	-	**$ 141,600**	
				Total	**Notes and assumptions**
Other		**0**		**$ 10,000**	SWPPP Development
Other		**0**		**$ 104,000**	Construction Monitoring: One inspection per week, plus 6 rain event visits per year, for two years. $1000 per mobilization
Other		**0**		**$ 27,600**	QSD consulting support and annual reporting. Average 2 hours per week of construction. $150 per hour

Task 5: Additional Consulting Support During Construction				**$ 50,000**	Assume no CEQA/NEPA documents or other environmental studies/surveys are needed.

Part 3 - Professional Consulting Services Expenses and Equipment Rental Fees

Expenses				**$ 14,529**	
Description	**Unit**	**Rate**	**Miles**	**Total**	**Notes and assumptions**
Mileage	Each	**0.58**	150	**$ 14,529**	EPM one site visit per month precon and 2 per month during construction. 1 site visit per month pre con and construction for other internal staff. 1 site visit per month of construction for EAC staff and consulting staff. 150 miles round trip from LA
Per Diem -Daily GSA Rate (Lodging and Meals)	Daily			**$ -**	
Auto Rental	Daily			**$ -**	
Auto Rental Fuel	Each			**$ -**	
Other Describe:	add unit here			**$ -**	
	add unit here			**$ -**	
	add unit here			**$ -**	
	add unit here			**$ -**	

Equipment Rental				**$ -**	
Description	**Unit**	**Rate**	**Amount**	**Total**	**Notes and assumptions**
Trimble	Daily			**$ -**	
List Equipment Here	list unit here			**$ -**	
List Equipment Here	list unit here			**$ -**	
List Equipment Here	list unit here			**$ -**	
List Equipment Here	list unit here			**$ -**	
List Equipment Here	list unit here			**$ -**	
List Equipment Here	list unit here			**$ -**	
	list unit here			**$ -**	

Abatement $ 28,437.00

Date Prepared: 1/23/2020

Estimator's Name: Alana McKean reviewed by Chanice Allen

Project	Description/Value	Notes/Assumptions
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Moderni	
Diameter (inches)	NA	
Length (ft)	NA	
Pre Const. Planning Support Duration (weeks)	104	Assumes 26 months based on Flour's schedule dated 12/20/2019
Construction Duration (weeks)	92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019
Water Treatment Duration (Months)	NA	Assumes new pipe and potable water for any hydrotests. No treatment needed.
Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Table 1: Abatement Cost Built-In Assumptions

1. This assumes 8 hours for one Super, 8 hours for two Workers and 8 hours for one IH per day. Assume 0.4 hours for Warehouse and 0.4 hours for two Admin per day.
2. This assumes OT is only for one Super, two Workers and one IH per day.
3. This price is based off of RM Meyers estimate of $1 per inch per foot plus 33% for a IH
4. This assumes we are providing SCAQMD with a 48-hour notification. We pay 50% of the Procedure 5 plan $325.36 + Expedite fee $325.35 + square footage fee.
5. If the project increases in square footage above previously submitted notification, (i.e. 999 sq. ft. to 1500 sq. ft) it will require additional fees for the additional sq. footage.
6. This assumes $65.00 per worker per day. For this we assume one Super and two Workers.
7. This assumes one per diem or subsistence charge for one Super and two Workers per day.

Assumptions

Assume 10 tie ins, 1 day of abatement per tie in. 10 hour days
Assume 5 feet per tie in needs abatement. 50 feet total
Assume average size of 20 inch pipe Lines 404 (18”) and 406 (22”)
Assume 5 separate notifications are needed due to tie ins at different times

Pipe Wrap and Paint Abatement Price Estimate

Instructions: Please see Table 1 for more details on each footnote. This estimate should include costs for asbestos containing material abatement and paint abatement. Paint waste storage, shipping, and disposal costs should be included on the hazardous materials tab.
Section 3 should only be used if there is a plan to recycle pipe using approved abatement vendors.
Sections 4a - 4c. are applicable where the project is located in one of these air districts. Facility surveys are required for all SCAQMD notifications. If an air district is not listed, notifications fees are not anticipated.
Section 5 - Identifies fees for abatement contractor. .
Section 6 - Identifies fees for Industrial Hygiene support on asbestos and/or lead paint projects. Assume there will only be 1 closeout report

Number of Days[1] 10

Total $ 17,977.33 — Labor Cost Using Average Rates

Total $ 18,672.00 — Labor cost using Worst Case Rates

Section 2: Abatement Contractor and Industrial Hygienist Overtime Labor Cost

Number of OT Hours[2] 20

Total $ 5,125.00 — OT Labor Cost Using Average OT Rates

Total $ 5,140.00 — OT Labor Cost Using Worst Case OT Rates

Section 3: Recycling with ACM Labor Costs

Pipe Size (inches) 20

Length of Pipe to be recycled with ACM (Feet) 50

Total[3] $ 1,330.00

Section 4a: SCAQMD Notification Costs

	Quantity		*Cost[4]*
up to 1,000 sq. ft		**Total** $	-
1,000 to 5,000 sq. ft		**Total** $	-
5,000 to 10,000 sq. ft		**Total** $	-
10,000 to 50,000 sq. ft		**Total** $	-
Facility Survey (add'l)		**Total** $	-
Revisions[5]		**Total** $	-

Section 4b: Ventura Air District Notification Costs

	Quantity		*Cost*
less than 160 sq. ft.	5	**Total** $	375.00
160 to 5000 sq. ft.		**Total** $	-
more than 5000 sq. ft		**Total** $	-

Section 4c. Antelope Valley Air District Notification Costs

	Quantity		*Cost*
100-999 sq. ft.		**Total** $	-
1,000-4,999 sq. ft.		**Total** $	-
5,000-9,999 sq. ft.		**Total** $	-
>10,000 sq. ft.		**Total** $	-

Section 5: Abatement Contractor Expenses

	Quantity
Days of Vehicle Use	**10**
Materials[6]	
Days of Subsistence[7]	

Total $ 1,250.00

Section 6: Industrial Hygienist Expenses

	Quantity
Mobilization	**10**
Per Diem	
Closeout Report	

Total $ 3,000.00

Total $ 27,727.33 — Using Average Rates

Total $ 28,437.00 — Using Worst Case Rates

Water Treatment

Instructions: The water treatment duration and water volume to be treated entered on the Summary worksheet are used to determine default treatment costs. If groundwater is expected, please add the anticipated volume of groundwater expected and duration to the planned time for treating hydrostatic test water. For projects with water treatment volumes less than 250,000 gallons, please enter 1 month for treatment system duration and plan to use a mobile treatment system. If treatment is not expected, please enter "0" in cell H15 and note in cell K15 the assumption of no treatment. In addition, if you wish to override the default treatment costs, enter the calculated value in cell H15 and provide detail notes regarding your source of alternate costs and assumptions in cell K15. **Note: If treatment is needed beyond two weeks for small projects, do not use the default costs; it is recommended that you develop a custom estimate.**

Date Prepared: _____

Estimator's Name: _____

Project	Description/Value	Notes/Assumptions
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Moderniz	
Diameter (inches)	NA	
Length (ft)	NA	
Pre Const. Planning Support Duration (weeks)	104	Assumes 26 months based on Flour's schedule dated 12/20/2019
Construction Duration (weeks)	92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019
Water Treatment Duration (Months)	NA	Assumes new pipe and potable water for any hydrotests. No treatment needed.
Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Projected Project Size and Cost Estimate[1]

Large Project

$ -

This assumption is based on water volume of gallons and a duration of NA months.

Alternate Forecast Amount

Default Estimate Override - If forecast is believed to be an amount other than the prescribed estimate above, type other amount here and provide source of assumptions in cell K5.

REFERENCE ONLY - (Not used for cost estimates; the default is the project size or Estimate from the Water Treatment Vendor)

Material Costs						Mobilization/Delivery Costs	
Drum Vessels including carbon	$ 525	Month				Location	Cost
2500gal tank	$ 400	Month	$ 175	Week		San Diego / Riverside Counties	$12,500
5000gal tanks	$ 650	Month	$ 300	Week		Orange County	$6,500
18" dual pod skid mounted sand filte	$ 650	Month	$ 300	Week		Los Angeles County	$9,500
24" dual pod skid mounted sand filte	$ 850	Month	$ 400	Week		Ventura / San Bernardino Counties	$12,500
36" dual pod skid mounted sand filte	$ 1,100	Month	$ 500	Week		Santa Barbara County	$15,500
48" dual pod skid mounted sand filte	$ 1,600	Month	$ 600	Week		San Louis Obispo / Kern Counties	$20,500
5hp pumps and panel	$ 300	Month	$ 125	Week			
7.5hp pumps and panel	$ 500	Month	$ 200	Week		**Demobilization Costs (Includes non-haz disposal)**	
10hp pumps and panel	$ 700	Month	$ 300	Week		San Diego / Riverside Counties	$9,500
15hp pumps and panel	$ 850	Month	$ 400	Week		Orange County	$5,500
20hp pumps and panel	$ 950	Month	$ 450	Week		Los Angeles County	$7,500
25hp pump and panel	$ 1,150	Month	$ 550	Week		Ventura / San Bernardino Counties	$9,500

Table 1: Water Treatment Estimates

Project Size	Minimum Volume Treated	Maximum Volume Treated	Monthly Cost	UOM (Days)
Small Project[1]	1	249999	$ 22,000	30.42
Medium Project	250,000	750000	$ 50,500	30.42
Large Project	750000		$ 50,500	30.42

Water Treatment Function Text
This assumption is based on water volume of gallons and a duration of months.

[1] Assumes a small project will only take up to two weeks to complete and a mobile treatment system is used. Treatment duration should always be entered as 1 for small projects.

Table 1: Assumptions used to determine water treatment costs for mobile system based on two weeks of treatment. Items in bold were doubled to determine the monthly costs for medium and large volume projects.

1. **Two weeks of labor (100 hours)**
2. **Eight hours of PM support**
3. **500 pounds of new carbon media**

30hp pump and panel	$	1,350	Month	$ 650	Week		Santa Barbara County	$11,500
40hp pump and panel	$	1,550	Month	$ 750	Week		San Luis Obispo / Kern Counties	$14,500
100-250gpm Polymer M Injection System and Chemical for Heavy Metals Removal				$ 550	Week			
300-500gpm Polymer M Injection System and Chemical for Heavy Metals Removal				$ 950	Week			

4. Two weeks of a mobile (200 gpm) carbon filtration system and berm
5. 10 days of per diem
6. Five filter bags per day
7. One drum to dispose of filter bags
8. Two hours a day for the operator's pickup truck
9. 16 hours for a Stake bed to mob/demob filtration trailer
10. 16 hours for third party to deliver and pick up filtration trailer
11. Subcontractor carbon removal and disposal

Hazardous Materials

Date Prepared: 1/23/2020
Estimator's Name: Alana McKean

Project	Description/Value	Notes/Assumptions
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Modernization	
Diameter (inches)	NA	
Length (ft)	NA	
Pre Const. Planning Support Duration (weeks)	104	Assumes 26 months based on Flour's schedule dated 12/20/2019
Construction Duration (weeks)	92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019
Water Treatment Duration (Months)	NA	Assumes new pipe and potable water for any hydrotests. No treatment needed.
Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Total Hazmat Costs	
$	13,430

Part 1A- Estimated Soil Volumes and associated Roll-Off Bin and Drum Counts

Directions: Use this calculator to estimate the volume of contaminated soil expected. The tool also calculated the weight and number of non-bulk (drums) or bulk containers that will be necessary to contain the waste for offsite transport. The calculated values of bulk or non-bulk containers should be used in Part 1B to determine waste container counts and the number of loads expected for waste transportation. In addition, the volume of soil generated should be used to calculate the number of samples to be collected for profiling purposes (see Part 1c) and volume of waste to be disposed (see Part 2).

Contaminated Soil Estimator - Weights and Container Volumes - Bulk Waste

Assumptions:

Soil Type		Enter Excavation Dimensions				Cubic Yards (yd^3)	Approximate Material Weight (Tons)	Number of 20 yd^3 Roll-Off Bins[1]	Number of End Dumps[2]	Number of Drums[3]
		Length (ft)		Width (ft)	Depth (ft)					
Soil (Dry)						0	0.0	0	0	0
Soil (Dry)						0	0.0	0	0	0
Soil (Dry)						0	0.0	0	0	0
Soil (Wet)						0	0.0	0	0	0
Soil (Wet)						0	0.0	0	0	0
Soil (Wet)						0	0.0	0	0	0
Sand (Dry)						0	0.0	0	0	0
Sand (Dry)						0	0.0	0	0	0
Sand (Dry)						0	0.0	0	0	0
Sand (Wet)						0	0.0	0	0	0
Sand (Wet)						0	0.0	0	0	0
Sand (Wet)						0	0.0	0	0	0
					Total	0	0	0	0	0

1. Assumes that 15 tons of soil will be moved with a 20 cubic yard bin and semi truck and trailer. If a smaller roll-offs will be used, that will need to estimated separately.
2. Assumes that each end dump will carry 22-tons of soil.
3. Assumes one 55-gallon drum holds 7.35 cubic feet of soil

Part 1B - Waste Container and Transportation Costs

Bulk and Non Bulk Transportation Rates

Directions: Use the table below to estimate waste container costs and transportation costs by container type and distance to disposal facility. See the notes section for standard assumptions. Specific assumptions should be listed per line item.

Description	Count	Assumptions
Drum Purchase Count:	10	
Number of Trips to Deliver Drums to project site	1	
Number of Trips to Deliver Drums to Disposal facility	5	
Roll Off Bin Count:		
Roll Off Bin Mobilization count		
Roll of Bin Duration on site (months)		

Non-Bulk Shipment Costs

Description	Count	UOM		Rate	Total	Assumptions
D.O.T Spec Drums	10	Per Drum		$ 59.00	$ 590.00	
Non Coastal Areas - Drum Delivery to Project Site or Disposal facility- Number of Shipments to Disposal Facility (up to 100 miles Roundtrip)		Per load		$ 185.00	$ -	
Non Coastal Areas - Drum Delivery to Project Site or Disposal facility- Number of Shipments to Disposal Facility (101 - 250 miles Roundtrip)		Per load		$ 360.00	$ -	
Coastal Areas - Drum Delivery to Project Site or Disposal facility- Number of Shipments to Disposal Facility (201-600 miles Roundtrip)	1	Per load		$ 770.00	$ 770.00	
Non-Coastal Areas - Drum Delivery to Project Site or Disposal facility - Number of Shipments to Disposal Facility (251-500 miles Roundtrip)		Per load		$ 650.00	$ -	
Total Non Bulk Shipping Costs					**$ 1,360.00**	

Bulk Shipment Costs						
Roll Off Bin Delivery Fee (100 miles roundtrip)		Per bin		$ 250.00	$ -	
Roll Off Bin Delivery Fee (200 miles round trip)		Per bin		$ 415.00	$ -	
Roll Off Bin Monthly Fee		Per bin/ Per Month		$ 15.00	$ -	
Hydrostatic Test Water Delivery - Vacuum Truck Daily Rate - Assumes one 120 bbl vacuum truck hauling water from source to site for 10 hours.		Per Day		$ 720.00	$ -	
Coastal Areas - Bulk Waste Shipments (e.g. vacuum truck, rocket launcher, end dumps) - Shipments to disposal facility (up to 200 miles Roundtrip)		Per Load		$ 665.00	$ -	
Coastal Areas - Bulk Waste Shipments (e.g. vacuum truck, rocket launcher, end dumps) - Shipments to disposal facility (201-600 miles Roundtrip)		Per Load		$ 1,470.00	$ -	
Non Coastal Areas - Bulk Waste Shipments (e.g. vacuum truck, rocket launcher, end dumps) - Shipments to disposal facility (up to 100 miles Roundtrip)		Per Load		$ 465.00	$ -	
Non Coastal Areas - Bulk Waste Shipments (e.g. vacuum truck, rocket launcher, end dumps) - Shipments to disposal facility (101 - 250 miles Roundtrip)		Per load		$ 750.00	$ -	
Non Coastal Areas - Bulk Waste Shipments (e.g. vacuum truck, rocket launcher, end dumps) - Shipments to disposal facility (251-500 miles Roundtrip)		Per load		$ 1,285.00	$ -	
Certified Clean Truck for Hydrostatic Test Water		Per Truck		$ 625.00	$ -	
Total Bulk Shipping Costs					**$** -	

Notes:

1. Bulk Shipments - One gear truck can hold up to 30 new drums.
2. Assume round trip for all shipments and deliveries
3. Be sure to list assumptions
4. Use Part 1A for drum or bin counts for contaminated soil
5. To assist with delivery and standby times, speeds of 45-52 mph were used for transportation time estimates and assumed 2 hour delivery standby at disposal facilities for bulk shipments and all vacuum truck deliveries require washouts and 1 hour of standby for non-bulk drum shipments. Vacuum trucks do not go out at capacity due to weight limitations. Assume 70 barrel (bbl) has 65 bbl max capacity and 120 bbl has 110 bbl max capacity.

Part 1C: Sampling and Profiling Costs

Directions: Use the table below to estimate sampling costs for waste characterization (e.g. painted surfaces, potential asbestos containing material, potential contaminated soil, hydrostatic test water, etc.) and/or sampling expected to meet permit requirements. See the notes section for standard assumptions. Specific assumptions should be listed per line item.

Sampling Costs						
Sample Type	**UOM**	**Rate[1]**		**Sample Count**	**Cost**	**Assumptions**
Paint Samples[2]	per sample	$ 181.00		**10**	$ 1,810.00	**Assume some painted surfaces samples during tie in activities.**
Asbestos Samples[2]	per sample	$ 30.00		**10**	$ 300.00	**Assume some asbestos samples during tie in activities.**
Analytical Hazardous Waste Characteristics	per sample	$ 1,350.00			$ -	
Analytical (water) Hazardous Waste Characteristics/Discharge Permit	per sample	$ 1,240.00			$ -	
Analytical (soil) hydrocarbon or pesticide impacted	per sample	$ 885.00		10	$ 8,850.00	Assume some soil samples maybe needed due to site history as a MGP.
Analytical (water) for disposal (2 day turn around)	per sample	$ 975.00			$ -	
Analytical (water) for hydrotest	per sample	$ 410.00			$ -	
Profile Fee	per location	$ 75.00			$ -	
<insert user specified here>	per sample	insert rate here			insert formula here	
<insert user specified here>	per sample	insert rate here			insert formula here	
Total Sampling and Profiling Costs					**$ 10,960.00**	

Notes:
1. Assumes a 24-hour turn around time for sampling, unless noted otherwise.
2. Sampling normally conducted by Industrial Hygiene firm and labor costs for sampling is captured on the abatement tab. These analytical costs are not listed under abatement services, but costs will be borne by the Industrial Hygiene contractor.

Part 2 Disposal Costs

Disposal Costs						
Waste Description (HazMat)	**UOM**	**Cost**		**Amount**	**Total**	**Assumptions**
Nonhazardous Waste Water (non bulk)	Per Drum	$ 87.50			$ -	
Nonhazardous Waste Water (bulk) less than 100,000 gallons	Per Gallon	$ 0.24			$ -	
Nonhazardous Waste Water (bulk) greater than 100,000 gallons	Per Gallon	$ 0.20			$ -	
Non-hazardous Oil Contaminated Soil/Solids (non-bulk)	Per Drum	$ 67.00		5	$ 335.00	
Non-hazardous Oil Contaminated Soil/Solids (bulk)	Per Ton	$ 54.00			$ -	
Lead Contaminated Solids	Per Drum	$ 155.00		5	$ 775.00	**Assume some lead disposal during tie in activities.**
Soils, Non Haz (wet)	Per Ton	$ 110.00			$ -	
Rags and Pigs from hydrostatic testing (small job)	per shipment	$ 300.00			$ -	
Rags and Pigs from hydrostatic testing (large job)	Per shipment	$ 1,000.00			$ -	
Total Disposal Costs					**$ 1,110.00**	

Notes:

Part 3 Miscellaneous - Frac Tank Cleanouts, Emergency Standby Support for Hydrostatic Tests and Tie Ins

Description	UOM	Amount	Rate	Cost ($)	Notes	Assumptions
Supervisor (for large jobs)	Per day		$ 850.00	$ -	Up to 10 hours day to supervise large jobs. Large jobs are generally where we expect bulk shipments of waste and more than 4 loads shipped per day; or sensitive sites that require coordination.	
Daily Standby for Hydrostatic Testing (Vac truck and driver)	Per day		$ 770.00	$ -	This cost is for 1 individual. Please adjust amount based on number of personnel expected to support the job.	
Tank Cleaning	Per Tank		$ 1,080.00	$ -	Includes labor hours, equipment and supplies	
Lake Tank Cleaning	Per Tank		$ 20,000.00		Includes labor hours, equipment and supplies	
Per Diem	Per Day/Per Person		$ 125.00	$ -	Use for overnight stays	
Total Miscellaneous Costs				$ -		

Notes:

Permit/Plan Fees

	Total	$ 25,736.00

Date Prepared: _____

Estimator's Name: _____

Project	Description/Value	Notes/Assumptions
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Modernization	
Diameter (inches)	NA	
Length (ft)	NA	
Pre Const. Planning Support Duration (weeks)	104	Assumes 26 months based on Flour's schedule dated 12/20/2019
Construction Duration (weeks)	92	Assumes 23 months of construction based on Flours schedule dated 12/20/2019
Water Treatment Duration (Months)	NA	Assumes new pipe and potable water for any hydrotests. No treatment needed.
Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Instructions: Complete the permit table by Itemizing each permit that is needed. Provide the basic permit fee description and enter the amount. The high level details that make up the basis of the assumption should be provided as well. Please use the reference material column to attach supporting documents or hyperlinks to supporting documents.

Line No.	Permit/Plan Fee Description	Amount	Basis of Assumptions	Reference Material	
Example	Dust Control Plan Fee	$ 900.00	2016 Fee Schedule for XYZ Agency. Assumes a 9% increase (assuming 1.5% annual increase) to account for fee increases that may be applied when this project is expected to be constructed in 2019.	<Insert supporting document, if applicable>	
1	VCAPCD Authority To Construct (ATC) Permit	$ 25,000	Includes permitting and processing fees	http://www.vcapcd.org/pubs/Rules/42/201904/Rule-42-clean.pdf	Per Karin Fickerson
2	Construction General Permit / SWPPP	$ 736	Assume 8 acres of disturbance	SWPPP Fee Schedule: https://www.waterboards.ca.gov/resources/fees/docs/swconst_peracrefees_chart.pdf	
3			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
4			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
5			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
6			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
8			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
7			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
8			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
9			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
10			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
11			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	
12			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>	

Mitigation Fees

Total	$	-

Assume no mitigation fees

Date Prepared: _____

Estimator's Name: _____

Project	Description/Value	Notes/Assumptions
County	Ventura	
Project Type (hydrotest, replacement, valve upgrade, valve installation, valve automation)	Compressor Modernization	
Diameter (inches)	NA	
Length (ft)	NA	
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Abatement Duration (days)	10	Assume 10 tie-ins 1 day of abatement per tie in.
Water Volume (gallons)		Volume of water unknown at this time.
Source Water (potable/non-potable)	Potable	Assume potable water will be used.
Water Disposal Method (offsite disposal, beneficial reuse, etc.)	Ground	Assume water will be discharged to land for dust control or compaction.

Insructions: Complete Table 1 by Itemizing each mitigation fee based on project scope and impacts. Provide the basic mitigation fee description and enter the amount. The high level details that make up the the basis of the assumption should be provided as well. Please use the reference material column to attach supporting documents or to insert hyperlinks to supporting documents, where applicable. If the project scope involves activities that will be covered by the SoCalGas California Desert Conservation Area Programmatic Permit,please use Table 2 to calculate mitigation fees.

Table 1: Estimated Mitigation Fees (See Table 2 for the SoCalGas CDCA Programmatic Permit Fees)

Line No.	Mitigation Fee Description	Amount	Basis of Assumptions	Reference Material
Example	XYZ Mitigation Bank	$ 2,400.00	Temporary and permanent impacts total 2.4 acres; The mitigation fee is $1,000 per acre	<Insert supporting document, if applicable>
1			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
2			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
3			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
4			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
5			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
6			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
7			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
8			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>
9			<Insert brief discussion of cost basis>	<Insert supporting document, if applicable>

Table 2: 2016 CDCA Programmatic Permit Fees for impacts to Suitable Habitat

new Table

Instructions: Enter the Disturbance acres below and complete the compensation formula fields. Compensation Amount is a calculated field.

Non Federal Lands		**Compensation Formula**			
Location	**Disturbance acres**	**Cost**	**Multiplier**	**Compensation Amount** (disturbance acres x cost x multiplier)	**Assumptions**
NECO/NEMO		$ 2,890	2	$ -	
NECO/NEMO DWMA		$ 2,890	5	$ -	
WEMO		$ 2,890	2	$ -	
WEMO DWMA		$ 2,890	5	$ -	
CVMSHCP		$ 2,890	1	$ -	
WECO		$ -	0	$ -	
Outside CDCA		$ 2,890	2	$ -	
Non-Fed Land Disturbance Total	0	**Non Federal Land Compensation Total for CDCA Programmatic Permit Impacts (CDFW)**		$ -	

Federal Lands		**Compensation Formula**			
Location	**Disturbance acres**	**Cost**	**Multiplier**	**Compensation Amount** (disturbance acres x cost x multiplier)	**Assumptions**
NECO/NEMO		$ 500	1	$ -	
NECO/NEMO DWMA		$ 500	5	$ -	
WEMO		$ 770	1	$ -	
WEMO DWMA		$ 770	5	$ -	
CVMSHCP		$ 5,730	1	$ -	
WECO		$ -	0	$ -	
Outside CDCA		$ -	0	$ -	
BLM Admin Fee			42% of Total Compensation amount	$ -	
Federal Lands Disturbance Total	**0**	**BLM Compensation Total for CDCA Programmatic Permit Impacts**		**$ -**	

Notes for Table 2:

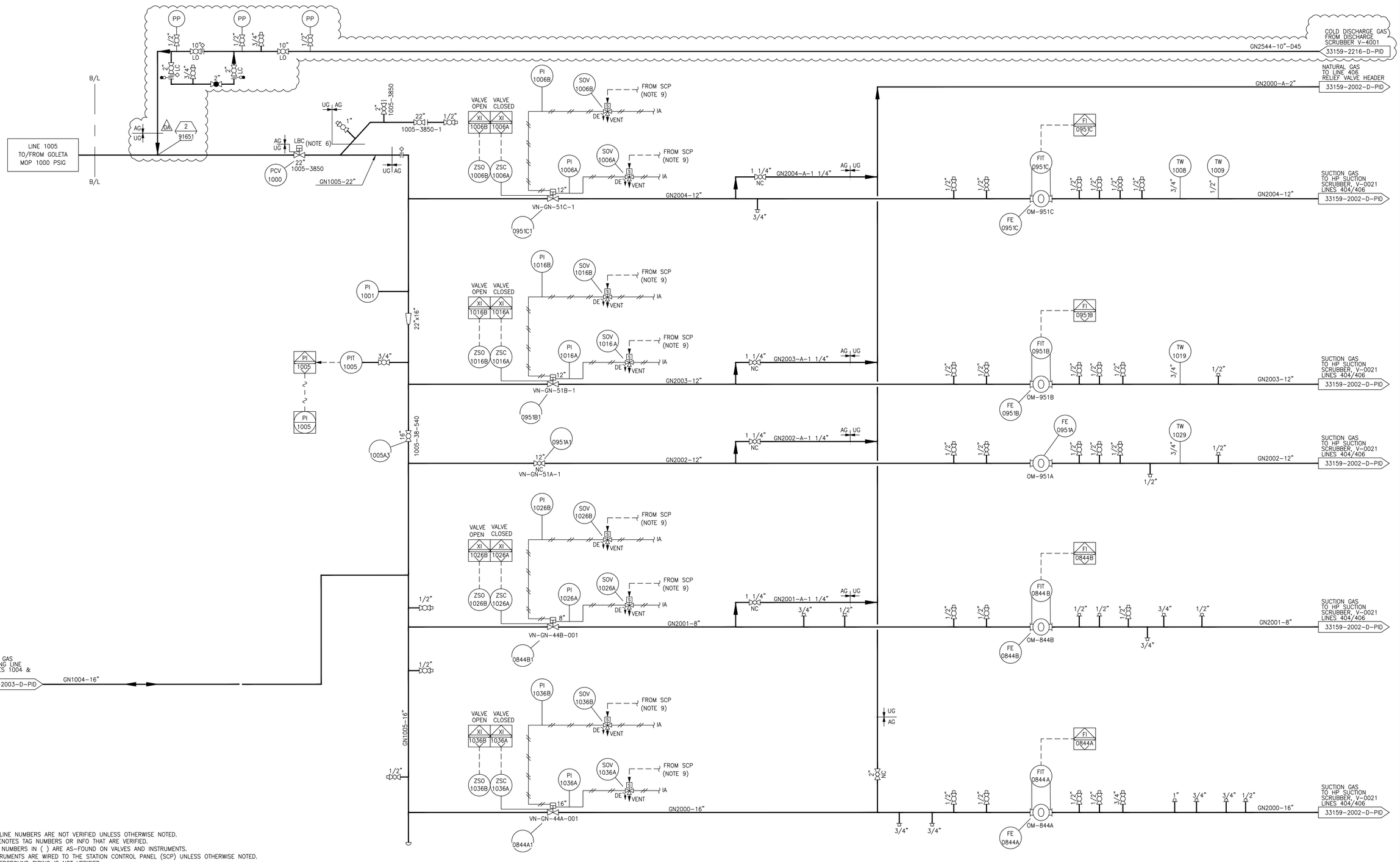
CDCA - California Desert Conservation Area
CVMSHCP - Coachella Valley Multiple Species Habitat Conservation Plan
DWMA - Desert Wildlife Management Area
NECO - Northeastern Colorado
NEMO - North Eastern Mojave
WECO - Western Colorado
WEMO - Western Mojave

Note: The cost for the non-federal lands is $2,890 per acre (most recent costs provided to SoCalGas from CDFW in 2016). The mitigation ratio is 2:1 for areas

CUBE	SCG_Projects:Project_Reporting
Program_Detail	Ventura Compressor Modernization
Version	Forecast
Activity	All Activities
Cost_Type	All Costs
m_Reporting	Value
Cost_Center	All Cost Centers
FERC_Account	All FERC Accounts
Company	All Companies
Stage	All Stages

			Jan 2020 PTD
All Cost Elements	**All Functions**	**All Purchase Orders**	**14,581,656.97**
Direct Costs	**All Functions**	**All Purchase Orders**	**10,221,538.15**
Direct Costs	**01 Project Management**	**All Purchase Orders**	**1,270,448.06**
Direct Costs	01 Project Management	GARNIER GROUP AND ASSOCIATES L - 112640	115.83
Direct Costs	01 Project Management	E2 CONSULTING ENGINEERS INC - 112884	154,689.33
Direct Costs	01 Project Management	PROGRAM MANAGEMENT AND CONTROL - 118153	42,120.45
Direct Costs	01 Project Management	PALISADE CORPORATION - 124860	714.28
Direct Costs	01 Project Management	AGILEONE - 94383	142,216.14
Direct Costs	01 Project Management	POWER ADVOCATE INC - 95811	351,055.20
Direct Costs	01 Project Management	RISK MANAGEMENT PROFESSIONALS - 97423	14,036.92
Direct Costs	01 Project Management	AVINEON INC - 98842	26,860.00
Direct Costs	01 Project Management	No Vendor	538,639.91
Direct Costs	**02 Project Operations**	**All Purchase Orders**	**53,183.09**
Direct Costs	02 Project Operations	BURNS & MCDONNELL ENGINEERING CO - 63858	32,388.36
Direct Costs	02 Project Operations	No Vendor	20,794.73
Direct Costs	**03 Engineering**	**All Purchase Orders**	**7,042,534.19**
Direct Costs	03 Engineering	COLLINGS AND ASSOCIATES LLC - 107120	2,844.38
Direct Costs	03 Engineering	PARSONS ENVIRONMENT & INFRASTR - 109709	3,507.50
Direct Costs	03 Engineering	PARSONS ENVIRONMENT & INFRASTRUCTURGROUP INC - 109710	6,674.24
Direct Costs	03 Engineering	IMAGINIT TECHNOLOGIES - 112356	24,500.00
Direct Costs	03 Engineering	EN ENGINEERING LLC - 112687	1,860.00
Direct Costs	03 Engineering	COMMONWEALTH LAND TITLE COMPAN - 113218	950.00
Direct Costs	03 Engineering	AVEVA INC - 115036	71,845.42
Direct Costs	03 Engineering	PROCESS ECOLOGY INC - 116344	24,922.61
Direct Costs	03 Engineering	STANTEC CONSULTING SERVICES IN - 116429	28,814.00
Direct Costs	03 Engineering	BROWNFIELD SOLUTIONS LTD - 116551	55,184.24
Direct Costs	03 Engineering	FLUOR ENTERPRISES INC - 117045	1,129,880.48
Direct Costs	03 Engineering	SUPERBTECH INC - 119542	36,602.20
Direct Costs	03 Engineering	JCK ENGINEERS INC - 124315	1,120.00
Direct Costs	03 Engineering	GULF INTERSTATE ENGINEERING CO - 129624	55,000.00
Direct Costs	03 Engineering	PARSONS ENGINEERING SCIENCE INC - 13254	2,140.00
Direct Costs	03 Engineering	REM ENGINEERING CO INC - 14424	170,227.80
Direct Costs	03 Engineering	UNIVERSAL ENSCO INC - 17705	58,593.50
Direct Costs	03 Engineering	GLOBAL TRADELINKS - 43180	69,625.00
Direct Costs	03 Engineering	SPEC SERVICES INC - 49625	107,326.16
Direct Costs	03 Engineering	REM ENGINEERING CO INC - 58322	77,338.77
Direct Costs	03 Engineering	EDM SERVICES INC - 62137	8,297.22
Direct Costs	03 Engineering	BURNS & MCDONNELL ENGINEERING CO - 63858	48,409.21
Direct Costs	03 Engineering	WESTLAND GROUP INC - 64095	2,684.00
Direct Costs	03 Engineering	WORLEYPARSONS GROUP - 94874	4,408,844.20
Direct Costs	03 Engineering	OSCEOLA CONSULTING - 97173	29,455.95
Direct Costs	03 Engineering	No Vendor	615,887.31
Direct Costs	**08 Environmental**	**All Purchase Orders**	**248,806.43**
Direct Costs	08 Environmental	ANDERSEN ENVIRONMENTAL - 108564	4,820.60
Direct Costs	08 Environmental	EUROFINS CALSCIENCE INC - 114600	1,282.50
Direct Costs	08 Environmental	SAPPHOS ENVIRONMENTAL INC - 115632	13,931.19
Direct Costs	08 Environmental	DOUGLAS G HONEGGER - 30914	600.00
Direct Costs	08 Environmental	TETRA TECH INC - 41707	64,100.36
Direct Costs	08 Environmental	ECOLOGY CONTROL INDUSTRIES INC - 44696	2,304.55
Direct Costs	08 Environmental	RINCON CONSULTANTS INC - 74037	60,851.50

Direct Costs	08 Environmental	ERM WEST INC - 82191	32,635.52
Direct Costs	08 Environmental	No Vendor	68,280.21
Direct Costs	**09 Land**	**All Purchase Orders**	**3,257.93**
Direct Costs	09 Land	No Vendor	3,257.93
Direct Costs	**13 Accounting/Project Controls**	**All Purchase Orders**	**1,125,653.67**
Direct Costs	13 Accounting/Project Controls	ORACLE AMERICA INC - 103662	1,054.00
Direct Costs	13 Accounting/Project Controls	KPMG LLP - 108862	4,619.29
Direct Costs	13 Accounting/Project Controls	PARSONS ENVIRONMENT & INFRASTRUCTURGROUP INC - 109710	171,079.25
Direct Costs	13 Accounting/Project Controls	CAMPOS EPC LLC - 112593	108,374.05
Direct Costs	13 Accounting/Project Controls	E2 CONSULTING ENGINEERS INC - 112884	148,304.36
Direct Costs	13 Accounting/Project Controls	CONSTRUCTION MANAGEMENT SOLUTI - 113160	498,625.45
Direct Costs	13 Accounting/Project Controls	MOTIVE POWER INC - 126046	29,934.18
Direct Costs	13 Accounting/Project Controls	TURNER & TOWNSEND LARKSPUR LLC - 127356	71,285.48
Direct Costs	13 Accounting/Project Controls	DR MCNATTY & ASSOCIATES INC - 77578	1,233.56
Direct Costs	13 Accounting/Project Controls	No Vendor	91,144.05
Direct Costs	**15 Supply Management**	**All Purchase Orders**	**31,857.80**
Direct Costs	15 Supply Management	CITIBANK SOUTH DAKOTA NA - 103507	910.00
Direct Costs	15 Supply Management	No Vendor	30,947.80
Direct Costs	**17 Gas Transmission**	**All Purchase Orders**	**1,296.97**
Direct Costs	17 Gas Transmission	No Vendor	1,296.97
Direct Costs	**20 Regulatory**	**All Purchase Orders**	**8,056.42**
Direct Costs	20 Regulatory	No Vendor	8,056.42
Direct Costs	**30 Construction**	**All Purchase Orders**	**114,319.82**
Direct Costs	30 Construction	CLEVELAND INTEGRITY SERVICES I - 111428	1,479.80
Direct Costs	30 Construction	CALIFORNIA PIPELINE INSPECTION - 114118	26,751.70
Direct Costs	30 Construction	CALIFORNIA PIPELINE INSPECTION - 118022	728.82
Direct Costs	30 Construction	CALIFORNIA PIPELINE INSPECTION CORP - 118023	4,742.92
Direct Costs	30 Construction	SOUTHWEST CONTRACTORS - 26239	960.40
Direct Costs	30 Construction	AMERICAN EXPRESS CO - 8752	1,806.34
Direct Costs	30 Construction	ENERGY EXPERTS INTERNATIONAL - 93571	77,849.84
Direct Costs	**91 Other**	**All Purchase Orders**	**22,417.07**
Direct Costs	91 Other	REM ENGINEERING CO INC - 14424	92.80
Direct Costs	91 Other	EUREST DINING SERVICES - 59592	283.04
Direct Costs	91 Other	EUREST DINING SERVICES - 8862	1,142.75
Direct Costs	91 Other	No Vendor	20,898.48
Direct Costs	**95 Accrual**	**All Purchase Orders**	**267,679.53**
Direct Costs	95 Accrual	E2 CONSULTING ENGINEERS INC - 112884	962.50
Direct Costs	95 Accrual	AVEVA INC - 115036	16,667.25
Direct Costs	95 Accrual	FLUOR ENTERPRISES INC - 117045	235,773.36
Direct Costs	95 Accrual	AMEC FOSTER WHEELER ENVIRONMEN - 119274	2,912.10
Direct Costs	95 Accrual	BURNS & MCDONNELL ENGINEERING CO - 63858	2,895.50
Direct Costs	95 Accrual	No Vendor	8,468.82
Direct Costs	**UnMapped**	**All Purchase Orders**	**32,027.17**
Direct Costs	UnMapped	SPEC SERVICES INC - 49625	15,282.30
Direct Costs	UnMapped	CITY OF VENTURA - 59340	378.00
Direct Costs	UnMapped	EDM SERVICES INC - 62137	4,690.53
Direct Costs	UnMapped	No Vendor	11,676.34
Non Direct Costs	**All Functions**	**All Purchase Orders**	**4,360,118.82**
Non Direct Costs	92 Non Direct Costs	All Purchase Orders	4,360,118.82



NOTES:

1. LINE NUMBERS ARE NOT VERIFIED UNLESS OTHERWISE NOTED.
2. * DENOTES TAG NUMBERS OR INFO THAT ARE VERIFIED.
3. TAG NUMBERS IN ( ) ARE AS-FOUND ON VALVES AND INSTRUMENTS.
4. INSTRUMENTS ARE WIRED TO THE STATION CONTROL PANEL (SCP) UNLESS OTHERWISE NOTED.
5. UNDERGROUND PIPING IS NOT VERIFIED.
6. LINE BREAK CONTROL (LBC). SELF CLOSING VALVE ON LOW PRESSURE.
7. CHROMATOGRAPH LOCATED IN ANALYZER SHELTER.
8. INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-FP-I" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   PRESSURE GAUGE TAG NUMBER PI-0102 WILL BE IDENTIFIED AS VN-FP-I-PI-0102.
9. TO BE VERIFIED.
10. SEE OLD DRAWINGS R-161-2001-D.PID & R-161-2002-D.PID (R-161) FOR REFERENCE.
11. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES)

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
0B	06/28/19	SB	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000
0A	03/29/19	SH	SD	MSN	PGG		ISSUED FOR REVIEW	91651.000
0	03/31/16	JC	BK	SA	OC	E15043	AS-BUILT PER WOA 91651	91651
							SUPERSEDES R-161-2001-D.PID	
							& R-161-2002-D.PID (R-161)	

	BY	DATE
DESIGNED:	AS-BUILT	03/31/16
DRAWN:	J.CERDA	03/31/16
CHECKED:	B.KING	03/31/16
PROJ APV:	A.CINAR	03/31/16
SCG ENG APV:	O.CONTRERAS	03/31/16
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas — A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114

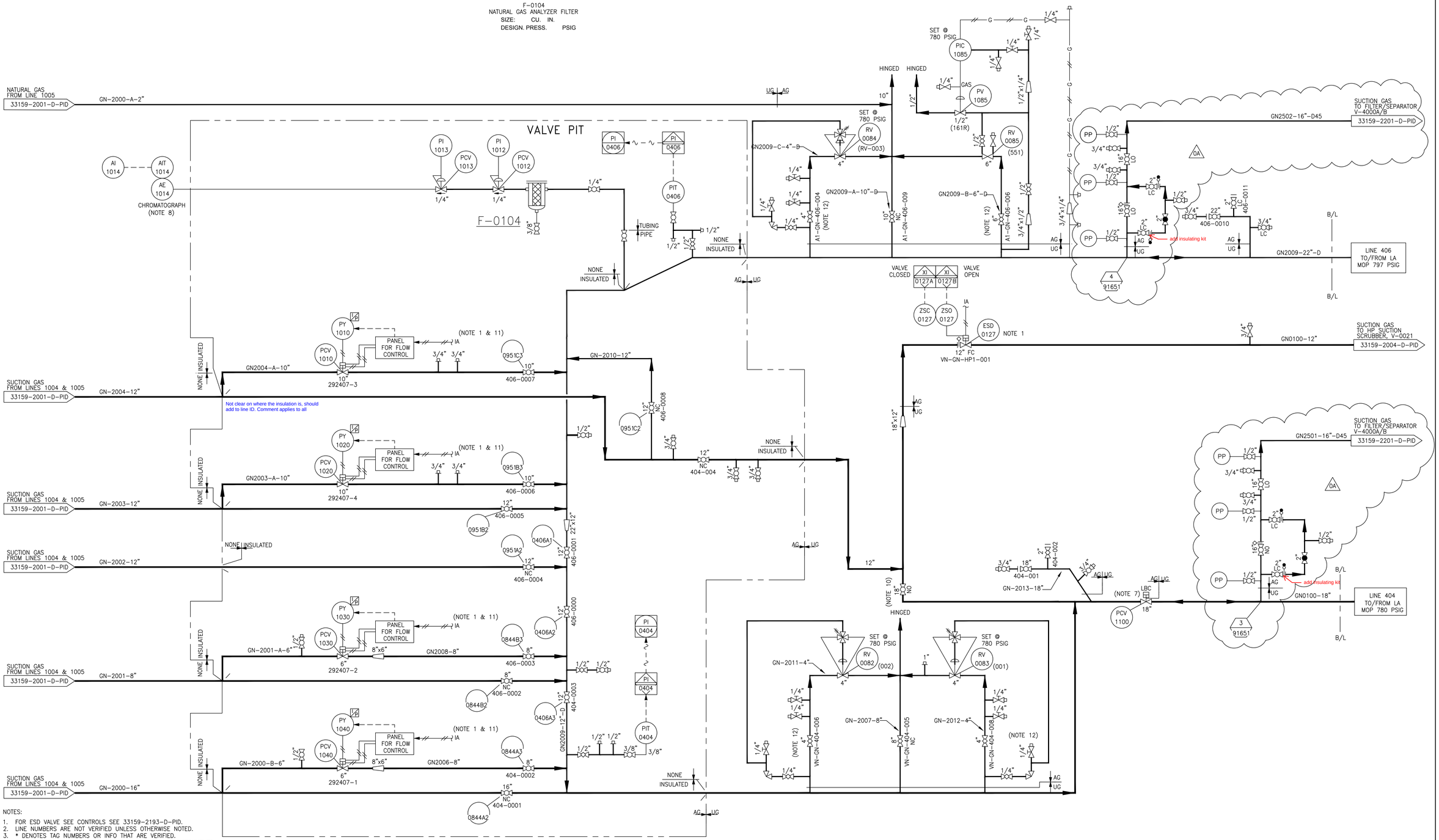
SCALE: NONE

VENTURA COMPRESSOR STATION HIGH PRESSURE SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2001-D-PID

REV: 0B

F-0104
NATURAL GAS ANALYZER FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG



NOTES:

1. FOR ESD VALVE SEE CONTROLS SEE 33159-2193-D-PID.
2. LINE NUMBERS ARE NOT VERIFIED UNLESS OTHERWISE NOTED.
3. * DENOTES TAG NUMBERS OR INFO THAT ARE VERIFIED.
4. TAG NUMBERS IN ( ) ARE AS-FOUND ON VALVES AND INSTRUMENTS.
5. INSTRUMENTS ARE WIRED TO THE STATION CONTROL PANEL (SCP) UNLESS OTHERWISE NOTED.
6. UNDERGROUND PIPING IS NOT VERIFIED.
7. LINE BREAK CONTROL (LBC), SELF CLOSING VALVE ON LOW PRESSURE.
8. CHROMATOGRAPH LOCATED IN ANALYZER SHELTER.
9. INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C1-I" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   PRESSURE GAUGE TAG NUMBER PI-0102 WILL BE IDENTIFIED AS VN-C1-I-0102.
10. TO BE VERIFIED.
11. TO BE VERIFIED WITH OPERATION.
12. ALL VALVES ON RELIEF VALVE PATH SHOULD BE L.O.
13. SEE OLD DRAWINGS R-161-2001-D.PID & R-161-2002-D.PID (R-161) REFERENCE.
14. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES)

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
0C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
0B	06/28/19	SB	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000
0A	03/29/19	SR	SD	MSN	PGG		ISSUED FOR REVIEW	91651.000
0	03/31/16	JC	BK	SA	0C	E15043	AS-BUILT PER WOA 91651	91651
							SUPERSEDES R-161-2001-D.PID & R-161-2002-D.PID (R-161)	

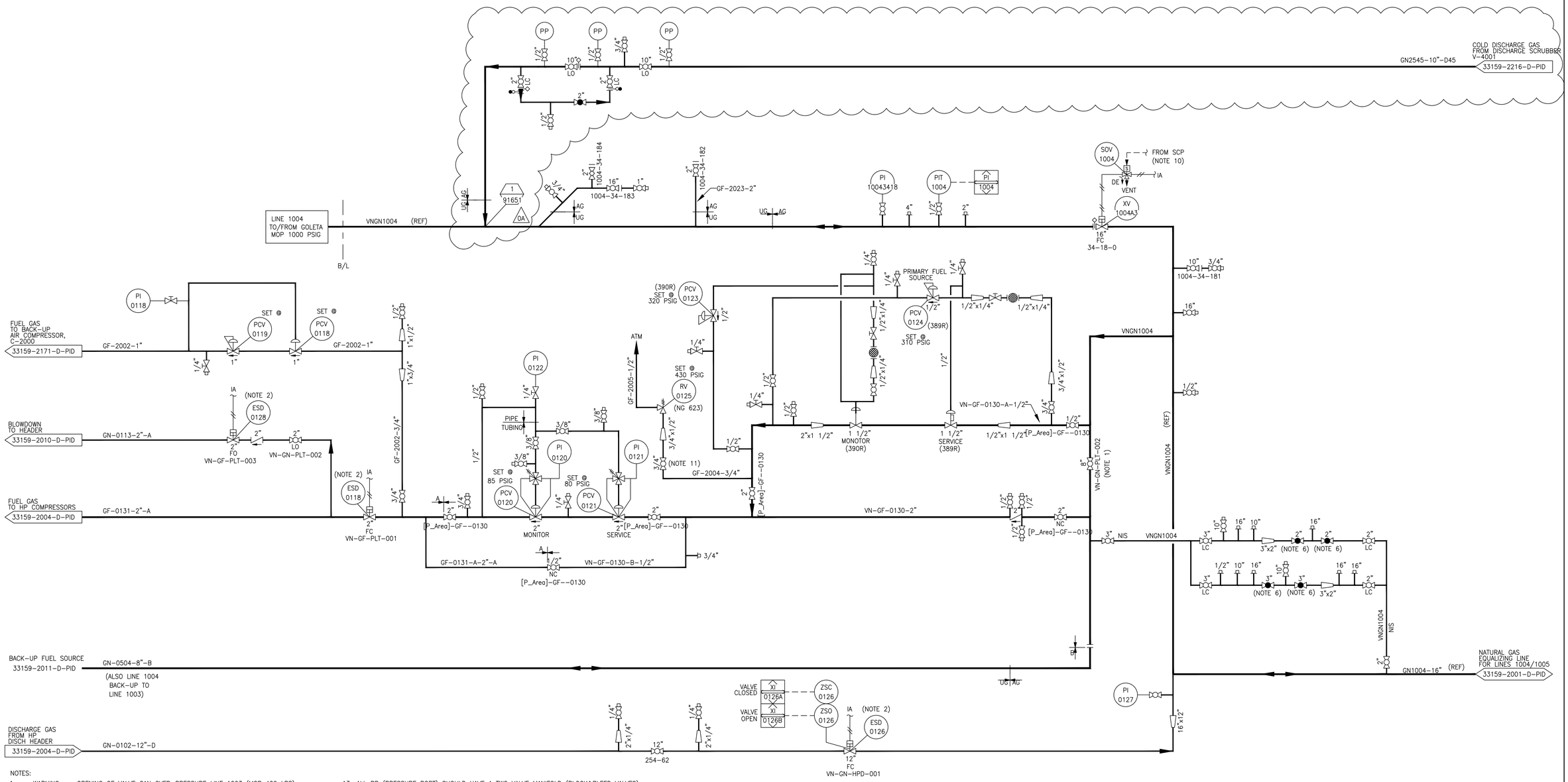
BY	DATE
DESIGNED: AS-BUILT	03/31/16
DRAWN: J.CEDRA	03/31/16
CHECKED: B.KING	03/31/16
PROJ APV: A.CINAR	03/31/16
SCG ENG APV: O.CONTRERAS	03/31/16
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION HIGH PRESSURE SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2002-D-PID REV 0C



NOTES:

1. --WARNING -- OPENING OF VALVE CAN OVER-PRESSURE LINE 1003 (MOP 400 LBS). VALVE SHALL ONLY BE OPERATED IN ACCORDANCE WITH SOCAL PROCEDURES.
2. FOR ESD VALVE CONTROLS 33159-2192-D-PID AND 33159-2193-D-PID.
3. LINE NUMBERS ARE NOT VERIFIED UNLESS OTHERWISE NOTED.
4. * DENOTES TAG NUMBERS OR INFO THAT ARE VERIFIED.
5. TAG NUMBERS IN ( ) ARE AS-FOUND.
6. REGULATOR INTERNALS ARE REMOVED.
7. INSTRUMENTS ARE WIRED TO THE STATION CONTROL PANEL (SCP) UNLESS OTHERWISE NOTED.
8. UNDERGROUND PIPING IS NOT VERIFIED.
9. INSTRUMENT TAG NUMBERS ARE PRECEDED WITH "VN-C1-I" UNLESS OTHERWISE NOTED. EXAMPLE: PRESSURE GAUGE TAG NUMBER "PI-0102" WILL BE IDENTIFIED AS "VN-C1-I-0102".
10. TO BE VERIFIED BY OPERATIONS.
11. ALL VALVES ON RELIEF VALVE PATH SHOULD BE L.O.
12. SEE OLD DRAWINGS R-161-2001-D.PID & R-161-2002-D.PID (R-161) FOR REFERENCE.
13. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES)

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
0C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
0B	06/28/19	SB	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000
0A	03/29/19	SG	SD	MSN	PGG		ISSUED FOR REVIEW	91651.000
0	03/31/16	JC	BK	SA	OC	E15043	AS-BUILT PER WOA 91651	91651
							SUPERSEDES R-161-2001-D.PID	
							& R-161-2002-D.PID (R-161)	

	BY	DATE
DESIGNED:	AS-BUILT	03/31/16
DRAWN:	J.CEDRA	03/31/16
CHECKED:	B.KING	03/31/16
PROJ APV:	A.CINAR	03/31/16
SCG ENG APV:	O.CONTRERAS	03/31/16
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION HIGH PRESSURE SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2003-D-PID

REV 0C

VN-C1-M-ST-0101
BLOWDOWN STACK
SIZE : 5'-9" OD x 24' T/B
CAPACITY : BBLS
TRIM : GN2024

ADD INFORMATION TO BLOCK

BACK-UP FUEL SOURCE
33159-2003-D-PID
GN0504-8"
(ALSO LINE 1004 BACK-UP TO LINE 1003)

GAS TO/FROM LP DISCH HEADER
33159-2010-D-PID
GN0502-8"

DRAIN TO CONDENSATE HEADER
33159-2181-D-PID
OX0505-2"

AG UG
1003-3778. 12"
12"x8"
GN0502-12"
VN-OX-001
2" LC
LOW POINT DRAIN
OX2001-2"
(NOT VERIFIED)

VALVE PIT
(NOTE 1)
XV 0001
1/2"
(NOTE 1)
ESD 0002
12" 1003-37781
ATM
GN2019-XX"
RV 0113
GN2018-XX"
(NOTE 8)
XV 1003A4
GN2020-XX"
ESD 1003A5
12"
TO 1031
AG UG AG
AG UG

B/L
LINE 1003 FROM GOLETA MOP 460 PSIG NOTE 10
12 91651
UG AG
3/4" PP
3/4" PP
6" LO FP
6" LO FP
6" GV1014-6"-B41
UNIT DEPRESSURATION FROM PLANT 2 COMPRESSORS
33159-2238-D-PID
1" A
2" LC
2" LC
1/2"
2"
EMERGENCY CONTROL AND STAND BY REGULATOR VAULT (TYP)
B/L
LINE 1003 TO OJAI MOP 400 PSIG

SUCTION GAS TO/FROM LP SUCTION HEADER
33159-2010-D-PID
GN0501-6"
AG UG

ST-0101
UNDERGROUND
2" 2" 2"x1"
2"x? 2" 2" 2"x1"
GN2021-?
GN2021-2"
GN2021-1"
1"
HOLE 1
3/4" NPTF
1" 1/4" NPTF
P-0101
AIP
1/4" NPTF
1" NPTF
1"x1/4"
1"
AG UG
GN0510-A-10"

DISTRIBUTION FEED TO CITY
GI 0003
8" 1031-0000
8"
6"x6"
(NOTE 1)
ESD 0017
8" 1031-0001
8" 1031-0002
GN0501-8"
B/L
LINE 1031 TO/FROM TEXACO MOP 175 PSIG
AU2001-1"
UTILITY AIR FROM HEADER
33159-2181-D-PID

NOT VERIFIED
GN0510-6"-A
10"x6"
6"
6"x4"
GN2016-4"
(NOTE 1)
ESD 0014
4"
NOT VERIFIED
NOT VERIFIED

GAS FROM BLOWDOWN HEADER
33159-2010-D-PID
GN0510-10"

NOTES:
1. ESD FUNCTION IS REMOVED AND INSTRUMENT AIR IS DISCONNECTED FROM VALVE.
2. LINE NUMBERS ARE NOT VERIFIED UNLESS OTHERWISE NOTED.
3. * DENOTES TAG NUMBERS OR INFO THAT ARE VERIFIED.
4. TAG NUMBERS IN ( ) ARE AS FOUND.
5. UNDERGROUND PIPING IS NOT VERIFIED.
6. ALL EQUIPMENT NUMBERS PRECEDED WITH "VN-FP-M" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   EQUIPMENT TAG NUMBER "F-0101" WILL BE IDENTIFIED AS "VN-FP-M-F-0101".
7. INSTRUMENT TAG NUMBERS PRECEDED WITH "VN-FP-I" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   PRESSURE GAUGE TAG NUMBER "PI-0102" WILL BE IDENTIFIED AS "VN-FP-I-PI-0102".
8. ALL VALVES ON RELIEF VALVE PATH SHOULD BE LO.
9. SEE OLD DRAWING R-155 R-1 OR CR-155 R1 FOR REFERENCE.

VN-C1-M-P-0101(AIP)
BLOWDOWN STACK DRAIN PUMP
CAPACITY GPM
△ P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
0A	05/29/19	AY	BK	SA	OC	E15043	ISSUED FOR DESIGN	91651
0	03/31/16	JC	BK	SA	OC	E15043	AS-BUILT PER WOA 91651	91651
							SUPERSEDES R-155	
							OR CR-155 R-1	

BY	DATE
DESIGNED: AS-BULT	03/31/16
DRAWN: J.CERDA	03/31/16
CHECKED: B.KING	03/31/16
PROJ APV: A.CINAR	03/31/16
SCG ENG APV: O.CONTRERAS	03/31/16
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
LOW PRESSURE SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2011-D-PID
REV 0A

F-0105
COOLANT FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

T-0040 (T-040)
COOLANT STORAGE AND RECYCLE TANK
SIZE: 60" DIA x 9'-8" T/T
CAPACITY: 1420 GAL
TRIM: WC0922-AD

T-0070 (T-070)
WASTE WATER STORAGE TANK
SIZE: 60" DIA x 9'-8" T/T
CAPACITY: 1420 GAL
TRIM: WC0934-AD

TO ELECTRICAL EQUIPMENT
XA 0924 LOW UPS VOLTAGE
XA 0925 LOSS OF PURCHASED POWER
XA 0926 ELECTRICAL GROUND FAULT

DISCONNECTED FROM DISTANCE PIECE DRAIN PUMP, P-0006

OPEN TO ATM
WC0711-1"-AD
WC0611-1"-AD
WC0811-1"-AD
SLOPE 3/8" PER 1'-0"

AS0608-2"-AD
AI0609-1"-AD
WC0610-1 1/2"-AD
OX0612-1"-BE
WC0611-1"-AD
AS0708-2"-AD
AI0709-1"-AD
WC0710-1 1/2"-AD
OX0712-1"-BE
AS0808-2"-AD
AI0809-1"-AD
WC0810-1 1/2"-AD
OX0812-1"-BE
OX0121-2"-BE
CONDENSATE

STARTING AIR FROM UTILITY AIR RECEIVER, V-0164 — 33159-2180-D-PID — AS0961-3"-AD — STARTING AIR
COOLANT SUPPLY TO HEADER — 33159-2180-D-PID — WC0921-2"-AD — COOLANT SUPPLY
INSTRUMENT AIR TO HEADER — 33159-2180-D-PID — AI0951-2"-AD — INSTRUMENT AIR
UTILITY AIR FROM UTILITY AIR RECEIVER, V-0164 — 33159-2180-D-PID — AU0971-2"-AD — UTILITY AIR
UTILITY WATER TO UTILITY STATIONS — 33159-2180-D-PID — WU0941-2"-LA — UTILITY WATER
COOLANT RECYCLE FROM WASTE COOLANT PUMPS — 33159-2180-D-PID — WC0931-1 1/2"-AD — COOLANT RECYCLE
UTILITY AIR TO WASTE OIL TRANSFER PUMP, P-0003 — 33159-2185-D-PID — AU0973-A-1"-AD

*VN-AI-IAR-002
TO HP SUCTION SCRUBBER, V-0021
NOT VERIFIED
*VN-AU-UAR-002
VN-WU-PLT-001

US-3
WU0944-3/4"-LA
AU0977-3/4"-AD

SCRUBBER & SEPARATOR FROM PLANT FUEL DRAIN — OX0132-1"-A — 33159-2004-D-PID
DRAIN FROM LP DISCH HEADER — OX0505-2"-BE — 33159-2011-D-PID
DRAIN FROM HP SUCTION SCRUBBER, V-0021 — OX0125-3"-D — 33159-2004-D-PID
CONDENSATE FROM HP COMPRESSORS — OX0127-2"-D — 33159-2180-D-PID
3/4" HOSE CONNECTION TO DRUM
*VN-OX-PLT-008
100 PSIG INSTRUMENT AIR FROM UTILITY AIR RECEIVER, V-0164 — AI0951-2"-AD — 33159-2175-D-PID

WU0946-2"-LA
WATER SOURCE (NOT VERIFIED)
WU0946-1"-LA
WU0946-1/2"-LA
WASTE WATER FROM AREA SUMP PUMP, P-0005 — WC0936-2"-AD — 33159-2180-D-PID
WASTE WATER
UTILITY WATER TO PLANT 2 — WU1001-2"-A21 — 33159-2253-D-PID
11 91651
OC

PI 0908
PCV 0907 (400R) SET @ ? PSIG
AU0973-1"-AD
P-0004
(AIP)
WC0933-1"-AD
AU0974-2"-AD

UTILITY AIR TO BLOWDOWN STACK PUMP, P-0101 — 33159-2011-D-PID — AU2001-1"
PCV 0914 (395R) SET @ ? PSIG
UTILITY AIR TO ENGINE OIL CHARGE PUMP, P-0001 — 33159-2185-D-PID — AU0974-A-1"-AD

WC0921-2"-AD
WC0921-1 1/2"-AD
RO 0918
WC0923-1"-AD
WC2000-1 1/2"
WC0931-1 1/2"-AD
WC0932-1 1/2"-AD
WC0936-2"-AD

FLANGE SCREEN ON AN 180° RETURN
ERV 0919
ERV 0922
SET @ 5%
SET @ 100%
LA 0921 LS 0921 LI 0921
LA 0923 LI 0923
LG 0920 LIT 0921
LG 0923 LIT 0923
WT0947-1"-LA
WT0947-3/4"-LA
SOV 0921
FQI 0925
FE 0925
DENIM WATER
WATER TREATMENT UNIT (TYP OF 4)
TO EYEWASH STATION

AUTO STATUS HI 0916A
MANUAL STATUS HI 0916B
HOA HS 0916
SOV 0916
PCV 0915 (401R) SET @ ? PSIG
PI 0917 (919)
AU0974-1"-AD
COOLANT CHARGE PUMP START FROM LSL-0175/0275/0375 — 33159-2180-D-PID

T-0040
T-0070
HL 4'-0"
HOLD
P-0002
WC0920-1"-AD
WC0920-1 1/2"-AD
F-0105
DIKED ROTATE AREA
SLOPE SLAB

WC0938-3"-AD
VACUUM TRUCK CONNECTION
TANK AREA LEAK DETECTION LA 0931 LS 0931
2'-0" x 2'-0" x 1'-6" DEEP SUMP

NOTES:
1. LINE NUMBERS ARE NOT VERIFIED.
2. * DENOTES TAG NUMBERS OR INFO THAT ARE VERIFIED.
3. TAG NUMBERS IN ( ) ARE AS-FOUND.
4. UNDERGROUND PIPING IS NOT VERIFIED.
5. INSTRUMENTS ARE WIRED TO THE STATION CONTROL PANEL (SCP) UNLESS OTHERWISE NOTED.
6. ALL EQUIPMENT NUMBERS PRECEDED WITH "VN-C1-M" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   EQUIPMENT TAG NUMBER "F-0101" WILL BE IDENTIFIED AS "VN-C1-M-F-0101".
7. INSTRUMENT TAG NUMBERS PRECEDED WITH "VN-C1-I" UNLESS OTHERWISE NOTED.
   EXAMPLE:
   PRESSURE GAUGE TAG NUMBER "PI-0102" WILL BE IDENTIFIED AS "VN-C1-I-PI-0102".
8. SEE OLD DRAWING R-157 R-1 FOR REFERENCE.

P-0002
COOLANT CHARGE PUMP
CAPACITY 20 GPM
ΔP: 24.3 PSI
HP V RPM

P-0004
WASTE COOLANT TRANSFER PUMP (AIP)
CAPACITY
ΔP: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO	DESCRIPTION	WOA
0C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
0B	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
0A	06/28/19	SB	SH	MSN		E15043	ISSUED FOR REVIEW	91651
0	03/31/16	JC	BK	SA	OC	E15043	AS-BUILT PER WOA 91651	91651
							SUPERSEDES R-157 R-1	

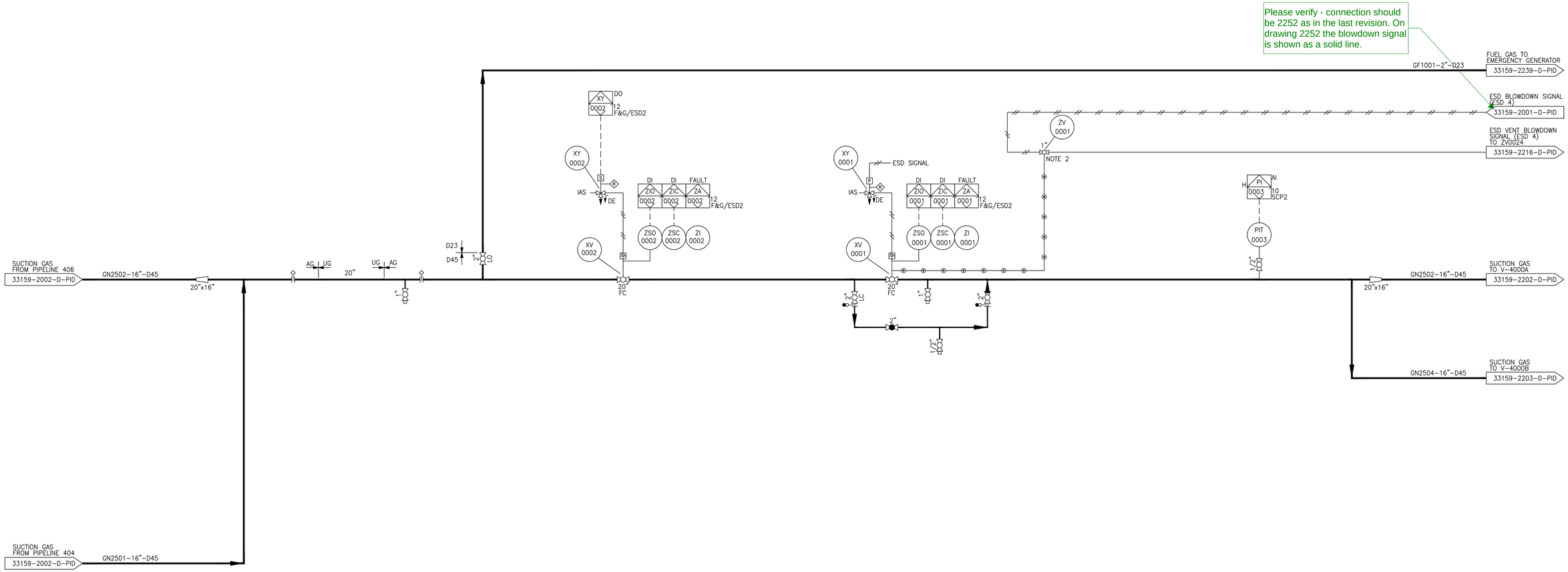
BY		DATE
DESIGNED:	J. CERDA	03/31/16
DRAWN:	J. CERDA	03/31/16
CHECKED:	B. KING	03/31/16
PROJ APV:	A. CINAR	03/31/16
SCG ENG APV:	O. CONTRERAS	03/31/16
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas — A Sempra Energy utility

VENTURA COMPRESSOR STATION
UTILITIES DISTRIBUTION
PIPING & INSTRUMENTATION DIAGRAM

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE
DRAWING NUMBER: 33159-2181-D-PID
REV: 0C

Please verify - connection should be 2252 as in the last revision. On drawing 2252 the blowdown signal is shown as a solid line.



NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED.
   EXAMPLE: INSTRUMENT TAG NUMBER XV-4061 WILL BE IDENTIFIED AS VN-C2-1-XV-4061.
2. ZV-1006A TO OPEN WHEN XV-1006A1 IS FULLY CLOSED.
3. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PID.
4. ESD SIGNAL, 30 PSIG, SEE ESD HEADER DRAWING 33159-2252-D-PID
5. PLC FIRE/GAS ESD 2 TO CLOSE XV-1006A2 IF NO PROOF OF XV-1006A1/C1 CLOSED IN TBD AMOUNT OF TIME.

UPDATE NOTE-2 VALVE TAG NUMBERS

UPDATE NOTE-5 VALVE TAG NUMBERS

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SG	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	SG	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.N.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

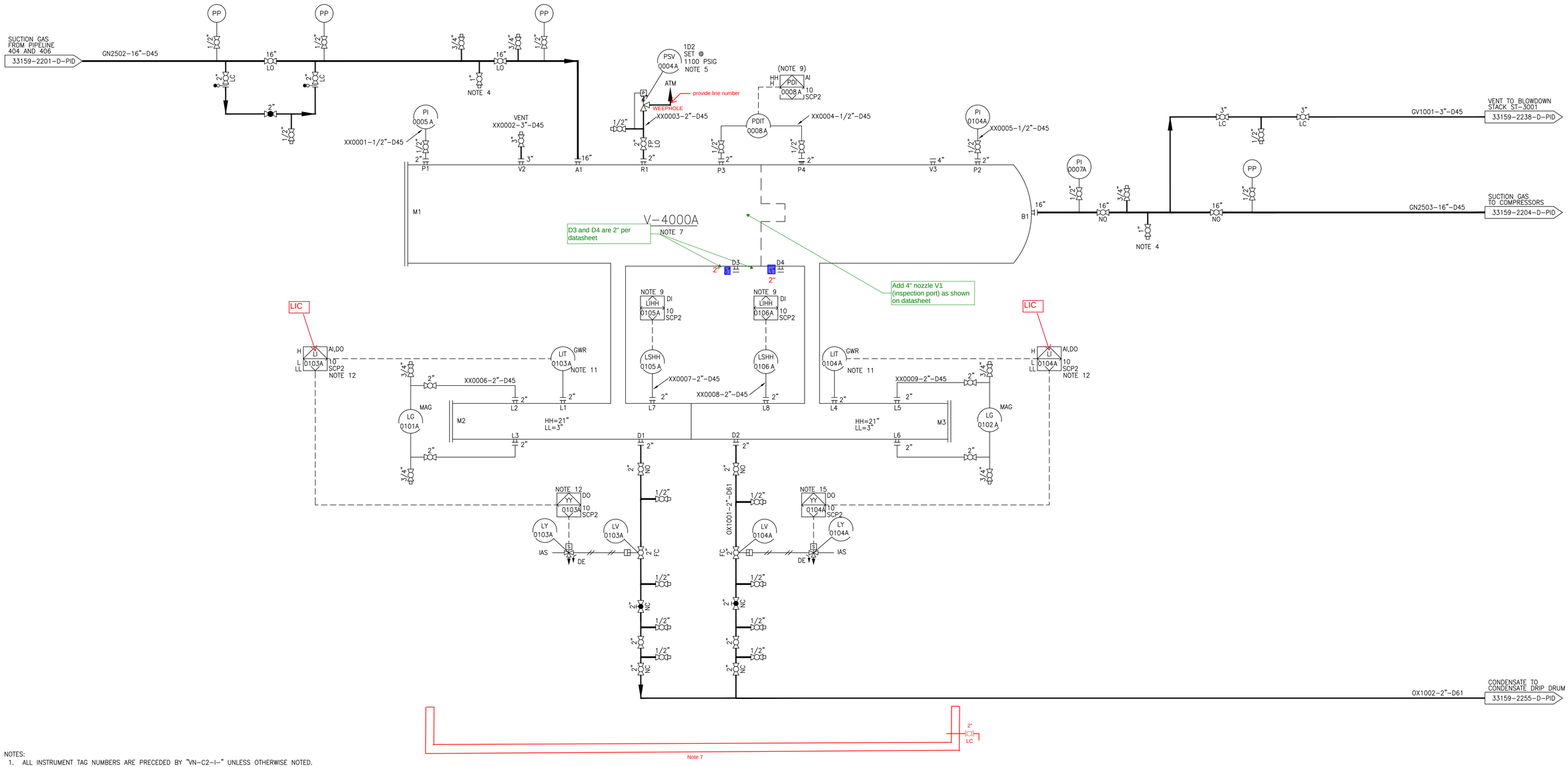
SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESOR STATION
PLANT 2 INLET GAS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2201-D-PID
REV: D

V-4000A
FILTER/SEPARATOR
SIZE: 3'-0" DIA X 13'-4" T/T (TOP BARREL)
SIZE: 2'-0" DIA X 13'-4" T/T (BOTTOM BARREL)
DESIGN: 1100 PSIG / FV @ 150 °F
OPERATING: 325-730 PSIG @ 55-80°F **(NOTE 14)**
CAPACITY: 100 MMSCFD NOTE 8
(NOTE 6)



NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-4061 WILL BE IDENTIFIED AS VN-C2-I-XV-4061.
2. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
4. SAMPLE POINT FOR ISOKINETIC PROBE.
5. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALK WAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. V-4000A SIZE & DIMENSIONS TO BE VERIFIED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. CONTAINMENT REQUIRED, SIZE BASED ON BOTTOM BARREL VOLUME ONLY. Single secondary containment for 4000A/B, V3100, V4011, V-4013.
8. V-4000A SIZED TO HANDLE 60% OF DESIGN FLOW (160 MMSCFD) AND TO HAVE A MINIMUM OF 20 FILTER ELEMENTS.
9. SHUTDOWN COMPRESSORS.
10. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVE)
11. TRANSMITTER FAILS TO LOW SIGNAL.
12. LV-0103A TO SHUT OFF ON BOTTOM BARREL LOW-LOW LIQUID LEVEL AND HIGH-HIGH LIQUID LEVEL ON V-4011.
13. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PID.
14. ALTERNATE CASE MAX SUCTION PRESSURE UP TO 730 PSIG.
15. LV-0104A TO SHUT OFF ON BOTTOM BARREL LOW-LOW LIQUID LEVEL AND HIGH-HIGH LIQUID LEVEL ON V-4011.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	DS	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: DS	03/29/19
CHECKED: SD	03/29/19
PROJ APV: M.S.MONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19

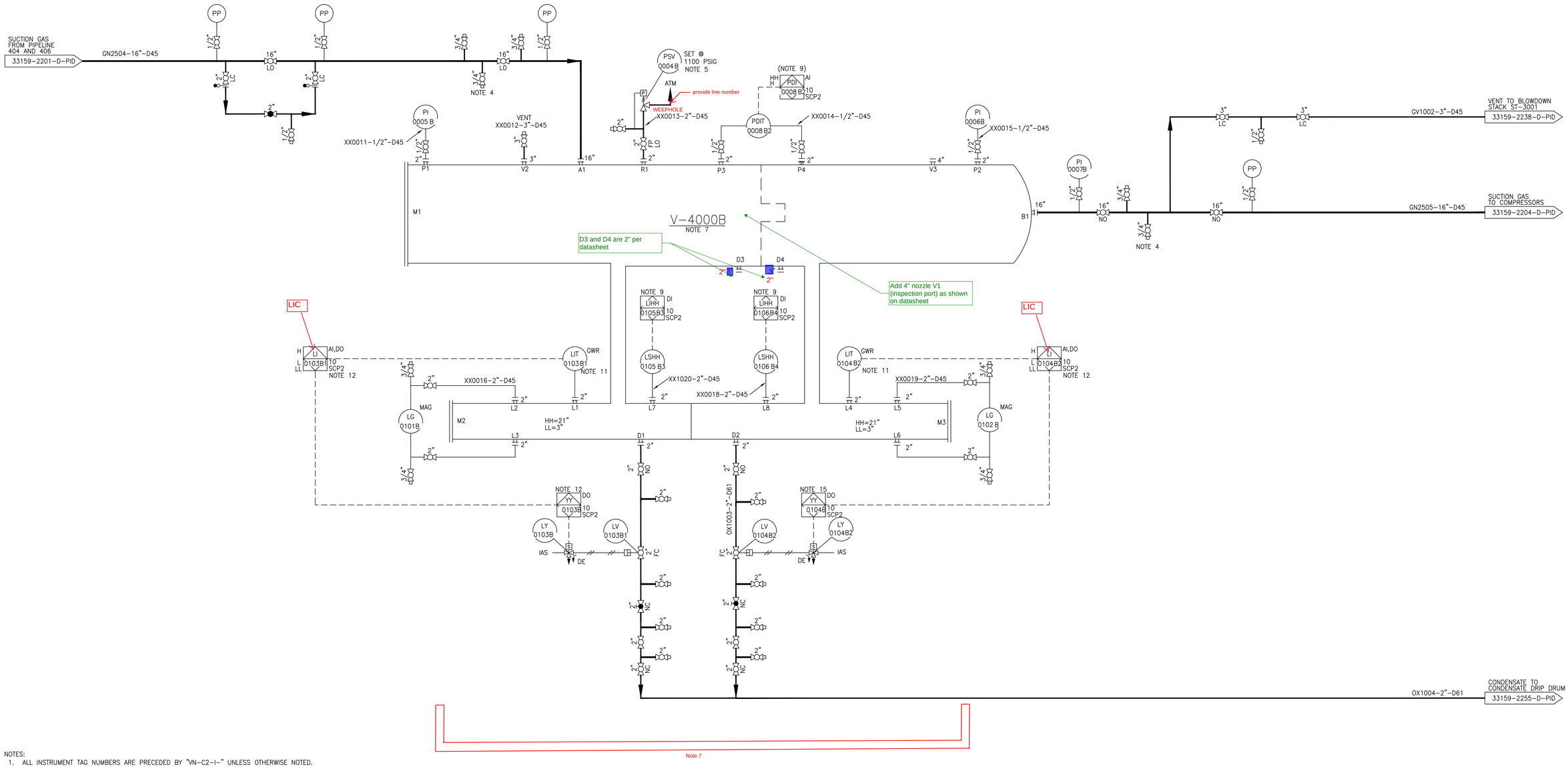
ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESOR STATION FILTER/SEPARATOR (V-4000A) PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2202-D-PID
REV: D

V-4000B
FILTER/SEPARATOR
SIZE: 3'-0" DIA X 13'-4" T/T (TOP BARREL)
SIZE: 2'-0" DIA X 13'-4" T/T (BOTTOM BARREL)
DESIGN: 1100 PSIG / FV @ 150 °F
OPERATING: 325-730 PSIG @ 55-80°F (NOTE 14)
CAPACITY: 100 MMSCFD (NOTE 8)
(NOTE 6)



NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-4061 WILL BE IDENTIFIED AS VN-C2-I-XV-4061.
2. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
4. SAMPLE POINT FOR ISOKINETIC PROBE.
5. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALK WAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. V-4000B SIZE & DIMENSIONS TO BE VERIFIED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. CONTAINMENT REQUIRED, SIZE BASED ON BOTTOM BARREL VOLUME ONLY. Single secondary containment for 4000A/B, V3100, V4011, V-4013.
8. V-4000B SIZED TO HANDLE 60% OF DESIGN FLOW (160 MMSCFD) AND TO HAVE A MINIMUM OF 20 FILTER ELEMENTS.
9. SHUTDOWN COMPRESSORS.
10. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVE)
11. TRANSMITTER FAILS TO LOW SIGNAL.
12. LV-0103B TO SHUT OFF ON BOTTOM BARREL LOW-LOW LIQUID LEVEL AND HIGH-HIGH LIQUID LEVEL ON V-4011. ← UPDATE NOTE-12 VALVE TAG NUMBER
13. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PID.
14. ALTERNATE CASE MAX SUCTION PRESSURE UP TO 730 PSIG.
15. LV-0104B TO SHUT OFF ON BOTTOM BARREL LOW-LOW LIQUID LEVEL AND HIGH-HIGH LIQUID LEVEL ON V-4011. ← UPDATE NOTE-15 VALVE TAG NUMBER

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SD	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	SD	03/29/19
CHECKED:	DS	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

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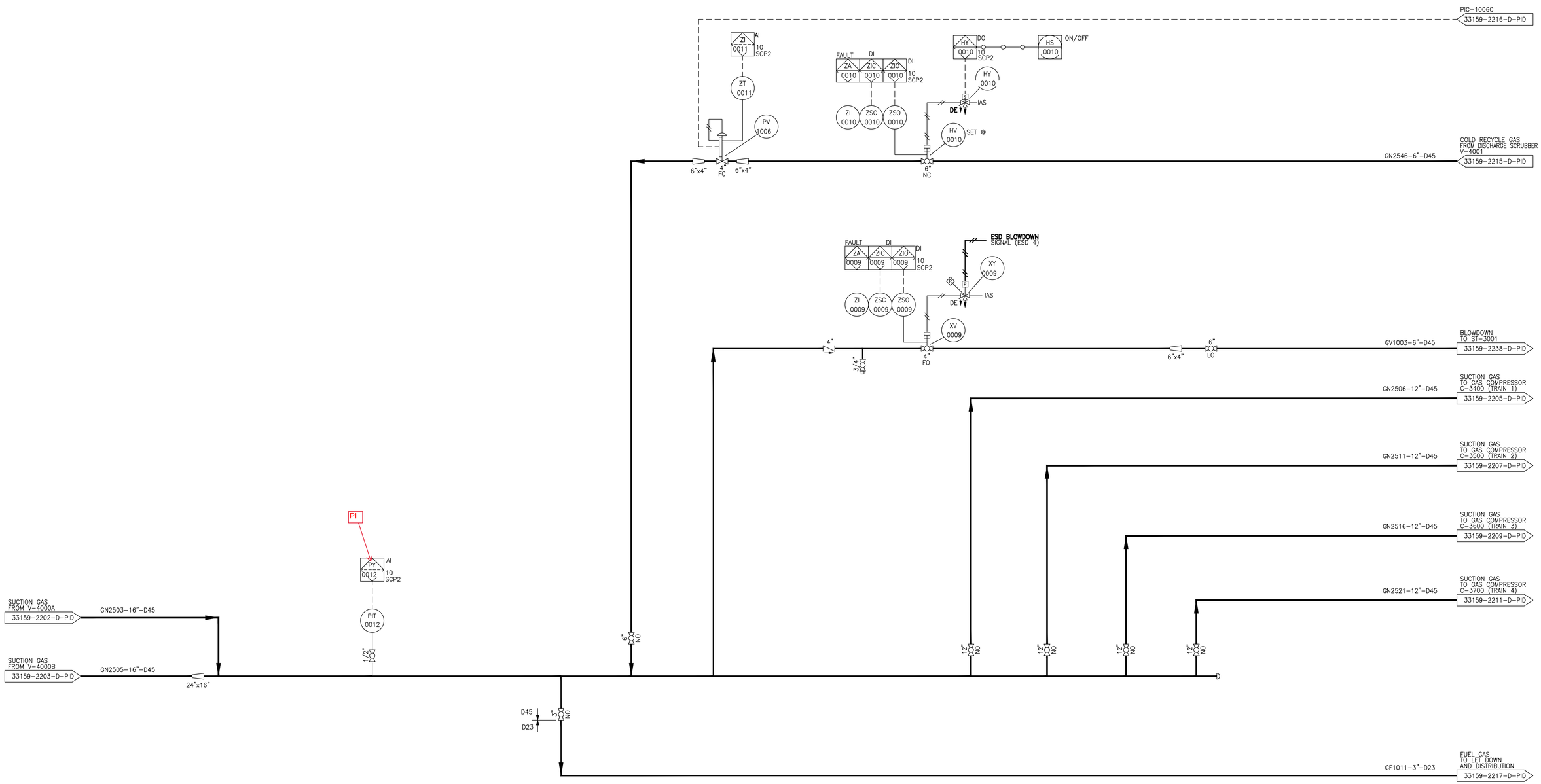
DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

VENTURA COMPRESOR STATION FILTER/SEPARATOR (V-4000B) PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2203-D-PID
REV: D



NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-4061 WILL BE IDENTIFIED AS VN-C2-I-XV-4061.
2. PSV, BLOWDOWN LINE SIZES AND CONTROL VALVE SIZES. TO BE RE-CONFIRMED DURING DETAIL ENGINEERING PHASE.
3. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PID.
4. ESD SIGNAL, 30 PSIG, SEE ESD HEADER DRAWING 33159-2252-D-PID

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/19/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SR	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

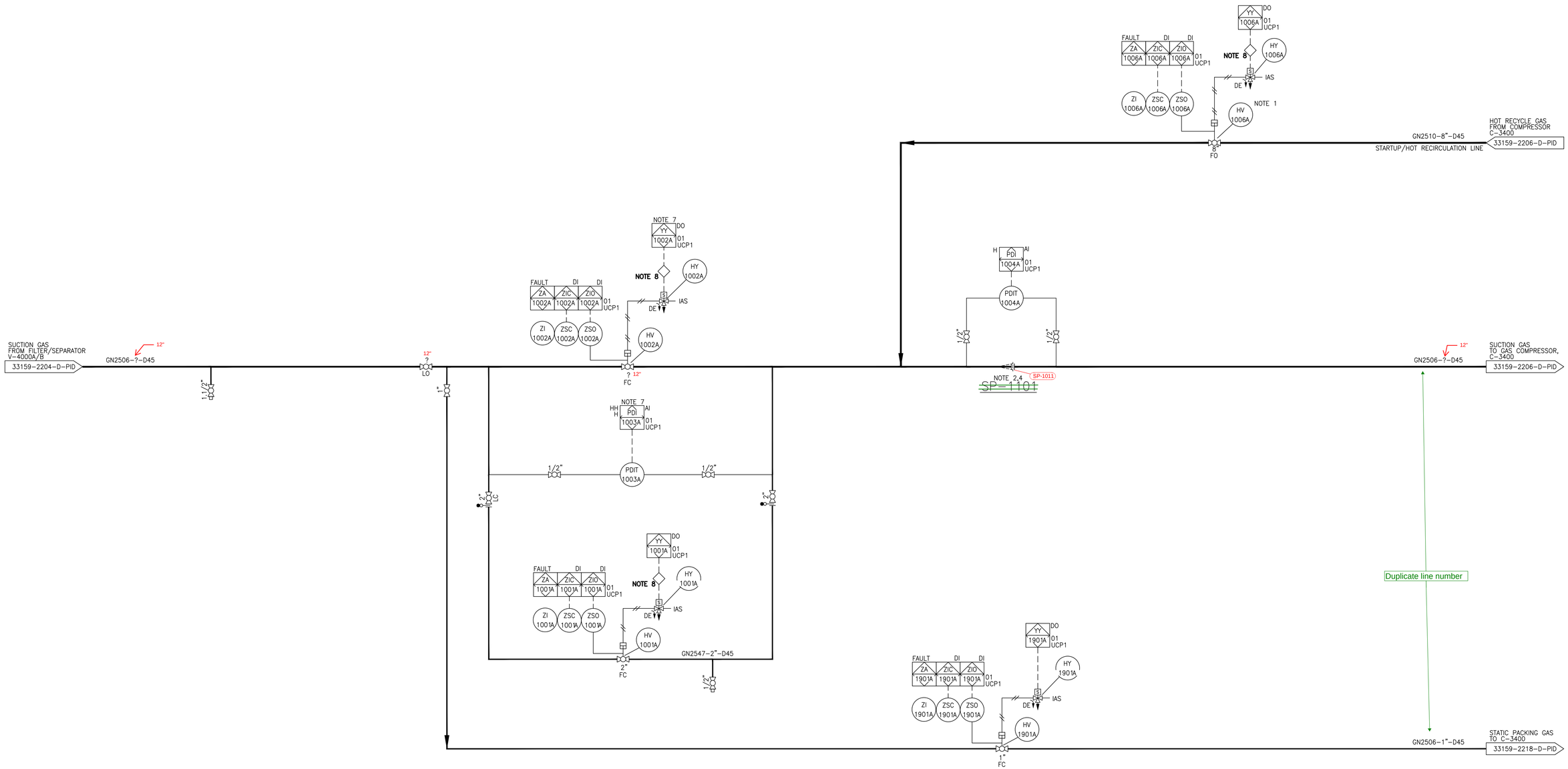
BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: SR	03/29/19
CHECKED: DS	03/29/19
PROJ APV: M.S.MONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESOR STATION FILTER/SEPARATOR MANIFOLD PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2204-D-PID
REV D



NOTES:

1. SLOW CLOSING VALVE.
2. STRAINER TO HAVE AT MINIMUM 200% OPEN AREA. 50 MESH TO BE USED FOR START-UPS AND PRE-COMMISSIONING.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-3400 WILL BE IDENTIFIED AS "VN-C2-1-XV-3400".
4. START-UP STRAINER ON BREAK-OUT SPOOL.
5. CONTROL VALVE, BLOWDOWN LINE SIZE, AND PSV SIZES WILL BE DETERMINED DURING FEED.
6. STRAIGHT RUN REQUIREMENT FOR FLOWMETER FE-1106A WILL BE DETERMINED DURING FEED.
7. PDIT-1106B LESS THAN 5 PSID TO ALLOW HV-1106B TO OPEN.
8. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
9. IAS, 80 PSIG MINIMUM, SEE HEADER DRAWING 33159-2247-D-PID.

NOTE 7, UPDATE INSTRUMENT TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	CS	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: CS	03/29/19
CHECKED: SD	03/29/19
PROJ APV: M.S.MONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114

SCALE: NONE

VENTURA COMPRESOR STATION
COMPRESSOR TRAIN 1
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2205-D-PID

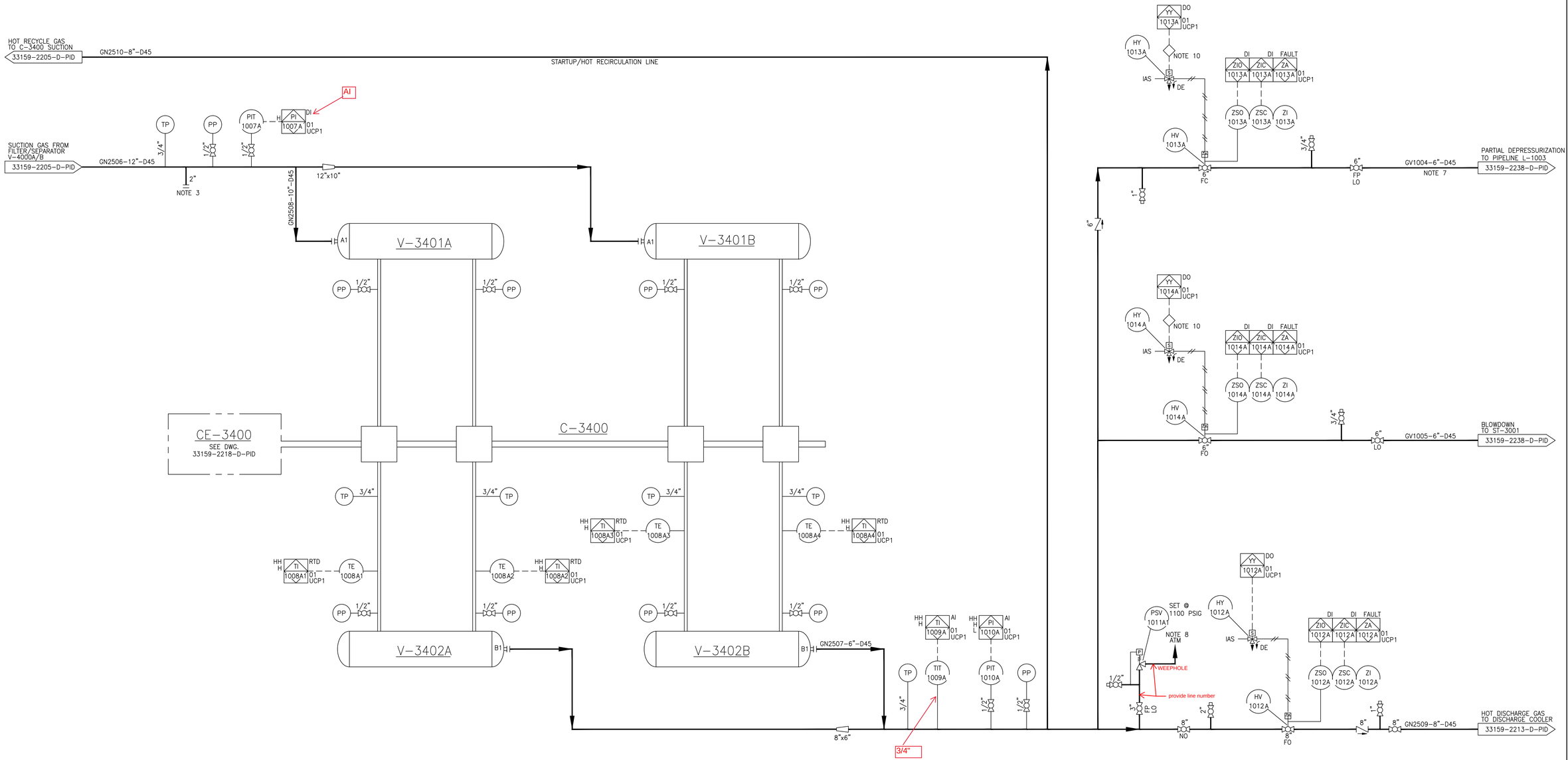
REV: D

V-3401A
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3401B
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3402A
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3402B
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F



NOTES:
1. SUCTION SCRUBBER TO BE ADDED IF DETERMINED NECESSARY BY COMPRESSOR PACKAGE VENDOR AS PART OF ACOUSTIC MITIGATION.
2. ALL REQUIRED INSTRUMENTATION INSIDE COMPRESSOR SKID SHALL BE PROVIDED BY COMPRESSOR VENDOR.
3. PROVISION FOR CHEMICAL CLEANING DURING PRE-COMMISSIONING.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
   EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED.
   EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
6. EQUIPMENT DETAILS TO BE FURNISHED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. PSV SIZE, BLOWDOWN, AND DEPRESSURISE LINE SIZES SHALL BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
8. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
9. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES).
10. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
11. IAS, MINIMUM 80PSIG. SEE HEADER DRAWING 33159-2247-D-PID.

C-3400
GAS COMPRESSOR
SIZE: TBD H.P. TBD
SUCT. PRESS. TBD °F @ 450 PSIG
DISCH. PRESS. TBD °F @ 1000 PSIG

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
D	11/15/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/18/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SR	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

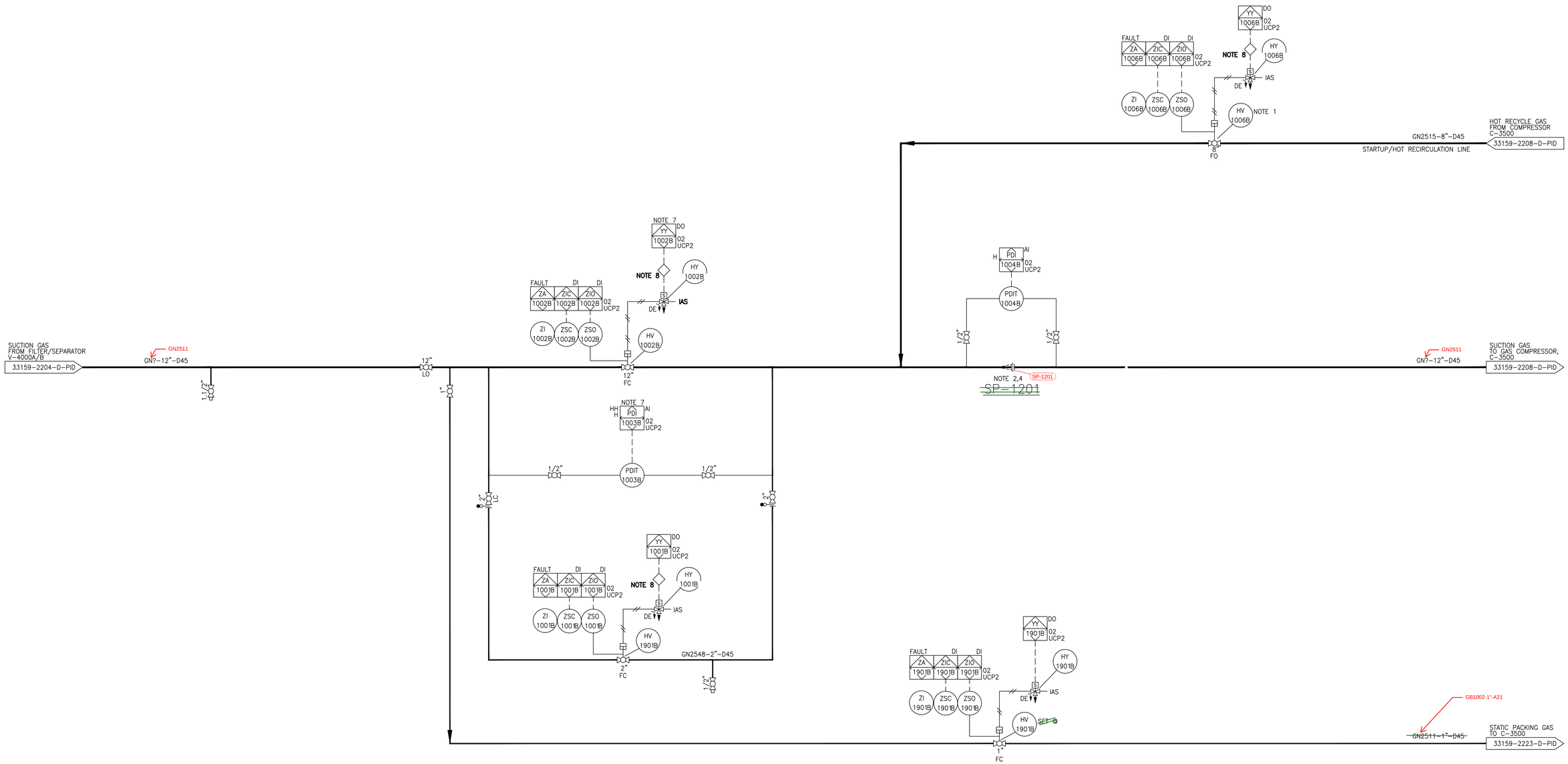
BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: SR	03/29/19
CHECKED: DS	03/29/19
PROJ APV: M.S.MONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 1 C-3400
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2206-D-PID
REV D



NOTES:
1. SLOW CLOSING VALVE.
2. STRAINER TO HAVE AT MINIMUM 200% OPEN AREA. 50 MESH TO BE USED FOR START-UPS AND PRE-COMMISSIONING.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-3400 WILL BE IDENTIFIED AS "VN-C2-1-XV-3400".
4. START-UP STRAINER ON BREAK-OUT SPOOL.
5. CONTROL VALVE, BLOWDOWN LINE SIZE, AND PSV SIZES WILL BE DETERMINED DURING FEED.
6. STRAIGHT RUN REQUIREMENT FOR FLOWMETER FE-1206A WILL BE DETERMINED DURING FEED.
7. PDIT-1206B LESS THAN 5 PSID TO ALLOW HV-1206B TO OPEN.
8. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
9. IAS, 80 PSIG MINIMUM, SEE HEADER DRAWING 33159-2247-D-PID.

NOTE 7, UPDATE INSTRUMENT TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/18/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	TR	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W.HEFNER	05/01/19
DRAWN: TR	05/01/19
CHECKED: SD	05/01/19
PROJ APV: M.S.MONES	05/01/19
SCG ENG APV: P.GHOUGASSIAN	05/01/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 2
PIPING & INSTRUMENT DIAGRAM

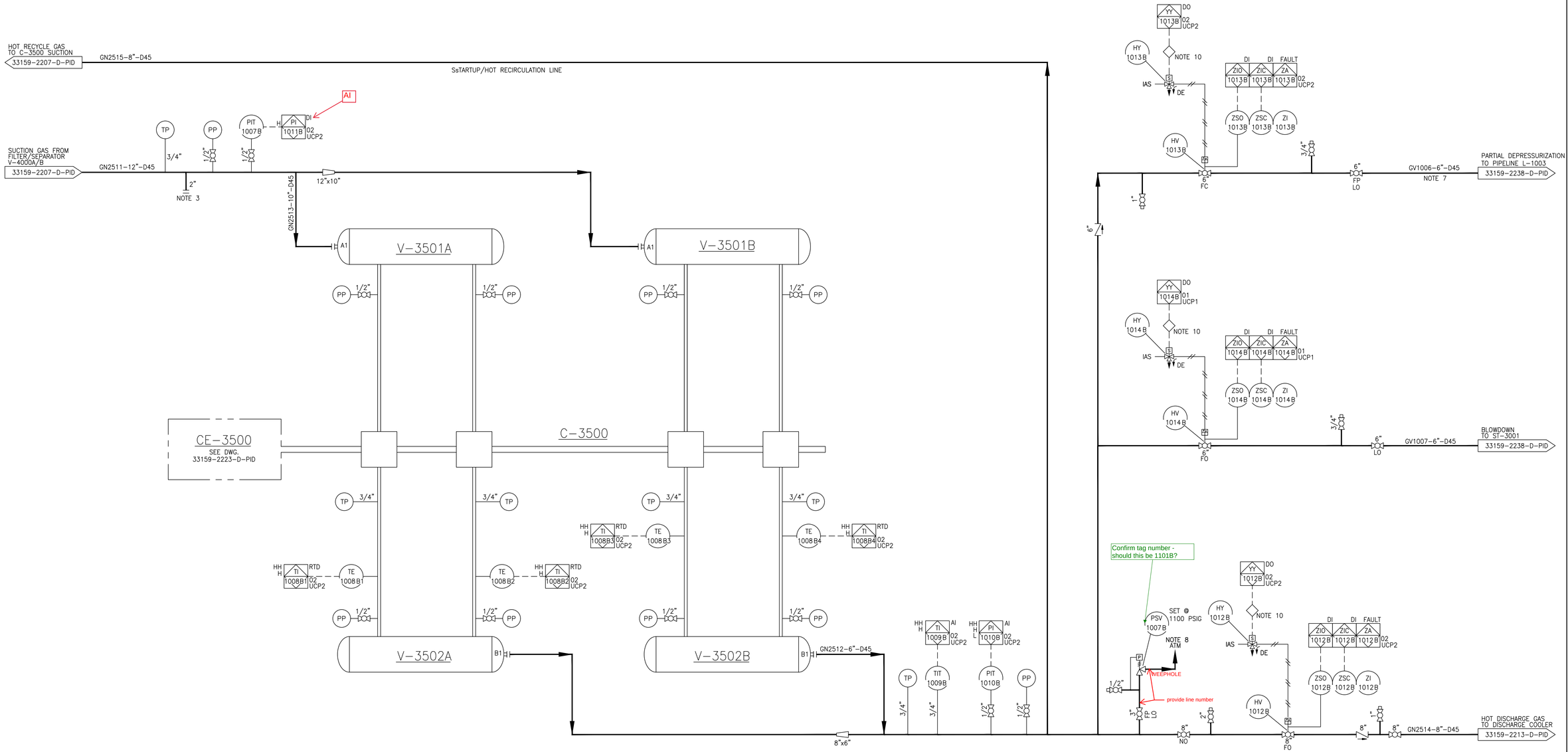
DRAWING NUMBER: 33159-2207-D-PID
REV: C

V-3501A
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3501B
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3502A
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3502B
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F



NOTES:
1. SUCTION SCRUBBER TO BE ADDED IF DETERMINED NECESSARY BY COMPRESSOR PACKAGE VENDOR AS PART OF ACOUSTIC MITIGATION.
2. ALL REQUIRED INSTRUMENTATION INSIDE COMPRESSOR SKID SHALL BE PROVIDED BY COMPRESSOR VENDOR.
3. PROVISION FOR CHEMICAL CLEANING DURING PRE-COMMISSIONING.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
6. EQUIPMENT DETAILS TO BE FURNISHED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. PSV SIZE, BLOWDOWN, AND DEPRESSURISE LINE SIZES SHALL BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
8. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
9. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES).
10. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
11. IAS, MINIMUM 80PSIG. SEE HEADER DRAWING 33159-2247-D-PID.

C-3500
GAS COMPRESSOR
SIZE: TBD H.P. TBD
SUCT. PRESS. 450 °F @ TBD PSIG
DISCH. PRESS. 1000 °F @ TBD PSIG

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
C	11/15/19	AO	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/17/19	AO	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	TR	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

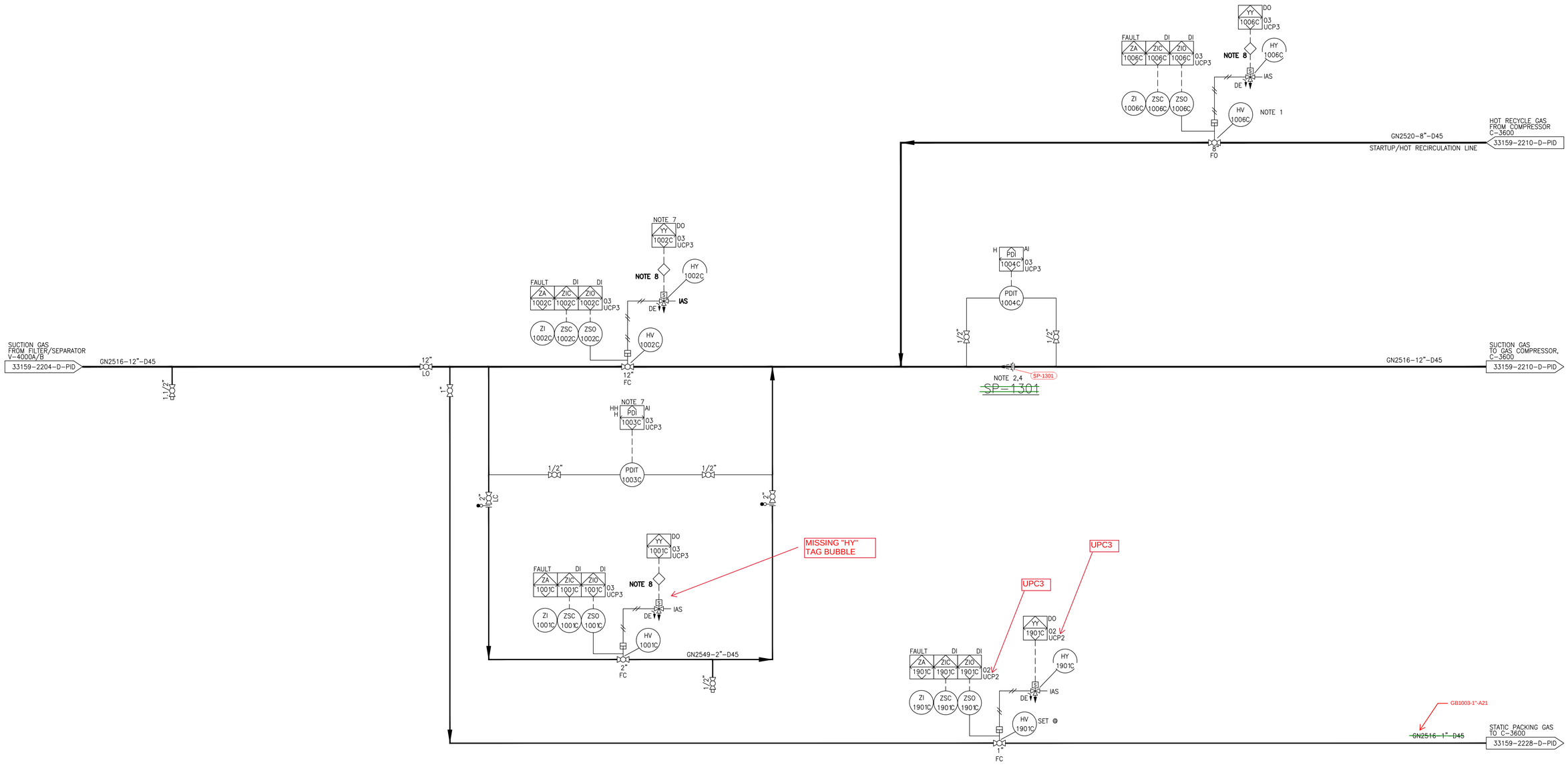
BY	DATE
DESIGNED: S.W.HEFNER	05/02/19
DRAWN: TR	05/02/19
CHECKED: SD	05/02/19
PROJ APV: M.S.MONES	05/02/19
SCG ENG APV: P.GHOUGASSIAN	05/02/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 2 C-3500
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2208-D-PID
REV C



NOTES:
1. SLOW CLOSING VALVE.
2. STRAINER TO HAVE AT MINIMUM 200% OPEN AREA. 50 MESH TO BE USED FOR START-UPS AND PRE-COMMISSIONING.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-3400 WILL BE IDENTIFIED AS "VN-C2-1-XV-3400".
4. START-UP STRAINER ON BREAK-OUT SPOOL.
5. CONTROL VALVE, BLOWDOWN LINE SIZE, AND PSV SIZES WILL BE DETERMINED DURING FEED.
6. STRAIGHT RUN REQUIREMENT FOR FLOWMETER FE-1306A WILL BE DETERMINED DURING FEED.
7. PDIT-1306B LESS THAN 5 PSID TO ALLOW HV-1306B TO OPEN
8. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
9. IAS, 80 PSIG MINIMUM, SEE HEADER DRAWING 33159-2247-D-PID.

NOTE 7, UPDATE INSTRUMENT TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
A	06/28/18	TR	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	05/03/19
DRAWN:	TR	05/03/19
CHECKED:	SD	05/03/19
PROJ APV:	M.S.MONES	05/03/19
SCG ENG APV:	P.GHOUGASSIAN	05/03/19

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 3
PIPING & INSTRUMENT DIAGRAM

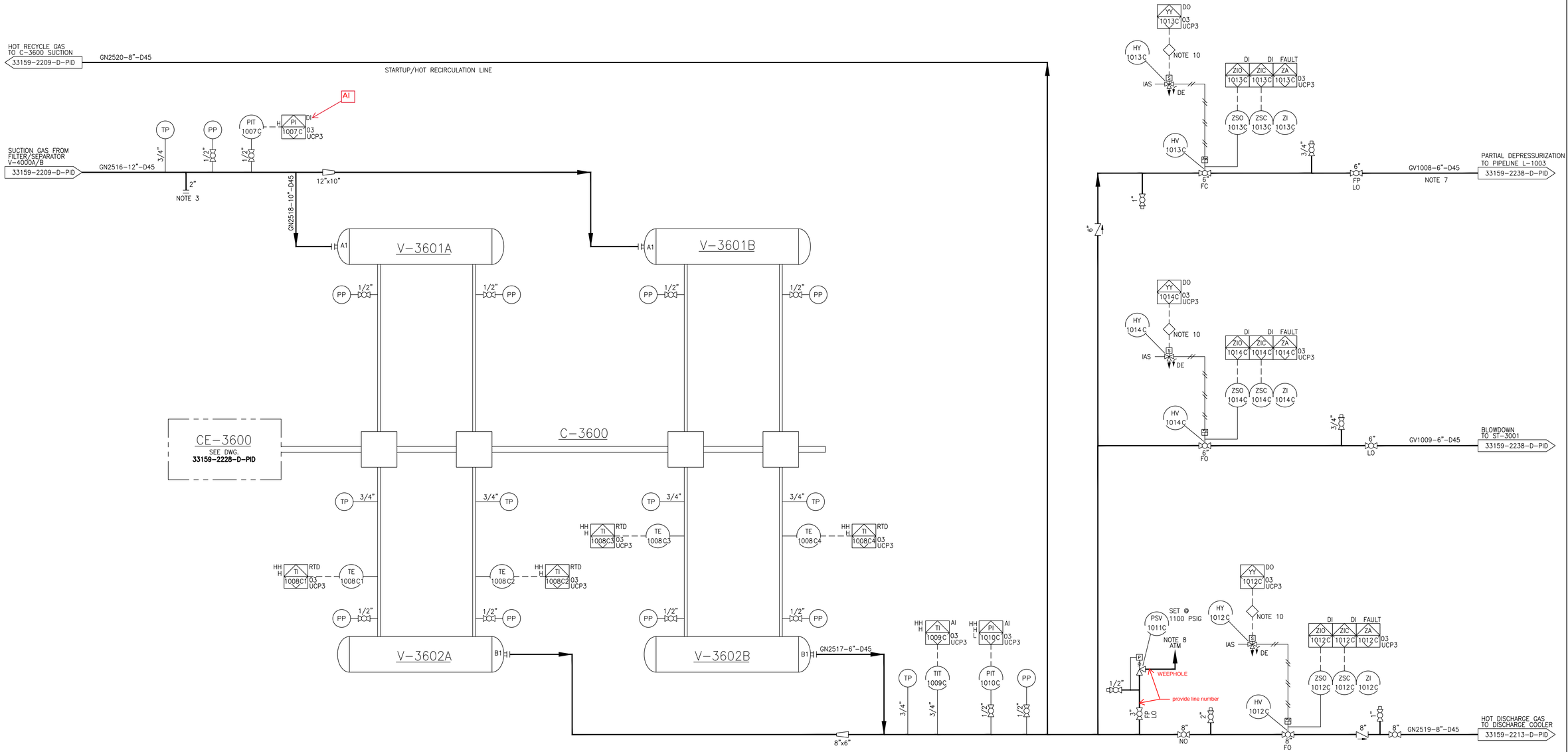
DRAWING NUMBER: 33159-2209-D-PID
REV: A

V-3601A
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3601B
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3602A
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3602B
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F



NOTES:
1. SUCTION SCRUBBER TO BE ADDED IF DETERMINED NECESSARY BY COMPRESSOR PACKAGE VENDOR AS PART OF ACOUSTIC MITIGATION.
2. ALL REQUIRED INSTRUMENTATION INSIDE COMPRESSOR SKID SHALL BE PROVIDED BY COMPRESSOR VENDOR.
3. PROVISION FOR CHEMICAL CLEANING DURING PRE-COMMISSIONING.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
6. EQUIPMENT DETAILS TO BE FURNISHED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. PSV SIZE, BLOWDOWN, AND DEPRESSURISE LINE SIZES SHALL BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
8. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
9. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES).
10. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
11. IAS, MINIMUM 80PSIG. SEE HEADER DRAWING 33159-2247-D-PID.

C-3600
GAS COMPRESSOR
SIZE: TBD H.P. TBD
SUCT. PRESS. TBD °F @ 450 PSIG
DISCH. PRESS. TBD °F @ 1000 PSIG

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO	DESCRIPTION	WOA
C	11/15/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/17/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	TR	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

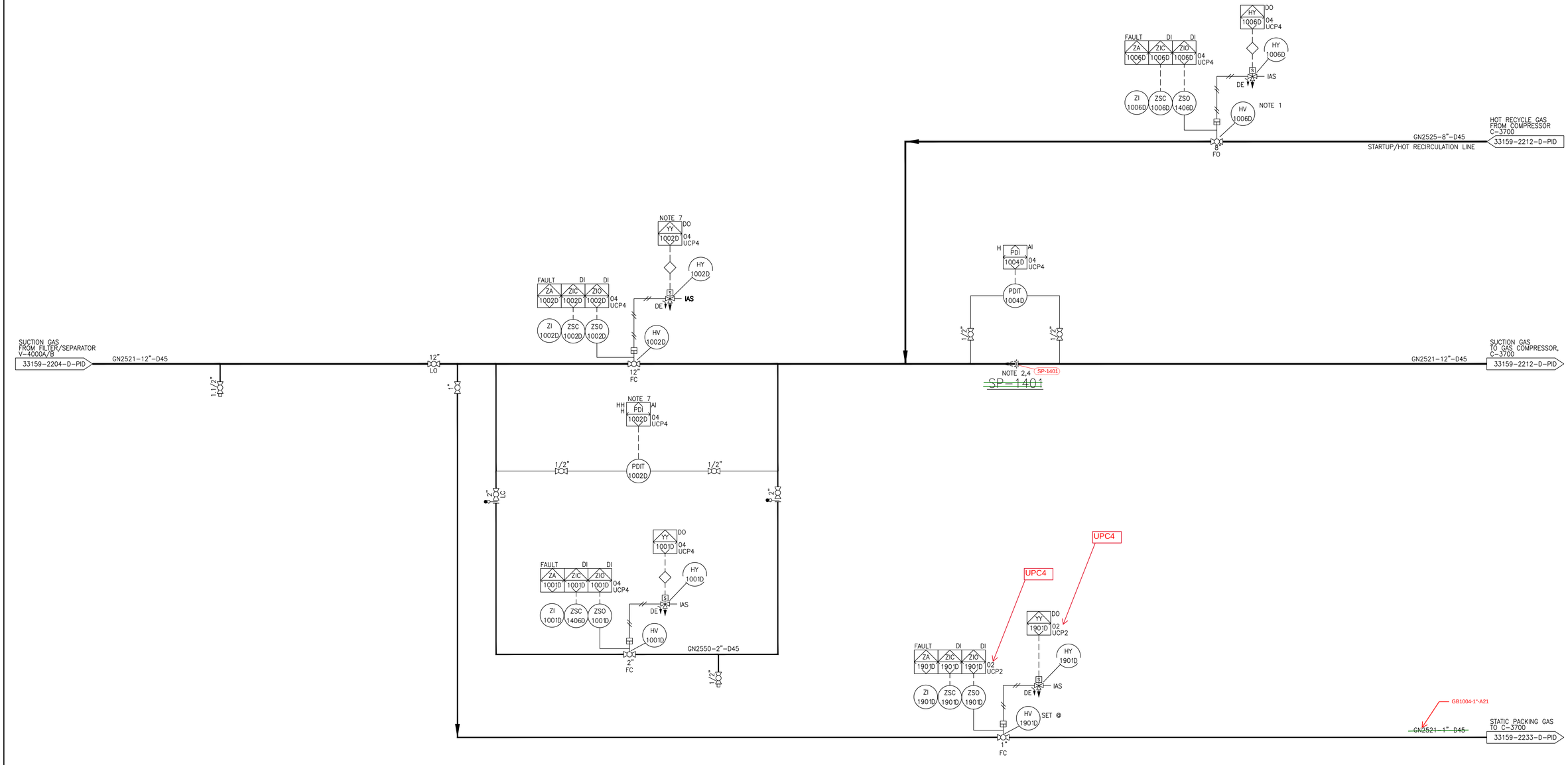
BY	DATE
DESIGNED: S.W.HEFNER	03/05/19
DRAWN: TR	03/05/19
CHECKED: SD	03/05/19
PROJ APV: M.S.MONES	03/05/19
SCG ENG APV: P.GHOUGASSIAN	03/05/19
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION COMPRESSOR TRAIN 3 C-3600 PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2210-D-PID REV C



NOTES:
1. SLOW CLOSING VALVE.
2. STRAINER TO HAVE AT MINIMUM 200% OPEN AREA. 50 MESH TO BE USED FOR START-UPS AND PRE-COMMISSIONING.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER XV-3400 WILL BE IDENTIFIED AS "VN-C2-1-XV-3400".
4. START-UP STRAINER ON BREAK-OUT SPOOL.
5. CONTROL VALVE, BLOWDOWN LINE SIZE, AND PSV SIZES WILL BE DETERMINED DURING FEED.
6. STRAIGHT RUN REQUIREMENT FOR FLOWMETER FE-1406A WILL BE DETERMINED DURING FEED.
7. PDIT-1406B LESS THAN 5 PSID TO ALLOW HV-1406B TO OPEN.
8. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
9. IAS, 80 PSIG MINIMUM, SEE HEADER DRAWING 33159-2247-D-PID.

NOTE 7, UPDATE INSTRUMENT TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/17/19	AO	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	CS	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	CS	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas — A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 4
PIPING & INSTRUMENT DIAGRAM

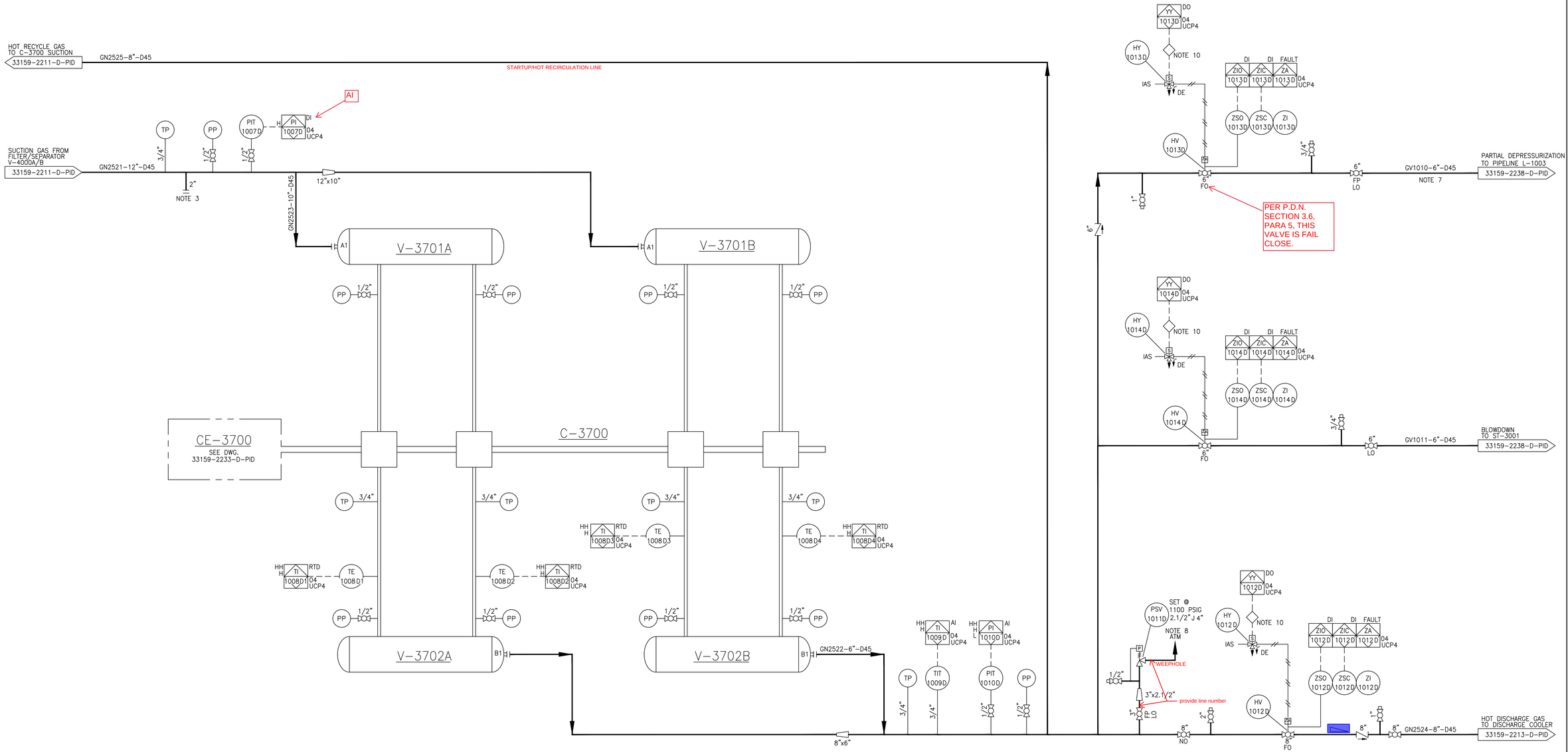
DRAWING NUMBER 33159-2211-D-PID REV C

V-3701A
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3701B
SUCTION BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3702A
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F

V-3702B
DISCHARGE BOTTLE (NOTE 6)
SIZE: X'-X" ID x X'-X" T/T
MAWP: XX PSIG @ XX °F



NOTES:
1. SUCTION SCRUBBER TO BE ADDED IF DETERMINED NECESSARY BY COMPRESSOR PACKAGE VENDOR AS PART OF ACOUSTIC MITIGATION.
2. ALL REQUIRED INSTRUMENTATION INSIDE COMPRESSOR SKID SHALL BE PROVIDED BY COMPRESSOR VENDOR.
3. PROVISION FOR CHEMICAL CLEANING DURING PRE-COMMISSIONING.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
6. EQUIPMENT DETAILS TO BE FURNISHED BY VENDOR DURING DETAIL ENGINEERING PHASE.
7. PSV SIZE, BLOWDOWN, AND DEPRESSURISE LINE SIZES SHALL BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
8. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
9. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK&BLEED VALVES).
10. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
11. IAS, MINIMUM 80PSIG. SEE HEADER DRAWING 33159-2247-D-PID.

C-3700
GAS COMPRESSOR
SIZE: TBD H.P. TBD
SUCT. PRESS. TBD °F @ 450 PSIG
DISCH. PRESS. TBD °F @ 1000 PSIG

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
B	11/01/19	AY	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	CS	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	CS	03/29/19
CHECKED:	DS	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

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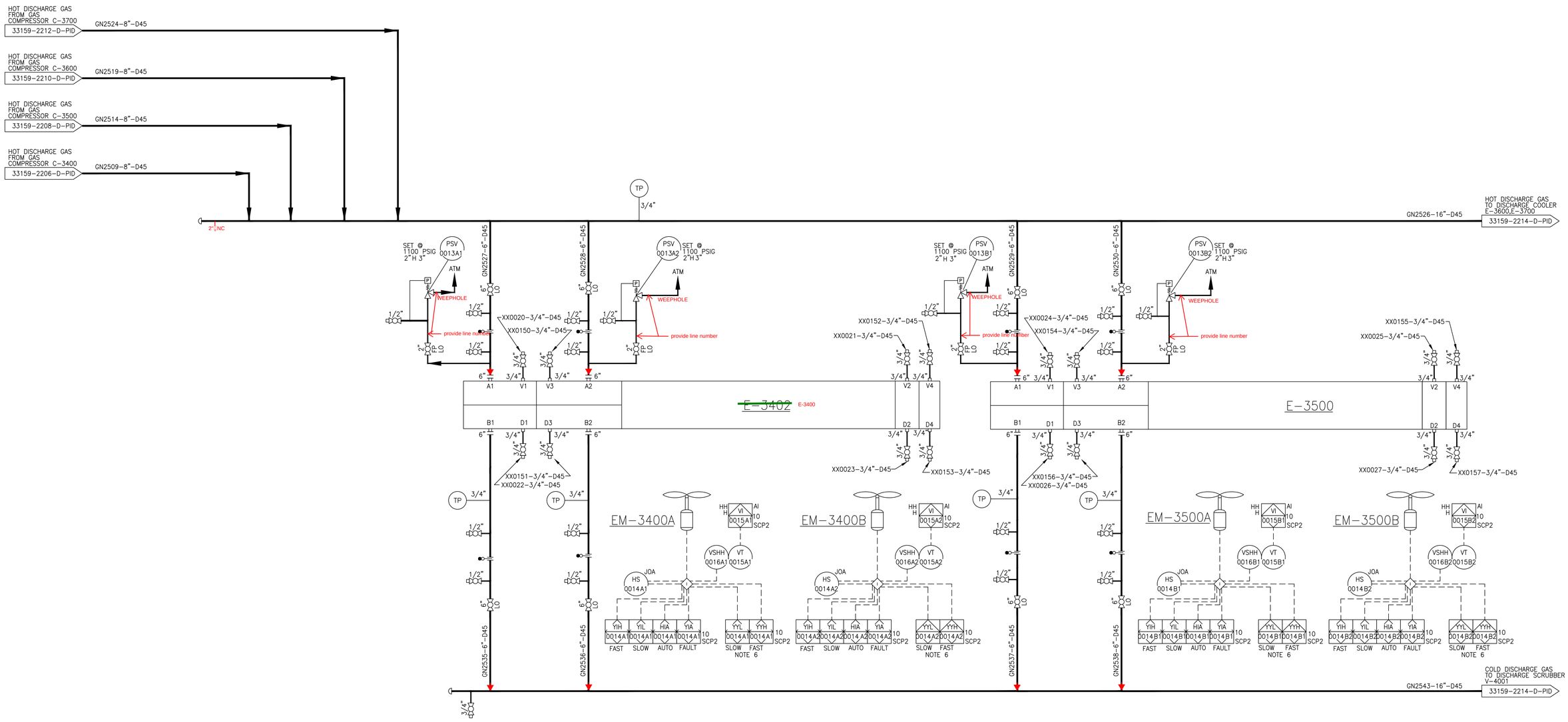
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR TRAIN 4 C-3700
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2212-D-PID
REV: B

~~E-3402~~ E-3400
~~JACKET WATER COOLER~~ DISCHARGE COOLER
DUTY: 4.81 MMBTU/HR
TUBE DESIGN: 1100 PSIG @ 300 °F
NO. OF TUBES: TBD
DESIGN FLOW: 40 MMSCFD

E-3500
DISCHARGE COOLER
DUTY: 4.81 MMBTU/HR
TUBE DESIGN: 1100 PSIG @ 300 °F
NO. OF TUBES: TBD
DESIGN FLOW: 40 MMSCFD



EM-3400A
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3400B
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3500A
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3500B
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

NOTES:
1. CONTROL VALVE, PSV'S, AND BLOWDOWN LINE SIZES TO BE CONFIRMED IN DETAIL ENGINEERING STAGE.
2. FAN MOTOR DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
3. PSVs AT THE DISCHARGE COOLER INLET ARE FOR OVERPRESSURE PROTECTION OF ASME STAMPED PRESSURE VESSELS AS REQUIRED BY CAL/OSHA TITLE 8 REGULATION.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TE-3411 WILL BE IDENTIFIED AS VN-C2-I-TE-3411.
6. TIC-1006A, LOCATED ON THE COOLER OUTLET COMMON HEADER, IS USED TO CONTROL FIN-FAN SEQUENCE AT MCC

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/01/19	AY	SB	SH	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/17/19	AO	SB	SH	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SH	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	03/29/19
DRAWN:	SH	03/29/19
CHECKED:	DS	03/29/19
PROJ APV:	M.S. NONES	03/29/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

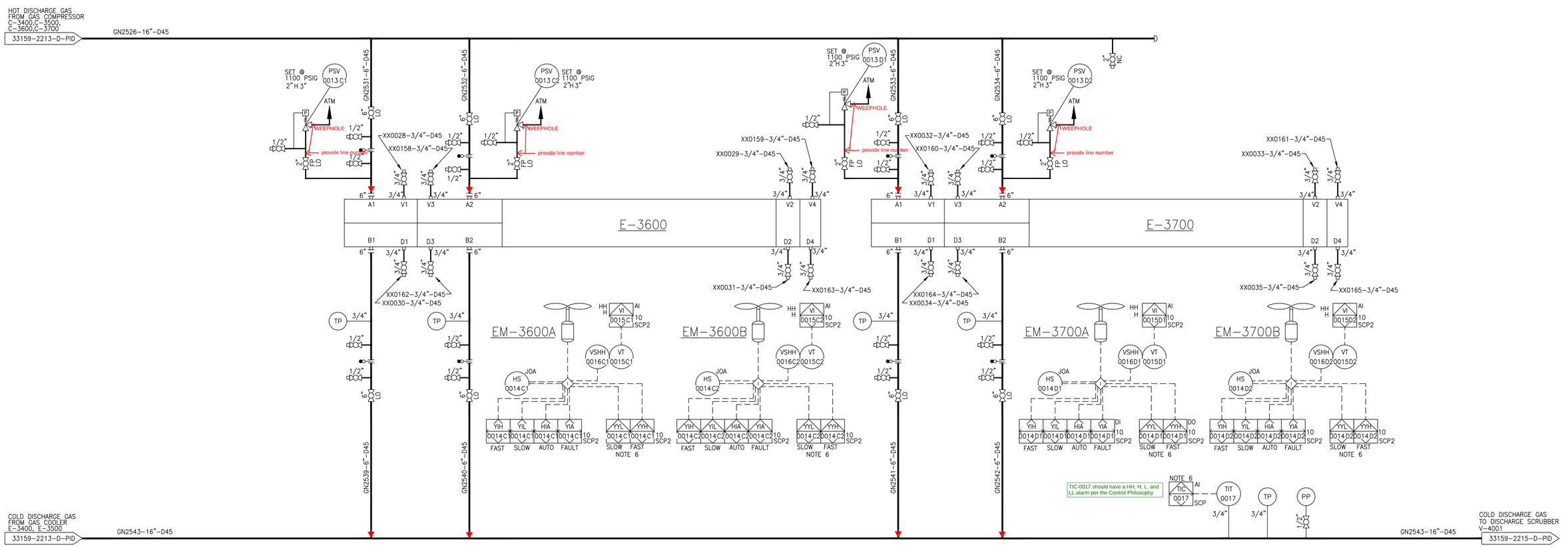
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESOR STATION
DISCHARGE COOLERS E-3400, E-3500
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2213-D-PID
REV: D

E-3600
DISCHARGE COOLER
DUTY: 4.8 MMBTU/HR
TUBE DESIGN: 1100 PSIG @ 300 °F
NO. OF TUBES: TBD
DESIGN FLOW: 40 MMSCFD

E-3700
DISCHARGE COOLER
DUTY: 4.8 MMBTU/HR
TUBE DESIGN: 1100 PSIG @ 300 °F
NO. OF TUBES: TBD
DESIGN FLOW: 40 MMSCFD



EM-3600A
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3600B
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3700A
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

EM-3700B
FAN MOTOR
POWER: TBD HP EACH
SPEED: (NOTE 2)

NOTES:
1. CONTROL VALVE, PSVs AND BLOWDOWN LINE SIZES TO BE CONFIRMED IN DETAIL ENGINEERING STAGE.
2. FAN MOTOR DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
3. PSVs AT THE DISCHARGE COOLER INLET ARE FOR OVER PRESSURE PROTECTION OF ASME STAMPED PRESSURE VESSELS AS REQUIRED BY CAL/OSHA TITLE 8 REGULATION.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100
5. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TE-3411 WILL BE IDENTIFIED AS VN-C2-I-TE-3411.
6. TIC-0054, LOCATED ON THE COOLER OUTLET COMMON HEADER, IS USED TO CONTROL FIN-FAN SEQUENCE AT MCC.
TIC-0017

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/01/19	AY	XX	XX	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/17/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	CS	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	CS	03/29/19
CHECKED:	DS	03/29/19
PROJ APV:	M.S.NONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESOR STATION
DISCHARGE COOLERS E-3600, E-3700
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2214-D-PID
REV: D

V-4001
DISCHARGE SCRUBBER NOTE 4
SIZE: 4'-0" DIA X 10'-0" T/T
DESIGN: 1100 PSIG @ 300 °F
OPERATING: 1000 PSIG @ 105 °F
CAPACITY: 160MMSCFD

HMBs, datasheets, and AVEVA line conditions use operating pressure of 990 psig

COLD RECYCLE TO SUCTION HEADER
33159-2204-D-PID
GN2546-6"-D45

COLD DISCHARGE GAS FROM DISCHARGE COOLERS E-3400,E-3500, E-3600,E-3700
33159-2214-D-PID
GN2543-16"-D45

PC 0021 AO
PI 0021 AI TO SCP2
ZI 0021 AI 10 SCP2
PIT 0021
ZT 0021
PY 0021
PV 0021
1/2"
16" FL
16" FP LO
GN2544-16"-D45
COLD DISCHARGE GAS TO PIPELINE 1004 & 1005
33159-2216-D-PID

16" NC
16" LO
1/2" PP
2" LC
XX0107-2"-D45
16" B1
SET @ 1100 PSIG 1"D 2"
PSV 0018
ATM
1E2 per updated PSV calculations
provide line number
WEEPHOLE
1" FP LO
XX0041-1"-D45

Note that 12" inlet and outlet nozzles based on AMACS internals drawing provided by SCG; however 16" nozzles recommended based on SCG's nozzle sizing criteria

V2 2" XX0108-2"-D45
R1 1"
P1 2" 1/2" PI 0020 XX0043-1/2"-D41
T1 2" 3/4" TP XX0044-3/4"-D41
M1 24"
V1 2" XX0045-2"-D41
A1 16"
L1 2"
L2 2"
H = 30"
L = 18"
LL = 6"
V-4001
D1 2"

PER I&C SPEC SECTION 5.2.13, INSTRUMENT CONNECTIONS INSTALLED ON VESSELS SHALL BE 2" FLANGED CONNECTION.

PER I&C SPEC SECTION 7.1.5, ALL TEMPERATURE CONNECTIONS TO VESSELS SHALL BE 2" ANSI FLANGED.

LIC
XX0042-2"-D41
3/4"
NOTE 5 LI 0019 AI,DO 10 SCP2
LIT 0019
LG 0019
NOTE 5 LY 0019 DO 10 SCP2
LY 0019
LV 0019
2" NO
2" FC
IAS
DE
1/2"
2"

OX1007-2"-D61
HYDROCARBON CONDENSATE TO CONDENSATE DRIP DRUM
33159-2255-D-PID

NOTES:
1. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TE-3411 WILL BE IDENTIFIED AS VN-C2-I-TE-3411.
3. CONTROL VALVES, PSV'S, AND BLOWDOWN LINE SIZES TO BE CONFIRMED IN DETAIL ENGINEERING PHASE.
4. VESSEL TO BE DESIGNED WITH AMACS INTERNALS.
5. LOW-LOW LEVEL ON DISCHARGE SCRUBBER OR HIGH-HIGH LEVEL ON CONDENSATE DRIP DRUM WILL DE-ENERGIZE THE SOLENOID AND CLOSE THE VALVE.
6. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK AND BLEED VALVES).
7. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 33159-2247-D-PID.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SR	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

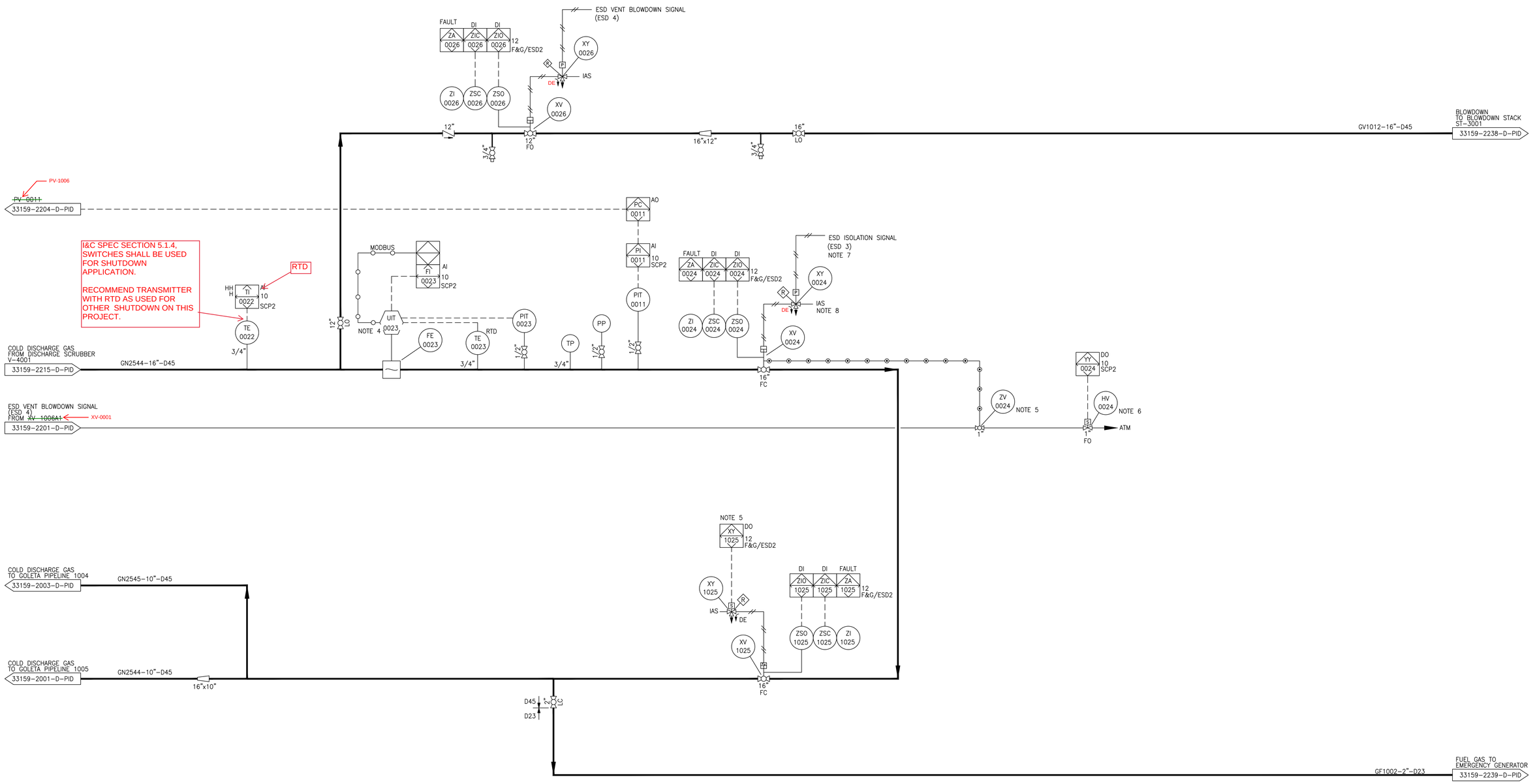
BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: SR	03/29/19
CHECKED: DS	03/29/19
PROJ APV: M.S.NONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESOR STATION
DISCHARGE SCRUBBER
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER 33159-2215-D-PID
REV D



NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TE-3411 WILL BE IDENTIFIED AS VN-C2-I-TE-3411.
2. CONTROL VALVE, PSV'S, AND BLOWDOWN LINE SIZES TO BE CONFIRMED IN DETAIL ENGINEERING PHASE.
3. ALL PP (PRESSURE PORT) SHOULD HAVE A TWO VALVE MANIFOLD (BLOCK & BLEED VALVES).
4. MULTIPLE VARIABLES/POINT/VALUES/ALARMS TRANSMITTED OVER MODBUS..
5. PLC FIRE/GAS ESD 2 TO CLOSE XV-1006C2 IF NO PROOF OF XV-1006A1/C1 CLOSED IN MULTIPLE VARIABLES/POINT/VALUES/ALARMS TRANSMITTED OVER MODBUS. AMOUNT OF TIME.
6. USED FOR RESETTING AFTER AN ESD.
7. ESD SIGNAL, 30 PSIG, SEE ESD HEADER DRAWING 33159-2252-D-PID.
8. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 33159-2247-D-PID.

NOTE 5, UPDATE VALVE TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
D	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
C	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SG	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W. HEFNER	03/29/19
DRAWN: SG	03/29/19
CHECKED:	03/29/19
PROJ APV: M.S. NONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38
DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESOR STATION
DISCHARGE COOLERS MANIFOLD
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2216-D-PID
REV: D

V-4013

F-4013

COMPRESSOR FUEL GAS REGULATOR FILTER
SIZE: XX SQ. IN.
DESIGN. PRESS. 1100 PSIG @ 150 °F
(NOTE 5)

FUEL GAS FROM V-4000A/B
33159-2204-D-PID

GF1011-3"-D23

3" FP

1/2"

3/4"

F-4013

V

Shown as 1.5" on D/S. To be updated based on vendor information.

NC

PDI 0201

HY 0202

NOTE 6

XY 0202 DO 10 SCP2

IAS

DE

HV 0202

DI ZIO 0202 | DI ZIC 0202 | FAULT ZA 0202 — 10 SCP2

ZSO 0202 | ZSC 0202 | ZI 0202

FC

SET @ 125 PSIG

PCV 0203A2

NOTE 1

PCV 0203A1

SET @ 120 PSIG

PCV 0204A2

PCV 0204A1

HH H PI 0205 AI 10 SCP2

PIT 0205

D23 A21

D45 A21

GF1012-2"-A21 — FUEL GAS TO CE-3400 33159-2218-D-PID

GF1013-2"-A21 — FUEL GAS TO CE-3500 33159-2223-D-PID

GF1014-2"-A21 — FUEL GAS TO CE-3600 33159-2228-D-PID

GF1015-2"-A21 — FUEL GAS TO CE-3700 33159-2233-D-PID

ESD VENT BLOWDOWN SIGNAL (ESD 4)

XY 0206

DI ZIO 0206 | DI ZIC 0206 | FAULT ZA 0206 — 12 F&G/ESD2

ZSO 0206 | ZSC 0206 | ZI 0206

XV 0206

2" FO

GV1013-2"-D45

BLOWDOWN TO STACK 33159-2238-D-PID

NOTES:

1. PCV SIZE AND SET PRESSURES TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE. FUEL GAS MANIFOLD PRESSURE PER SELECTED VENDOR REQUIREMENTS.
2. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-1" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT NUMBER PI-3005 WILL BE IDENTIFIED AS VN-C2-I-PI-3105.
4. [DELETED] ESD SIGNAL, 30 PSIG, SEE ESD HEADER DRAWING 33159-2252-D-PID.
5. F-4013 DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
6. AFTER SUCCESSFUL START-UP. VALVE OUT OF POSITION WILL RESULT IN STATION SHUTDOWN.
7. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 3159-2247-D-PID.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	SB	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	05/30/19
DRAWN:	SB	05/30/19
CHECKED:	DS	05/30/19
PROJ APV:	M.S.NONES	05/30/19
SCG ENG APV:	P.GHOUGASSIAN	05/30/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas — A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114

SCALE: NONE

VENTURA COMPRESSOR STATION
FUEL GAS LET DOWN & DISTRIBUTION PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER 33159-2217-D-PID

REV C

F-3400
INLET AIR FILTER #1
SIZE:

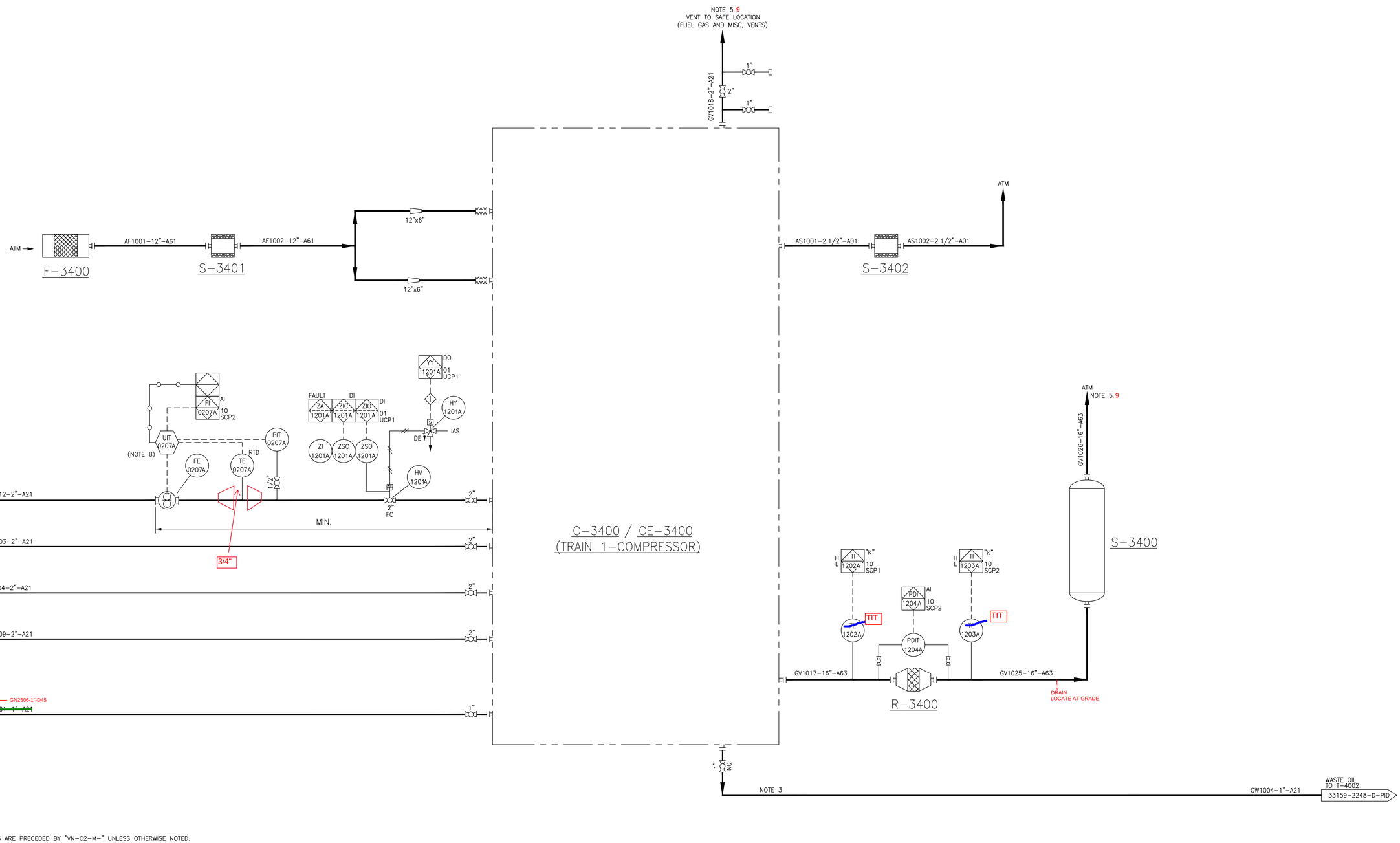
S-3401
INLET SILENCER #1
SIZE:

CE-3400
RECIPROCATING ENGINE DRIVER
HP V RPM

S-3402
STARTING AIR EXHAUST SILENCER #1
SIZE:

R-3400
CATALYTIC CONVERTER #1
SIZE:

S-3400
EXHAUST SILENCER #1
SIZE:



NOTES:
1. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER Y-0100, WILL BE IDENTIFIED AS VN-C2-M-V-0100.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
3. WASTE OIL FROM COMPRESSOR.
4. DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. DISCHARGE SHALL BE MINIMUM TO 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALK WAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
7. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PIP.
8. MULTIPLE VARIABLES/POINTS/VALUES/ALARMS TRANSMITTED OVER MODBUS.
9. VENT MANIFOLD DESIGNED TO ACCOMODATE THE USE OF A PORTABLE METER TO MEASURE VENT GAS RATE AND A TAP FOR FUTURE VAPOR RECOVERY UNIT

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	SC	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	SC	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
UTILITY FOR COMPRESSOR TRAIN-1
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2218-D-PID
REV: C

T-3403
CHEMICAL INJECTION POT #1
SIZE: B/T TBD
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:

T-3401 NOTE 4
AUXILIARY WATER EXPANSION TANK
SIZE: TBD
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY: gal

E-3401 NOTE 4
AUXILIARY WATER COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

E-3403 NOTE 4
ENGINE INTERCOOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

E-3404 NOTE 4
ENGINE LUBE OIL COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

MAKE-UP WATER FROM HEADER
33159-2256-D-PID
WU1023
~~WU1023~~-3/4"-A21

WU1023
~~WU1023~~-3/4"-A21
MAKE-UP WATER TO ~~T-8400~~ T-3400
33159-2220-D-PID

COOLING WATER FROM HEADER
33159-2254-D-PID
WC1014-2"-A21

HS 1610A2
(NOTE 6) YY 1610A2 DO 01 UCP1
LV 1610A2
LOW POINT
(NOTE 8)

LV 1610A1
(NOTE 6) YY 1610A1 DO 01 UCP1

NOTE 4

XX9106-3/8"-A01
XX9107-1/2"-A01
(NOTE 13)

(NOTE 6) LIL 1610A DI 01 UCP1
LSL 1610A
LG 1609A

T-3401

(NOTE 6) YY 1610A3 DO 01 UCP1
LV 1610A3
1/2" FC
XX1021-1/2"-A21
RADIATOR CAP
XX9108-2"-A01

ENGINE JACKET WATER SECTION
(SEE P&ID 33159-2220-D-PID)
VENDOR
CONTRACTOR

VENT TO SAFE LOCATION
PSV 1608A SET @ 150 PSIG 4"L 6"
(NOTE 10)
WEEP HOLE
1E2 per updated PSV calculations
provide line number

3/4"NPT 1" NPT
1/2" NPT
WC9105-3/4"-A01 3/4" TUBING

E-3401
HIGHEST TUBE PLUG
(NOTE 1)
DO NOT POCKET
WC1071-3/4"-A21 3/4" TUBING
WC1069-3/4"-A21-C BALANCE LINE NO POCKET
WC0170-1/2"-A21 HIGH POINT VENT LINE 1/2" TUBING

PI 1606A
PI 1601A
TI 1607A
TI 1602A
3/4"

WC1016-4"-A21-C
4" LO
3/4" VENT
3/4" LOW POINT DRAIN
1" NC
NOTE 4
TCV 1605A SET @
4"x3"
WC7185-2.1/2"-VN

CAP
PI 1902A
XX0051-3/4"-A21
WC1072-3/4"-A21 3/4" TUBING
XX0050-3/4"-B21
SAMPLE CONNECTION
T-3403

(NOTE 9)
WC1015-4"-A21 BY CONTRACTOR

FO 1604A 1/4" ORIFICE
CONTRACTOR
VENDOR
WC9103-2"-A01
E-3403
(NOTE 7)
WC9102-2"-A01
WC9104-2.1/2"-A01

P-3401
ENGINE DRIVEN
WC9101-2.1/2"-A01
CONTRACTOR
VENDOR

3/4" LOW POINT DRAIN
(NOTE 2) 3"x2.1/2"
1" NC
HH TI 1603A H AI 01 UCP1
TIT 1603A
3/4"

(NOTE 3)
(OIL)
E-3404
(NOTE 7)

WC1004-1"-A21

JACKET WATER FROM CE-3400
33159-2220-D-PID
WC1012-3/4"-A21 3/4" TUBING

COOLING WATER TO T-4003
33159-2251-D-PID
WC1004-1"-A21

WC1013-3/4"-A21
JACKECT WATER TO CE-3400
33159-2220-D-PID

NOTES:
1. FOR AIR COOLER FANS AND CONTROL INFORMATION, SEE ENGINE JACKET WATER COOLER. DWG. 33159-2220-D-PID.
2. ALL FLEX HOSE PROVIDED BY VENDOR TO BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
3. DETAILS FOR OIL FLOW THROUGH ENGINE OIL COOLER TO BE DEVELOPED DURING DETAILED ENGINEERING.
4. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION IS AVAILABLE.
5. MAXIMUM PRESSURE DROP OF AUXILIARY WATER PIPING IS 7 PSI.
6. LSL-1610A IS CONTROLLING THE MAKE-UP FOR AUXILIARY WATER. (LV-1610A1 , LV-1610A2 AND LV-1610A3) HS-1610A IS SELECTED VIA HMI (MAKE-UP VS REFILL)
7. EXCHANGERS ARE NOT SHELL & TUBE.
8. LOCATE VALVE GRADE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
9. LOCATE AT ENGINE INLET/OUTLET.
10. OUTLET LINE SIZED FOR SONIC FLOW.
11. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
12. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED.
13. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
14. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
15. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3401
AUXILIARY WATER PUMP
CAPACITY NOTE 4
△P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
C	11/01/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: A.NGUYEN	01/29/18
DRAWN: J.CERDA	01/29/18
CHECKED: B.MOJICA	01/29/18
PROJ APV: C.RIESCH	01/29/18
SCG ENG APV: L.BULLOCK	01/29/18
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION PROJECT
TRAIN 1 AUXILIARY WATER SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2219-D-PID
REV C

T-3400 (NOTE 9)
JACKET WATER EXPANSION TANK
SIZE: SQ. FT.
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
TRIM : WC7233-VN

E-3402 (NOTE 9)
JACKET WATER COOLER
SIZE: SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO OF TUBES:

E-3405 (NOTE 9)
HOTSTART CIRCULATING WATER HEATER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

MAKE-UP WATER FROM HEADER 33159-2219-D-PID
WU1023
~~WC1004~~-3/4"-A21
(NOTE 4) 1510A1 DO 01 UCP1
LV 1510A1
3/4" FC
WC1006-2"-A21
RADIATOR CAP 2"
XX9118-2"-A01
T-3400
2"
(NOTE 4) 1510A3 DO 01 UCP1
LV 1510A3
1/2" FC
XX0170-1/2"-A21
1/2"
(NOTE 2)
1/4" (NOTE 11)
3/8"
XX9117-3/8"-A01
1/2"
XX9116-1/2"-A01
LG 1509A
LSL 1510A
(NOTE 4) LIL 1510A DI 01 UCP1
1/2"
3/8"
1/4"
(NOTE 11)
decrease line weight for impulse line

VENT TO SAFE LOCATION
AUXILIARY JACKET WATER SECTION (SEE P&ID 33159-2219-D-PID)
JACKET WATER COOLER
VENDOR CONTRACTOR
3/4" NPT
WC1009-3/4"-A21
3/4" TUBING NO POCKET
1" NPT
BALANCE LINE NO POCKET
1/2" NPT
1/2" TUBING NO POCKET

(NOTE 7)
PSV 1508 A SET @ 150 PSIG 4"L6"
WEEPHOLE
1.5G3 per updated PSV calculations
E-3402
VENDOR CONTRACTOR
4" 150# RF 6"x4"
4" 150# RF 6"x4"
VENDOR CONTRACTOR
1/2"
DO NOT POCKET
LG FP 6"
LG 6"
3/4"
3/4" TUBING
WC1012-3/4"-A21
JACKET WATER TO CHEMICAL INJECTION POT T-3403 33159-2219-D-PID
provide line number
PI 1506 A
1/2"
TI 1507 A
3/4"
EM-3402
PI 1501A
1/2"
TI 1502 A
3/4"
WC1005-1"-A21
COOLING WATER TO T-4003 33159-2251-D-PID
WC1008-6"-A21-C

VI 1517A AI 01 UCP1
VSHH 1518A VT 1517A
JOA
HS 1516A
HS 1510A2
(NOTE 4) YY 1510A2 DO 01 UCP1
DI DI DI DO
YI 1516A HIA 1516A YIA 1516A YY 1516A 01 UCP1
RUN AUTO FAULT CALL
LV 1510A2
WC1007-6"-A21-C
WC1010-1"-A21-C
WC1011-1/2"-A21 HIGH POINT VENT LINE
CE-3400
(NOTE 6)
1" NC (NOTE 9)
1" CONTRACTOR VENDOR (NOTE 1) (NOTE 2)

COOLING WATER FROM HEADER 33159-2254-D-PID
WC1006-2"-A21
2"
(NOTE 5)
2"
3/4" LOW POINT
2" FC
6" LG (NOTE 6)
FO 1504 A 1/4"
VENDOR CONTRACTOR
TCV 1505 A
XX9110-6"-A01
ENGINE JACKET WATER MANIFOLD
XX9111-6"-A01
TIT 1503 A
JACKET WATER FROM CHEMICAL INJECTION POT T-3403 33159-2219-D-PID
WC1013-3/4"-A21
3/4"
1" NC (NOTE 9)
CONTRACTOR VENDOR
CONTRACTOR VENDOR
XX9112-6"-A01
HH TI AI 1503 A 01 UCP1
XX9113-1"-A01
(NOTE 1)
XX9109-6"-A01
P-3400
ENGINE DRIVEN
XX9115-1"-A01
RUN AUTO FAULT CALL
DI DI DI DO
HIA 1514 A YI 1514 A YIA 1514 A YY 1514 A 01 UCP1
HS 1515A
DO DI
YY 1515A YI 1515A 01 UCP1
JOA
HS 1514 A
1" 1" 1"
E-3405
XX9114-1"-A01
P-3402
PM-3402

NOTES:
1. ALL FLEX HOSE PROVIDED BY VENDOR SHALL BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
2. DETAILS WITHIN LIMITS ARE PART OF COMPRESSOR VENDOR PACKAGE THAT NEED TO BE VERIFIED.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
4. LSL 1510A IS CONTROLLING THE MAKE-UP FOR JACKET WATER (LV 1510A1, LV 1510A2, LV 1510A3). HS 1510A IS SELECTED VIA HMI (MAKE-UP VS REFILL).
5. LOCATE VALVE ACCESSIBLE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
6. LOCATE AT ENGINE INLET/OUTLET.
7. OUTLET LINE SIZED FOR SONIC FLOW.
8. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
9. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION AVAILABLE..
10. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED.
11. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
12. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION AVAILABLE.
13. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3400 (NOTE 9)
JACKET WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

P-3402 (NOTE 9)
HOTSTART CIRCULATING WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	SB	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: A.NGUYEN	02/13/18
DRAWN: J.CERDA	02/13/18
CHECKED: B.MOJICA	02/13/18
PROJ APV: C.RIESCH	02/13/18
SCG ENG APV: L.BULLOCK	02/13/18
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION PROJECT
TRAIN 1 JACKET WATER SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2220-D-PID
REV C

F-3500
INLET AIR FILTER #2
SIZE:

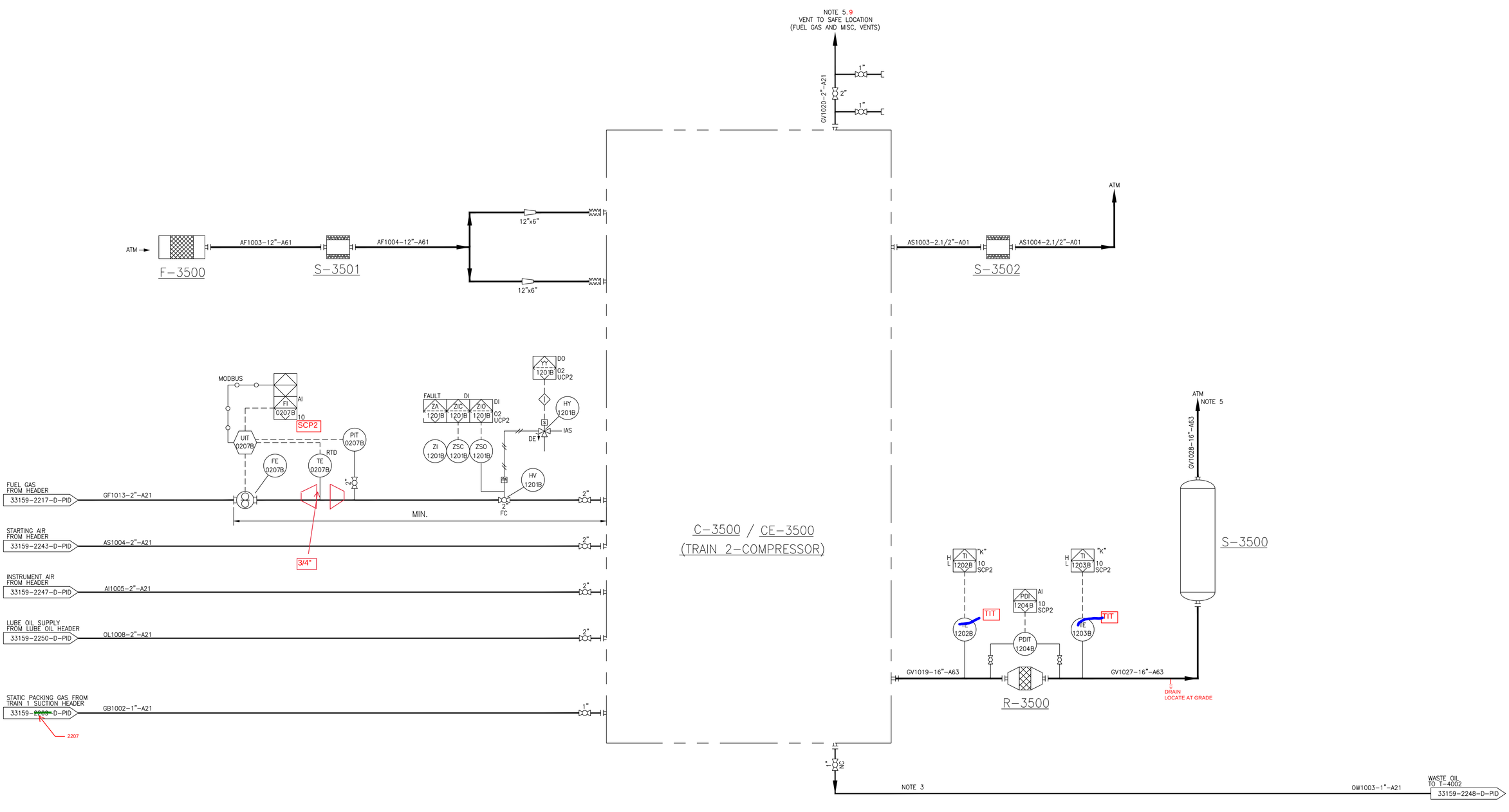
S-3501
INLET SILENCER #2
SIZE:

CE-3500
RECIPROCATING ENGINE DRIVER
HP V RPM

S-3502
STARTING AIR EXHAUST SILENCER #2
SIZE:

R-3500
CATALYTIC CONVERTER #2
SIZE:

S-3500
EXHAUST SILENCER #2
SIZE:



NOTES:

1. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
   EXAMPLE: EQUIPMENT TAG NUMBER Y-0100. WILL BE IDENTIFIED AS VN-C2-M-V-0100.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED.
   EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401
3. WASTE OIL FROM COMPRESSOR.
4. DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. DISCHARGE SHALL BE MINIMUM TO 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
7. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING33159-2247-D-PIP.
8. MULTIPLE VARIABLES/POINTS/VALUES ALARMS TRANSMITTED OVER MODBUS.
9. VENT MANIFOLD DESIGNED TO ACCOMODATE THE USE OF A PORTABLE METER TO MEASURE VENT GAS RATE AND A TAP FOR FUTURE VAPOR RECOVERY UNIT

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/18
DRAWN:	SB	06/28/18
CHECKED:	F. PAPADOPOL	06/28/18
PROJ APV:	M.S.MONES	06/28/18
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
UTILITY FOR COMPRESSOR TRAIN 2
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2223-D-PID
REV: C

T-3503 CHEMICAL INJECTION POT #1			T-3501 NOTE 4 AUXILIARY WATER EXPANSION TANK			E-3501 NOTE 4 AUXILIARY WATER COOLER			E-3503 NOTE 4 ENGINE INTERCOOLER			E-3504 NOTE 4 ENGINE LUBE OIL COOLER		
SIZE:	B/T	TBD	SIZE:	TBD		SQ. FT.			SQ. FT.			SQ. FT.		
DESIGN:	PSIG @	°F	DESIGN:	PSIG @	°F	TUBE DESIGN:	PSIG @	°F	TUBE DESIGN:	PSIG @	°F	TUBE DESIGN:	PSIG @	°F
OPERATING:	PSIG @	°F	OPERATING:	PSIG @	°F	SHELL DESIGN:	PSIG @	°F	SHELL DESIGN:	PSIG @	°F	SHELL DESIGN:	PSIG @	°F
CAPACITY:			CAPACITY:	gal		NO. OF TUBES:			NO. OF TUBES:			NO. OF TUBES:		

MAKE-UP WATER FROM HEADER 33159-2256-D-PID — WU1024-3/4"-A21 — MAKE-UP WATER TO T-3500 33159-2225-D-PID

COOLING WATER FROM HEADER 33159-2254-D-PID — WC1030-2"-A21

HS 1610B2 (NOTE 6) YY 1610B2 DO 02 UCP2 — S — LV 1610B2

LV 1610B1 (NOTE 6) YY 1610B1 DO 02 UCP2

2" — (NOTE 8) — 3/4" LOW POINT — 3/4" — 2" — 2" — 3/4" — 2"

VENT TO SAFE LOCATION

NOTE 4

3/8" (NOTE 13) — WC9206-3/8"-A01 — 3/8" — WC9207-1/2"-A01

(NOTE 6) LIL 1610B DI 02 UCP2 — LSL 1610B — LG 1609B — 1/2" — 1/2"

LV 1610B3 (NOTE 6) YY 1610B3 DO 02 UCP2 — 1/2" FC — XX1022-1/2"-A21

RADIATOR CAP 2" — WC9208-2"-A01

T-3501

ENGINE JACKET WATER SECTION (SEE P&ID 33159-2225-D-PID)

VENDOR CONTRACTOR

1/4" — 3/8" — (NOTE 13)

3/4"NPT — 1" NPT — 1/2" NPT

WC9205-3/4"-A01 3/4" TUBING

PSV 1608B (NOTE 10) SET @ 150 PSIG 4" L 6"

WEEPHOLE

1E2 per updated PSV calculations

provide line number

E-3501 — HIGHEST TUBE PLUG — VENDOR — (NOTE 1)

1/2" — DO NOT POCKET — 4" LO FB — 4" LO

3/4" TUBING WC1035-3/4"-A21 — 3/4" — 4" LO

WC1033-3/4"-A21-C BALANCE LINE NO POCKET

WC1034-1/2"-A21 HIGH POINT VENT LINE 1/2" TUBING

PI 1601B — 1/2" — TI 1607B — 3/4" — TI 1602B

PI 1606B — 1/2" — 3/4"

WC1032-4"-A21-C — 4" LO

3/4" VENT — 1" NC — 3/4" LOW POINT DRAIN

TCV 1605B — DE — 3"x2.1/2"

CAP — PI 1902B — 3/4" — 3/4" — XX0053-3/4"-A21

T-3503

4" (NOTE 9) — WC1031-4"-A21-C BY CONTRACTOR

CONTRACTOR VENDOR (NOTE 4)

FO 1604B — CONTRACTOR VENDOR — WC9203-2"-A01

E-3503 (NOTE 7)

WC9202-2"-A01 — WC9204-2.1/2"-A01

WC1036-3/4"-A21 — 3/4" — XX0052-3/4"-A21 — 3/4" — SAMPLE CONNECTION

1" NC — 3/4" LOW POINT DRAIN

(NOTE 2) 3"x2.1/2" — 3/4" — HH H TI 1603B AI 02 UCP2 — TIT 1603B

CONTRACTOR VENDOR — P-3501 ENGINE DRIVEN — WC9201-2.1/2"-A01

(NOTE 3) (OIL) — E-3504 (NOTE 7)

JACKET WATER FROM CE-3500 33159-2225-D-PID — WC1028-3/4"-A21

WC1017-1"-A21 — COOLING WATER TO T-4003 33159-2251-D-PID

WC1029-3/4"-A21 — JACKET WATER TO CE-3500 33159-2225-D-PID

P-3501
AUXILIARY WATER PUMP
CAPACITY NOTE 4
△P: PSI
HP V RPM

NOTES:
1. FOR AIR COOLER FANS AND CONTROL INFORMATION, SEE ENGINE JACKET WATER COOLER. DWG. 33159-2225-D-PID
2. ALL FLEX HOSE PROVIDED BY VENDOR TO BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
3. DETAILS FOR OIL FLOW THROUGH ENGINE OIL COOLER TO BE DEVELOPED DURING DETAILED ENGINEERING.
4. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION IS AVAILABLE.
5. MAXIMUM PRESSURE DROP OF AUXILIARY WATER PIPING IS 7 PSI.
6. LSL-1610B IS CONTROLLING THE MAKE-UP FOR AUXILIARY WATER. (LV-1610B1 , LV-1610B2 AND LV-1610B3) HS-1610B IS SELECTED VIA HMI (MAKE-UP VS REFILL).
7. EXCHANGERS ARE NOT SHELL & TUBE.
8. LOCATE VALVE GRADE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
9. LOCATE AT ENGINE INLET/OUTLET.
10. OUTLET LINE SIZED FOR SONIC FLOW.
11. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
12. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED.
13. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
14. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
15. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/18	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: A.NGUYEN	01/29/18
DRAWN: J.CERDA	01/29/18
CHECKED: B.MOJICA	01/29/18
PROJ APV: C.RIESCH	01/29/18
SCG ENG APV: L.BULLOCK	01/29/18

ENG FILE NO: E15043 — WOA: 91651

SoCalGas — A Sempra Energy utility

DWG CLASS: 38 — DWG DIST: 114 — SCALE: NONE

VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION PROJECT TRAIN 2 AUXILIARY WATER SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2224-D-PID — REV C

T-3500 (NOTE 9)
JACKET WATER EXPANSION TANK
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:
TRIM : WC7233-VN

E-3502 (NOTE 9)
JACKET WATER COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:
TRIM : WC7234-VN

E-3505 (NOTE 9)
HOTSTART CIRCULATING WATER HEATER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

WU1024
MAKE-UP WATER FROM HEADER 33159-2224-D-PID
WC1022-3/4"-A21
LV 1510B1
(NOTE 4) YY 1510B1 DO 02 UCP2
3/4" FC
WC1022-2"-A21
RADIATOR CAP 2"
AV-1201
WC9218-2"-A21
T-3500
2"
LV 1510B3
1/2" FC
XX0168-1/2"-A21
(NOTE 4) YY 1510B3 DO 02 UCP2
(NOTE 2)
1/4" (NOTE 11)
WC9217-3/8"-A21
3/8"
WC9216-1/2"-A21
1/2"
LG 1509 B
LSL 1510 B
(NOTE 4) LIL 1510 B DI 02 UCP2
Reduce line weight of impulse lines
(NOTE 11)
VENT TO SAFE LOCATION
AUXILIARY JACKET WATER SECTION (SEE P&ID 33159-2224-D-PID)
(NOTE 7)
PSV 1508 B SET @ 150 PSIG 4" L6"
1.5G3 per updated PSV calculations
provide line number
2"
DO NOT POCKET
E-3502
VENDOR CONTRACTOR
4" 150# RF
6"x4"
4" LO FP
PI 1506 B
1/2"
TI 1507 B
3/4"
EM-3502
VENDOR CONTRACTOR
3/4" NPT
WC1025-3/4"-A21 3/4" TUBING NO POCKET
1" NPT
BALANCE LINE NO POCKET
1/2" NPT
1/2" TUBING NO POCKET
4" 150# RF
6"x4"
PI 1501B
1/2"
TI 1502B
3/4"
WC1028-3/4"-A21 3/4" TUBING
JACKET WATER TO CHEMICAL INJECTION POT 33159-2224-D-PID
WC1018-1"-A21-C
COOLING WATER TO T-4003 33159-2251-D-PID
WC1024-6"-A21-C
HH H VI 1517 B AI 02 UCP2
VSHH 1518 B VT 1517 B
HS 1516 B JOA
HS 1510B2
(NOTE 4) YY 1510B2 DO 02 UCP2
DI YI 1516B RUN
DI HIA 1516B AUTO
DI YIA 1516B FAULT
DO YY 1516B CALL
02 UCP2
LV 1510B2
WC1023-6"-A21-C
WC1026-1"-A21-C
WC1027-1/2"-A21 HIGH POINT VENT LINE
CE-3500
(NOTE 6)
6" S
1" NC
COOLING WATER FROM HEADER 33159-2254-D-PID
WC1022-2"-A21
2"
(NOTE 5)
2"
2" FC
3/4" LOW POINT
(NOTE 6)
JACKET WATER FROM CHEMICAL INJECTION POT 33159-2224-D-PID
WC1029-3/4"-A21
3/4" TUBING
3/4"
1" NC (NOTE 9)
FO 1504 B 1/4"
VENDOR CONTRACTOR
WC9210-6"-A21
ENGINE JACKET WATER MANIFOLD
WC9211-6"-A21
TCV 1505 B SET @
1" (NOTE 1) CONTRACTOR VENDOR (NOTE 2)
SHOW TIT TO BE CONSTANT WITH OTHER TRAINS 1/3/4
TE 1503 B
TI
TIT 1503 B AI 02 UCP2
WC9213-1"-A21
WC9220-1"-VN
CONTRACTOR VENDOR
(NOTE 1)
WC9209-6"-A21
P-3500
ENGINE DRIVEN
HS 1515B
DO YY 1515B YI 1515B DI 02 UCP2
RUN DI HIA 1514B
AUTO DI YI 1514B
FAULT DI YIA 1514B
CALL DO YY 1514B 02 UCP2
JOA HS 1514 B
E-3505
WC7195-1"-VN
P-3502
PM-3502

NOTES:
1. ALL FLEX HOSE PROVIDED BY VENDOR SHALL BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
2. DETAILS WITHIN LIMITS ARE PART OF COMPRESSOR VENDOR PACKAGE THAT NEED TO BE VERIFIED.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
4. LSL 1510B IS CONTROLLING THE MAKE-UP FOR JACKET WATER (LV 1510B1, LV 1510B2, LV 1510B3). HS 1510B IS SELECTED VIA HMI (MAKE-UP VS REFILL).
5. LOCATE VALVE ACCESSIBLE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
6. LOCATE AT ENGINE INLET/OUTLET.
7. OUTLET LINE SIZED FOR SONIC FLOW.
8. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
9. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION AVAILABLE..
10. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED.
11. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
12. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3500 (NOTE 9)
JACKET WATER PUMP
CAPACITY
△P: PSI
HP V RPM

P-3502 (NOTE 9)
HOTSTART CIRCULATING WATER PUMP
CAPACITY
△P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	SB	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	A. NGUYEN	06/28/18
DRAWN:	J. CERDA	06/28/18
CHECKED:	B. MOJICA	06/28/18
PROJ APV:	C. RIESCH	06/28/18
SCG ENG APV:	L. BULLOCK	06/28/18

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION PROJECT TRAIN 2 JACKET WATER SYATEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2225-D-PID
REV: C

F-3600
INLET AIR FILTER #3
SIZE:

S-3601
INLET SILENCER #3
SIZE:

CE-3600
RECIPROCATING ENGINE DRIVER
HP V RPM

S-3602
STARTING AIR EXHAUST SILENCER #3
SIZE:

R-3600
CATALYTIC CONVERTER #3
SIZE:

S-3600
EXHAUST SILENCER #3
SIZE:

NOTE 5.9
VENT TO SAFE LOCATION
(FUEL GAS AND MISC, VENTS)

GV1022-2"-A21
1"
2"
1"

ATM
AF1005-12"-A61
F-3600
S-3601
AF1006-12"-A61
12"x6"
12"x6"
AS1005-2.1/2"-A01
S-3602
AS1006-2.1/2"-A01
ATM

MODBUS
FI 0207C AI 10 SCP2
UIT 0207C
NOTE 8
PIT 0207C
RTD
TE 0207C
FE 0207C
1/2"
3/4"

FAULT
ZA 1201C
ZIC 1201C
ZIO 1201C
DI 03 UCP3
ZI 1201C
ZSC 1201C
ZSO 1201C
YY 1201C DO 03 UCP3
HY 1201C
I
IAS
DE
HV 1201C
FC

FUEL GAS FROM HEADER
33159-2217-D-PID
GF1014-2"-A21
2"
MIN.

STARTING AIR FROM HEADER
33159-2243-D-PID
AS1005-2"-A21
2"

INSTRUMENT AIR FROM HEADER
33159-2247-D-PID
AI1006-2"-A21
2"

LUBE OIL SUPPLY FROM LUBE OIL HEADER
33159-2250-D-PID
OL1007-2"-A21
2"

STATIC PACKING GAS FROM TRAIN SUCTION HEADER
33159-2209-D-PID
GB1003-1"-A21
1"

C-3600 /CE-3600
(TRAIN 3-COMPRESSOR)

ATM
NOTE 5
GV1030-16"-A63
S-3600

TI 1202C "K" H L 10 SCP2
TI 1204C AI 10 SCP2
TI 1203C "K" H L 10 SCP2
TE 1202C TIT
PDI 1204C
TE 1203C TIT
GV1021-16"-A63
GV1029-16"-A63
R-3600
DRAIN
LOCATE AT GRADE

NOTE 3
OW1002-1"-A21
WASTE OIL TO T-4002
33159-2248-D-PID

NOTES:
1. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER Y-0100. WILL BE IDENTIFIED AS VN-C2-M-V-0100.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
3. WASTE OIL FROM COMPRESSOR.
4. DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. DISCHARGE SHALL BE MINIMUM TO 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
7. IAS, MINIMUM 80PSIG, SEE HEADER DRAWING 33159-2247-D-PID.
8. MULTIPLE VARIABLES/POINTS/VALUES/ALARMS TRANSMITTED OVER MODBUS
9. VENT MANIFOLD DESIGNED TO ACCOMODATE THE USE OF A PORTABLE METER TO MEASURE VENT GAS RATE AND A TAP FOR FUTURE VAPOR RECOVERY UNIT

REV	DATE	DRAWN	CHECKED	PRJ APV	SCE APV	ENG FILE NO	DESCRIPTION	WOA
B	11/01/19	AY	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SC	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	SC	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCE ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
UTILITY FOR COMPRESSOR TRAIN 3
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2228-D-PID
REV: B

T-3603 CHEMICAL INJECTION POT #1		T-3601 (NOTE 4) AUXILIARY WATER EXPANSION TANK		E-3601 AUXILIARY WATER COOLER (NOTE 4)		E-3603 ENGINE INTERCOOLER (NOTE 4)		E-3604 (NOTE 4) ENGINE LUBE OIL COOLER	
SIZE:	B/T TBD	SIZE:	TBD	SQ. FT.		SQ. FT.		SQ. FT.	
DESIGN:	PSIG @ °F	DESIGN:	PSIG @ °F	TUBE DESIGN:	PSIG @ °F	TUBE DESIGN:	PSIG @ °F	TUBE DESIGN:	PSIG @ °F
OPERATING:	PSIG @ °F	OPERATING:	PSIG @ °F	SHELL DESIGN:	PSIG @ °F	SHELL DESIGN:	PSIG @ °F	SHELL DESIGN:	PSIG @ °F
CAPACITY:		CAPACITY:	gal	NO. OF TUBES:		NO. OF TUBES:		NO. OF TUBES:	
LIQUID:									

MAKE-UP WATER FROM HEADER 33159-2256-D-PID — WU1025-3/4"-A21 — MAKE-UP WATER TO T-3600 33159-2230-D-PID

COOLING WATER FROM HEADER 33159-2254-D-PID — WC1046-2"-A21

HS 1610C2 (NOTE 6) YY 1610C2 DO 03 UCP3 — LV 1610C2

LV 1610C1 (NOTE 6) YY 1610C1 DO 03 UCP3

2" (NOTE 8) 2" LOW POINT VENT TO SAFE LOCATION

NOTE 4

WC9306-3/8"-A21 — 3/8" (NOTE 13)

WC9307-1/2"-A21 — 3/8"

LV 1610C3 (NOTE 6) YY 1610C3 DO 03 UCP3 — 1/2" FC — XX0167-1/2"-A21

RADIATOR CAP 2" — WC9308-2"-A21

(NOTE 6) LIL 1610C DI 03 UCP3 — LSL 1610C — LG 1609C — 1/2"

T-3601

ENGINE JACKET WATER SECTION (SEE P&ID 33159- -D-PID)

VENDOR / CONTRACTOR

1/4" 3/8" (NOTE 13) — WC9305-3/4"-A21 3/4" TUBING

3/4"NPT 1" NPT — 1/2" NPT

(NOTE 10) PSV 1608C SET @ 150 PSIG 4" L 6"

WEEPHOLE

1E2 per updated PSV calculations

provide line number

E-3601

HIGHEST TUBE PLUG

(NOTE 1)

1/2" — DO NOT POCKET — 4" LO FP — 4" LO — 3/4" — 4" LO

3/4"TUBING WC1051-3/4"-A21

WC1049-3/4"-A21-C BALANCE LINE NO POCKET

WC1050-1/2"-A21 HIGH POINT VENT LINE 1/2" TUBING

PI 1606C — 1/2" — PI 1601C — 1/2" — TI 1607C — 3/4" — TI 1602C

3/4" — 3/4"

WC1048-4"-A21-C — 4" LO — 3/4" VENT — 1" NC — 3/4" LOW POINT DRAIN

CAP — PI 1902C — 3/4" — 3/4" — XX0055-3/4"-A21

T-3603

4" (NOTE 9) — WC2421-4"-A21 BY CONTRACTOR

CONTRACTOR VENDOR

TCV 1605C — DE — 3"x2.1/2"

WC7186-2.1/2"-VN

FO 1604C 1/4" ORIFICE

WC9303-2"-A21

E-3603 (NOTE 7)

WC9304-2.1/2"-A21

WC9302-2"-A21

WC1052-3/4"-A21 3/4" TUBING — 3/4"

XX0054-3/4"-A21

1" NC — 3/4" LOW POINT DRAIN

JACKET WATER FROM CE-3600 33159-2230-D-PID — WC1044-3/4"-A21 3/4" TUBING

(NOTE 2) 3"x2.1/2" — 3/4"

P-3601 ENGINE DRIVEN

WC9301-2.1/2"-A21

HH H TI 1603C AI 03 UCP3 — TIT 1603C

(NOTE 3) — (OIL)

E-3604 (NOTE 7)

SAMPLE CONNECTION

WC1019-1"-A21 — COOLING WATER TO T-4003 33159-2251-D-PID

WC1045-3/4"-A21 — JACKET WATER TO CE-3600 33159-2230-D-PID

NOTES:
1. FOR AIR COOLER FANS AND CONTROL INFORMATION, SEE ENGINE JACKET WATER COOLER. DWG. 33159-2230-D-PID
2. ALL FLEX HOSE PROVIDED BY VENDOR TO BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
3. DETAILS FOR OIL FLOW THROUGH ENGINE OIL COOLER TO BE DEVELOPED DURING DETAILED ENGINEERING.
4. DELETED PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION IS AVAILABLE.
5. MAXIMUM PRESSURE DROP OF AUXILIARY WATER PIPING IS 7 PSI.
6. ALL LSL-1610C IS CONTROLLING THE MAKE-UP FOR AUXILIARY WATER. (LV-1610C1 , LV-1610C2 AND LV-1610C3) HS-1610C IS SELECTED VIA HMI (MAKE-UP VS REFILL).
7. EXCHANGERS ARE NOT SHELL & TUBE.
8. LOCATE VALVE GRADE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
9. LOCATE AT ENGINE INLET/OUTLET.
10. OUTLET LINE SIZED FOR SONIC FLOW.
11. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
12. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED.
13. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
14. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
15. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3601
AUXILIARY WATER PUMP
CAPACITY NOTE 4
ΔP: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: A. NGUYEN	01/29/18
DRAWN: J. CERDA	01/29/18
CHECKED: B. MOJICA	01/29/18
PROJ APV: C. RIESH	01/29/18
SCG ENG APV: L. BULLOCK	01/29/18

ENG FILE NO: E15043 — WOA: 91651.000

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DWG CLASS: 38 — DWG DIST: 114 — SCALE: NONE

VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION PROJECT TRAIN 3 AUXILIARY WATER SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2229-D-PID — REV C

T-3600 (NOTE 9)
JACKET WATER EXPANSION TANK
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:
TRIM : WC7233-VN

E-3602 (NOTE 9)
JACKET WATER COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:
TRIM : WC7234-VN

E-3605 (NOTE 9)
HOTSTART CIRCULATING WATER HEATER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

MAKE-UP WATER FROM HEADER
33159-2229-D-PID
WU1025
WC9383 3/4"-A21
(NOTE 4) YY 1510C1 DO 03 UCP3
LV 1510C1
3/4" FC
RADIATOR CAP 2"
WC9318-2"-A21
WC1038-2"-A21
(NOTE 4) YY 1510C3 DO 03 UCP3
LV 1510C3
1/2" FC
XX0171-1/2"-A21
(NOTE 2)
1/4" (NOTE 11)
WC9317-3/8"-A21
WC9316-1/2"-A21
LG 1509 C
LSL 1510 C
(NOTE 4) LIL 1510 C DI 03 UCP3
(NOTE 11)
Reduce line weight for impulse lines
T-3600
2"
1/2"
VENT TO SAFE LOCATION
AUXILIARY JACKET WATER SECTION (SEE P&ID 33159-2229-D-PID)
(NOTE 7)
PSV 1508 C SET @ 150 PSIG 4"L6"
WEEPHOLE
1.5G3 per updated PSV calculations
E-3602
VENDOR CONTRACTOR
VENDOR CONTRACTOR
VENDOR CONTRACTOR
3/4" NPT
WC1041-3/4"-A21 3/4" TUBING NO POCKET
1" NPT
1/2" NPT
BALANCE LINE NO POCKET
1/2" TUBING NO POCKET
2" DO NOT POCKET
6"x4" 4" 150# RF
4" 150# RF 6"x4"
LO FP
PI 1506 C
TI 1507 C
1/2"
3/4"
EM-3602
PI 1501C
TI 1502 C
3/4" TUBING
WC1044-3/4"-A21
JACKET WATER TO CHEMICAL INJECTION POT T-3603
33159-2229-D-PID
WC1020-1"-A21-C
COOLING WATER TO T-4003
33159-2251-D-PID
provide line number
HH H VI 1517 C AI 03 UCP3
VSHH 1518 C
VT 1517 C
JOA
HS 1516 C
DI DI DI DO
YI HIA YIA YY
1516 C 1516 C 1516 C 1516 C 03 UCP3
RUN AUTO FAULT CALL
HS 1510C2
(NOTE 4) YY 1510C2 DO 03 UCP3
LV 1510C2
2" FC
WC1039-6"-A21-C
WC1042-1"-A21-C
WC1043-1/2"-A21 HIGH POINT VENT LINE
WC1040-6"-A21-C
CE-3600
(NOTE 6)
6" SO
1" NC (NOTE 9)
COOLING WATER FROM HEADER
33159-2254-D-PID
WC1038-2"-A21
2"
(NOTE 5)
3/4" LOW POINT
(NOTE 6)
JACKET WATER FROM CHEMICAL INJECTION POT
33159-2229-D-PID
WC1045-3/4"-A21 3/4" TUBING
3/4"
1" NC (NOTE 9)
FO 1504 C 1/4"
VENDOR CONTRACTOR
ENGINE JACKET WATER MANIFOLD
TCV 1505 C
WC9310-6"-A21
WC9311-6"-A21
1" (NOTE 1) CONTRACTOR VENDOR (NOTE 2)
TIT 1503 C
WC9312-6"-A21
CONTRACTOR VENDOR
CONTRACTOR VENDOR
(NOTE 1)
P-3600
ENGINE DRIVEN
WC9309-6"-A21
HH H TI 1503 C AI 03 UCP3
WC9313-1"-A21
WC9315-1"-A21
HS 1515C
DO YY 1515C YI 1515C DI 03 UCP3
RUN AUTO FAULT CALL
DI DI DI DO
HIA YI YIA YY
1514 C 1514 C 1514 C 1514 C 03 UCP3
JOA
HS 1514 C
1" NC
E-3605
WC9314-1"-A21
P-3602
PM-3602

NOTES:
1. ALL FLEX HOSE PROVIDED BY VENDOR SHALL BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
2. DETAILS WITHIN LIMITS ARE PART OF COMPRESSOR VENDOR PACKAGE THAT NEED TO BE VERIFIED.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
4. LSL 1510C IS CONTROLLING THE MAKE-UP FOR JACKET WATER (LV 1510C1, LV 1510C2, LV 1510C3). HS 1510C IS SELECTED VIA HMI (MAKE-UP VS REFILL).
5. LOCATE VALVE ACCESSIBLE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
6. LOCATE AT ENGINE INLET/OUTLET.
7. OUTLET LINE SIZED FOR SONIC FLOW.
8. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
9. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION AVAILABLE..
10. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED.
11. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
12. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3600 (NOTE 9)
JACKET WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

P-3602 (NOTE 9)
HOTSTART CIRCULATING WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	SB	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	02/28/19	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	A. NGUYEN	02/13/18
DRAWN:	J. CERDA	02/13/18
CHECKED:	B. MOJICA	02/13/18
PROJ APV:	C. RIESCH	02/13/18
SCG ENG APV:	L. BULLOCK	02/13/18
ENG FILE NO:	E15043	
WOA:	91651	
SCALE:	NONE	
DWG CLASS:	38	DWG DIST: 114

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION PROJECT
TRAIN 3 JACKET WATER SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2230-D-PID
REV C

F-3700
INLET AIR FILTER #4
SIZE:

S-3701
INLET SILENCER #4
SIZE:

CE-3700
RECIPROCATING ENGINE DRIVER
HP V RPM

S-3702
STARTING AIR EXHAUST SILENCER #4
SIZE:

R-3700
CATALYTIC CONVERTER #4
SIZE:

S-3700
EXHAUST SILENCER #4
SIZE:

NOTE 5.9
VENT TO SAFE LOCATION
(FUEL GAS AND MISC, VENTS)

GV1024-2"-A21
1"
2"
1"

ATM
AF1007-12"-A61
F-3700
S-3701
AF1008-12"-A61
12"x6"
12"x6"
AS1007-2.1/2"-A01
S-3702
AS1008-2.1/2"-A01
ATM

UPC4

YY 1201D DO 04 UCP1
HY 1201D
DET
IAS
FAULT
ZA 1201D
ZIC 1201D
ZIO 1201D
DI
DI
04 UCP4
ZI 1201D
ZSC 1201D
ZSO 1201D
HV 1201D
FC

FI 0207D AI 10
UIT 0207D
NOTE 8
PIT 0207D
RTD
FE 0207D
TE 0207D
1/2"

FUEL GAS FROM HEADER
33159-2217-D-PID
GF1015-2"-A21
2"
MIN.
3/4"

STARTING AIR FROM HEADER
33159-2243-D-PID
AS1006-2"-A21
2"

INSTRUMENT AIR FROM HEADER
33159-2247-D-PID
AI1007-2"-A21
2"

LUBE OIL SUPPLY FROM LUBE OIL HEADER
33159-2250-D-PID
OL1006-2"-A21
2"

STATIC PACKING GAS FROM TRAIN 4 SUCTION HEADER
33159-2211-D-PID
GB1004-1"-A21
1"

C-3700 / CE-3700
(TRAIN 4-COMPRESSOR)

ATM
NOTE 5
GV1032-16"-A63
S-3700

TI 1202D "K" 10 SCP2
TE 1202D
TIT
PDI 1204D AI 10 SCP2
PDIT 1204D
TI 1203D "K" 10 SCP2
TE 1203D
TIT

GV1023-16"-A63
GV1031-16"-A63
R-3700
DRAIN
LOCATE AT GRADE

NOTE 3
OW1001-1"-A21
TO COMPRESSOR AREA
WASTE OIL
WASTE OIL TANK T-4002
33159-2248-D-PID

NOTES:
1. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER Y-0100. WILL BE IDENTIFIED AS VN-C2-M-V-0100.
2. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401
3. WASTE OIL FROM COMPRESSOR.
4. DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. DISCHARGE SHALL BE MINIMUM TO 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. DIGITAL OUTPUT INTERLOCK BY "STRING RELAY" NORMALLY OPEN CONTACT.
7. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 33159-2247-D-PID
8. MULTIPLE VARIABLES/POINTS/VALUES/ALARMS TRANSMITTED OVER MODBUS
9. VENT MANIFOLD DESIGNED TO ACCOMODATE THE USE OF A PORTABLE METER TO MEASURE VENT GAS RATE AND A TAP FOR FUTURE VAPOR RECOVERY UNIT

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	XX	XX	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SC	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W.HEFNER	03/29/19
DRAWN: SC	03/29/19
CHECKED: SD	03/29/19
PROJ APV: M.S.MONES	03/29/19
SCG ENG APV: P.GHOUGASSIAN	03/29/19

ENG FILE NO: E15043
WOA: 91651

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
UTILITY FOR COMPRESSOR TRAIN 4
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2233-D-PID
REV C

T-3703
CHEMICAL ADDITION POT
SIZE: B/T TBD
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:

T-3701 (NOTE 4)
AUXILARY WATER EXPANSION TANK
SIZE: TBD
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY: gal

E-3701 (NOTE 4)
AUXILIARY WATER COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

E-3703 (NOTE 4)
ENGINE INTERCOOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

E-3704 (NOTE 4)
ENGINE LUBE OIL COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

MAKE-UP WATER FROM HEADER 33159-2256-D-PID
WU1026-3/4"-A21
MAKE-UP WATER TO T-3700 33159-2235-D-PID
COOLING WATER FROM HEADER 33159-2254-D-PID
WC1062-1"-A21
HS 1610D2
LV 1610D2
LV 1610D1
(NOTE 6) DO YY 1610D1 04 UCP4
(NOTE 6) DO YY 1610D2 04 UCP4
LOW POINT
VENT TO SAFE LOCATION
(NOTE 8)
NOTE 4
WC9406-3/8"-A21
WC9407-1/2"-A21
(NOTE 13)
LV 1610D3
(NOTE 6) DO YY 1610D3 04 UCP4
RADIATOR CAP 2"
WC9408-2"-A21
XX0169-1/2"-A21
(NOTE 6) DI LIL 1610D 04 UCP4
LSL 1610D
LG 1609D
T-3701
ENGINE JACKET WATER SECTION (SEE P&ID 33159-2235-D-PID)
VENDOR CONTRACTOR
SET @ 150 PSIG 4" L 6"
PSV 1608D
(NOTE 10)
WEEPHOLE
1E2 per updated PSV calculations
provide line number
XX9405-3/4"-A21
3/4" TUBING
E-3701
HIGHEST TUBE PLUG
(NOTE 1)
DO NOT POCKET
3/4" TUBING WC1067-3/4"-A21
WC1065-3/4"-A21-C BALANCE LINE NO POCKET
WC1066-1/2"-A21 HIGH POINT VENT LINE 1/2" TUBING
PI 1601D
PI 1606D
TI 1607D
TI 1602D
WC1064-4"-A21-C
CAP
PI 1902D
T-3703
XX0057-3/4"-A21
WC1068-3/4"-A21 3/4" TUBING
XX0056-3/4"-A21
SAMPLE CONNECTION
WC1063-4"-A21-C BY CONTRACTOR
(NOTE 9)
CONTRACTOR VENDOR
WC7187-2.1/2"-VN
TCV 1605D
3"x2.1/2"
3/4" LOW POINT DRAIN
FO 1604D 1/4"ORIFICE
E-3703
(NOTE 7)
WC9403-2"-A21
WC9402-2"-A21
WC9404-2.1/2"-A21
P-3701
ENGINE DRIVEN
WC9401-2.1/2"-A21
(NOTE 2)
(NOTE 3)
(OIL)
E-3704
(NOTE 7)
(NOTE 6) HH H TI 1603D AI 04 UCP4
TIT 1603D
JACKET WATER FROM CE-3700 33159-2235-D-PID
WC1060-3/4"-A21
COOLING WATER TO T-4003 33159-2251-D-PID
WC1021-1"-A21
JACKET WATER TO CE-3700 33159-2235-D-PID
WC1061-3/4"-A21

NOTES:
1. FOR AIR COOLER FANS AND CONTROL INFORMATION, SEE ENGINE JACKET WATER COOLER DWG. 33159-2235-D-PID.
2. ALL FLEX HOSE PROVIDED BY VENDOR TO BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
3. DETAILS FOR OIL FLOW THROUGH ENGINE OIL COOLER TO BE DEVELOPED DURING DETAILED ENGINEERING.
4. DELETED PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION IS AVAILABLE.
5. MAXIMUM PRESSURE DROP OF AUXILIARY WATER PIPING IS 7 PSI.
6. ALL LSL-1610D IS CONTROLLING THE MAKE-UP FOR AUXILIARY WATER. (LV-1610D1 , LV-1610D2 AND LV-1610D3) HS-1610D IS SELECTED VIA HMI (MAKE-UP VS REFILL).
7. EXCHANGERS ARE NOT SHELL & TUBE.
8. LOCATE VALVE GRADE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
9. LOCATE AT ENGINE INLET/OUTLET.
10. OUTLET LINE SIZED FOR SONIC FLOW.
11. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
12. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-I-" UNLESS OTHERWISE NOTED.
13. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
14. PSV,CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
15. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3701 **(NOTE 4)**
AUXILIARY WATER PUMP
CAPACITY
ΔP: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION COMPRESSOR MODERNIZATION PROJECT TRAIN 4 AUXILIARY WATER SYSTEM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2234-D-PID
REV C

T-3700 (NOTE 9)
JACKET WATER EXPANSION TANK
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
TRIM : WC7233-VN

E-3702 (NOTE 9)
JACKET WATER COOLER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:
TRIM : WC7234-VN

E-3705 (NOTE 9)
HOTSTART CIRCULATING WATER HEATER
SQ. FT.
TUBE DESIGN: PSIG @ °F
SHELL DESIGN: PSIG @ °F
NO. OF TUBES:

WU1026
~~WC1003~~ 3/4"-A21
MAKE-UP WATER FROM HEADER 33159-2234-D-PID
LV 1510D1
(NOTE 4) YY 1510D1 DO 04 UCP4
WC1054-2"-A21
RADIATOR CAP 2"
XX9418-2"-A21
T-3700
VENT TO SAFE LOCATION
AUXILIARY JACKET WATER SECTION (SEE P&ID 33159-2234-D-PID)
(NOTE 7)
PSV 1508 D SET @ 150 PSIG 4"L6"
WEEPHOLE
1.5G3 per updated PSV calculations
provide line number
E-3702
VENDOR
CONTRACTOR
4" 150# RF
6"x4"
4"
LO
FP
DO NOT POCKET
PI 1506 D
TI 1507 D
EM-3702
HH H VI 1517 D AI 04 UCP4
VSHH 1518 D
VT 1517 D
HS 1516 D JOA
YI 1516 D RUN
HIA 1516 D AUTO
YIA 1516 D FAULT
YY 1516 D CALL
DI DI DI DO 04 UCP4
HS 1510D2
(NOTE 4) YY 1510D2 DO 04 UCP4
LV 1510D2
WC1055-6"-A21-C
COOLING WATER FROM HEADER 33159-2254-D-PID
WC1054-2"-A21
2"
3/4" LOW POINT
(NOTE 5)
JACKET WATER FROM CHEMICAL INJECTION POT T-3703 33159-2234-D-PID
WC1061-3/4"-A21
3/4" 3/4" TUBING
(NOTE 6)
1" NC (NOTE 9)
WC1057-3/4"-A21 3/4" TUBING NO POCKET
3/4" NPT
PI 1501D
TI 1502 D
3/4" TUBING
BALANCE LINE NO POCKET
1/2" TUBING NO POCKET
1/2" NPT
(NOTE 4) YY 1510D3 DO 04 UCP4
LV 1510D3
1/2" FC
WC1054-2"-A21
(NOTE 2)
1/4" (NOTE 11)
XX9417-3/8"-A21
XX9416-1/2"-A21
XX0172-1/2"-A21
3/8"
1/2"
LG 1509 D
LSL 1510 D
(NOTE 4) LIL 1510 D DI 04 UCP4
(NOTE 11)
Reduce line weight for impulse lines
WC1059-1/2"-A21 HIGH POINT VENT LINE
WC1058-1"-A21-C
WC1056-6"-A21-C
JACKET WATER TO CHEMICAL INJECTION POT T-3703 33159-2234-D-PID
WC1060-3/4"-A21
COOLING WATER TO T-4003 33159-2251-D-PID
WC1037-1"-A21
CE-3700
(NOTE 6)
1" NC (NOTE 9)
1" CONTRACTOR VENDOR (NOTE 1) (NOTE 2)
FO 1504 D 1/4"
TCV 1505D SET @
WC9410-6"-A21
ENGINE JACKET WATER MANIFOLD
WC9411-6"-A21
TIT 1503 D
HH H TI 1503 D AI 04 UCP4
WC9412-6"-A21
WC9413-1"-A21
WC9415-1"-A21
CONTRACTOR VENDOR (NOTE 1)
P-3700
ENGINE DRIVEN
WC9409-6"-A21
HS 1515D
DO YY 1515D DI YI 1515D 04 UCP4
HS 1514 D
RUN HIA 1514 D AUTO YI 1514 D FAULT YIA 1514 D CALL YY 1514 D DI DI DI DO 04 UCP4
E-3705
WC9414-1"-A21
P-3702
PM-3702

NOTES:
1. ALL FLEX HOSE PROVIDED BY VENDOR SHALL BE SHIPPED LOOSE AND INSTALLED BY CONTRACTOR.
2. DETAILS WITHIN LIMITS ARE PART OF COMPRESSOR VENDOR PACKAGE THAT NEED TO BE VERIFIED.
3. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRMED DURING DETAIL ENGINEERING.
4. LSL 1510D IS CONTROLLING THE MAKE-UP FOR JACKET WATER (LV 1510D1, LV 1510D2, LV 1510D3). HS 1510D IS SELECTED VIA HMI (MAKE-UP VS REFILL).
5. LOCATE VALVE ACCESSIBLE WITH LINE OF SIGHT TO EXPANSION TANK LEVEL GAUGE.
6. LOCATE AT ENGINE INLET/OUTLET.
7. OUTLET LINE SIZED FOR SONIC FLOW.
8. ALL EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED.
9. PART OF COMPRESSOR VENDOR PACKAGE TO UPDATE WHEN INFORMATION AVAILABLE.
10. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-1-" UNLESS OTHERWISE NOTED.
11. LOCATE VENT VALVE ACCESSIBLE FROM PLATFORM, FIELD ROUTE.
12. VENDOR FURNISHED EQUIPMENT. P&ID SHALL BE REVIEWED & UPDATED DURING DETAIL ENGINEERING.

P-3700 (NOTE 9)
JACKET WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

P-3702 (NOTE 9)
HOTSTART CIRCULATING WATER PUMP
CAPACITY
Δ P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	SB	SH	MN		E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MN		E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	AO	SH	MN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		

ENG FILE NO: E15043
WOA: 91651

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION PROJECT
TRAIN 4 JACKET WATER SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2235-D-PID
REV: C

ST-3001 (NOTE 6)
PLANT BLOWDOWN STACK (WITH SILENCER)
SIZE: TBD OD X TBD H
CAPACITY: TBD MMSCFD

UNIT PARTIAL DEPRESSURIZING FROM C-3700
33159-2212-D-PID
GV1010-6"-D45

UNIT PARTIAL DEPRESSURIZING FROM C-3600
33159-2210-D-PID
GV1008-6"-D45

UNIT PARTIAL DEPRESSURIZING FROM C-3500
33159-2208-D-PID
GV1006-6"-D45

UNIT PARTIAL DEPRESSURIZING FROM C-3400
33159-2206-D-PID
GV1004-6"-D45

BLOWDOWN FROM COLD DISCHARGE HEADER
33159-2216-D-PID
GV1012-16"-D45

BLOWDOWN FROM SUCTION GAS HEADER
33159-2204-D-PID
GV1003-6"-D45

BLOWDOWN FROM C-3400
33159-2206-D-PID
GV1005-6"-D45

BLOWDOWN FROM C-3500
33159-2208-D-PID
GV1007-6"-D45

BLOWDOWN FROM C-3600
33159-~~2210~~ 2212 -D-PID
GV1009-6"-D45

BLOWNDOWN FROM C-3700
33159-2212-D-PID
GV1011-6"-D45

FROM FUEL GAS HEADER LINE
33159-2217-D-PID
GV1013-2"-D45

BLOWDOWN FROM V-4000A
33159-2202-D-PID
GV1001-3"-D45

BLOWDOWN FROM V-4000B
33159-2203-D-PID
GV1002-3"-D45

10"x6"

PCV 0028A2 — SET @ 180 PSIG
PCV 0028A1
PCV 0029A2 — SET @ 175 PSIG
PCV 0029A1
PI 0030 (AI, H, 10, SCP2)
PIT 0030
D45 B41
GV1014-6"-B41
UNIT PARTIAL DEPRESSURIZATION FROM PLANT 2 COMPRESSORS TO L-1003
33159-2011-D-PID

FAULT DI
ZA 0027 | ZIO 0027 | ZIC 0027 — DI 12 F&G/ESD2
ESD VENT BLOWDOWN SIGNAL (ESD 4)
XY 0027
R P
DE IAS
ZSO 0027
ZSC 0027
ZI 0027
XV 0027

GV1015-6"-D45
6" FC

GV1016-20"-D45
20" FP LO
6" LO

NOTE 5
ATM
NOTE 3
1.1/2" DRAIN
XX0090-1.1/2"-A21

(NOTE 7)

ST-3001

NOTES:
1. ALL EQUIPMENT NUMBER PRECEDED WITH "VN-C2-M-" UNLESS OTHERWISE NOTED.
   EXAMPLE: EQUIPMENT TAG NUMBER F-0101 WILL BE IDENTIFIED AS "VN-C2-M-F-0101".
2. ALL INSTRUMENT NUMBER PROCEEDED WITH "VN-C2-M" UNLESS OTHERWISE NOTED.
   EXAMPLE: INSTRUMENT TAG XV-3419 WILL BE IDENTIFIED AS "VN-C2-I-XV-3419".
3. SILENCER.
4. ALL BLOWDOWN, DEPRESSURISING LINE SIZES, PCV TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
5. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
6. STACK ST-3001 DIMENSIONS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
7. BLOWDOWN LINES AND HEADER TO HAVE A DRAIN TO COLLECT CONDENSATE OR RAINWATER.

8. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 33159-2247-D-PID
9. ESD SIGNAL, 30 PSIG, SEE ESD HEADER DRAWING 33159-2252-D-PID

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: S.W.HENFER	06/28/19
DRAWN:	
CHECKED:	
PROJ APV: M.S.NONES	06/28/19
SCG ENG APV:	
ENG FILE NO: E15043	
WOA: 91651	

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VENTURA COMPRESSOR STATION
BLOWDOWN HEADER & STACK
PIPING & INSTRUMENTATION DIAGRAM

DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

DRAWING NUMBER: 33159-2238-D-PID
REV: C

V-3100
GENERATOR FUEL GAS REGULATOR FILTER (NOTE 5,7,9)
SIZE: XXXX
DESIGN: 1100 PSIG @ 300 °F

G-3100
EMERGENCY GENERATOR
POWER: 600 KW (NOTE 6)
HP:
RPM:

ADD PSV

FUEL GAS FROM SUCTION HEADER
33159-2201-D-PID
GF1001-2"-D23

FUEL GAS FROM DISCHARGE HEADER
33159-2216-D-PID
GF1002-2"-D23

V-3100

PDI 4200
HY 4201
HV 4201
YY 4201 DO 10 SCP2
ZIO 4201 DI
ZIC 4201 DI
ZA 4201 FAULT
10 SCP2
ZSO 4201
ZSC 4201
ZI 4201
LG 4200
LT 4200
LI 4200 AI 10 SCP2
XX0182-2"-D23
XX0180-3/4"-D23
NC

Shown as 1.5" on D/S. To be updated based on vendor information.

SET @ 250 PSIG PCV 4202A2 NOTE 1
PCV 4202A1
SET @ 65 PSIG PCV 4203A2 NOTE 1
PCV 4203A1
SET @ 60 PSIG PCV 4204A2 NOTE 1
PCV 4204A1
NOTE 1

NOTE 10 HH H L PI 4205 AI 10 SCP2
PIT 4205

GF1003-2"-D23
D23 A21
FP

YY 4209 DO 10 SCP2
HY 4209 IAS
HV 4209
DI ZIO 4209
DI ZIC 4209
FAULT ZA 4209
10 SCP2
ZSO 4209
ZSC 4209
ZI 4209
FC

PI 4208
TI 4207
3/4"

MODBUS
FI 4206 AI 10 SCP2
UIT 4206 NOTE 4
PIT 4206
TE 4206 RTD
FE 4206
3/4"

0L2575-2"-A21
ATM VENT TO SAFE LOCATION NOTE 8
N4
N1

G-3100
NOTE 1,4

This is shown as a cap connection on quote from WPI

N2 2" 2"
OL1010-2"-A21
LUBE OIL FROM P-4001
33159-2250-D-PID

N3 2"
OW1006-2"-A21
WASTE OIL TO T-4002
33159-2248-D-PID

N5 1" N6 1" 3/4"
WU1027-3/4"-A21
MAKE-UP WATER FROM HEADER
33159-2256-D-PID

Connection not included on quote from WPI

WC1081
~~WC1080~~ 1"-A21
COOLING WATER FROM HEADER
33159-2254-D-PID

WC1080
~~WC1084~~ 1"-A21
COOLING WATER TO T-4003
33159-2251-D-PID

Add note that generator package will also contain the following equipment: Generator Auxiliary Water Cooler (E-3102); Generator Jacket Water Cooler (tag TBD); Jacket Water Pump (P-3101); Auxiliary Water Pump (P-3102); Generator Exhaust Silencer; Generator Exhaust Catalyst; Generator Engine Exhaust Stack (tag TBD); Chemical Addition Pot (T-3101); Jacket Water Expansion Tank (tag TBD); Auxiliary Water Expansion Tank (T-3102).

NOTES:
1. PCV SIZE AND SET PRESSURES TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
2. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
3. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT NUMBER PI-3005 WILL BE IDENTIFIED AS VN-C2-I-PI-3105.
4. MULTIPLE VARIABLES/POINTS/VALUES/ALARMS TRANSMITTED OVER MODBUS.
5. ~~I-1013~~ DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
6. ESTIMATED TO BE VERIFIED DURING DETAILED ENGINEERING.
7. FILTER TO BE SIZED TO HANDLE SLUG OF DEBRIS FROM PIGGING.
8. DISCHARGE SHALL BE MINIMUM OF 10 FEET ABOVE THE ADJACENT HIGHEST PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
9. EQUIPMENT DETAILS TO BE FURNISH DURING DETAIL ENGINEERING PHASE.
10. ~~HV-2002~~ OPEN/CLOSE FROM SCP WITH PRESSURE PERMISSIVE (PIT-2002 LESS THAN 80PSIG)
11. IAS, MINIMUM 80 PSIG, SEE HEADER DRAWING 33159-2247-D-PID

V-3100
HV-4201

NOTE 10, UPDATE INSTRUMENT TAG NUMBERS.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
B	11/15/19	AY	DS	MSN		E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	DS	MSN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	05/30/19
DRAWN:	SG	05/30/19
CHECKED:	SD	05/30/19
PROJ APV:	M.S.MONES	05/30/19
SCG ENG APV:	P.GHOUGASSIAN	05/30/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
EMERGENCY GENERATOR
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER 33159-2239-D-PID
REV B

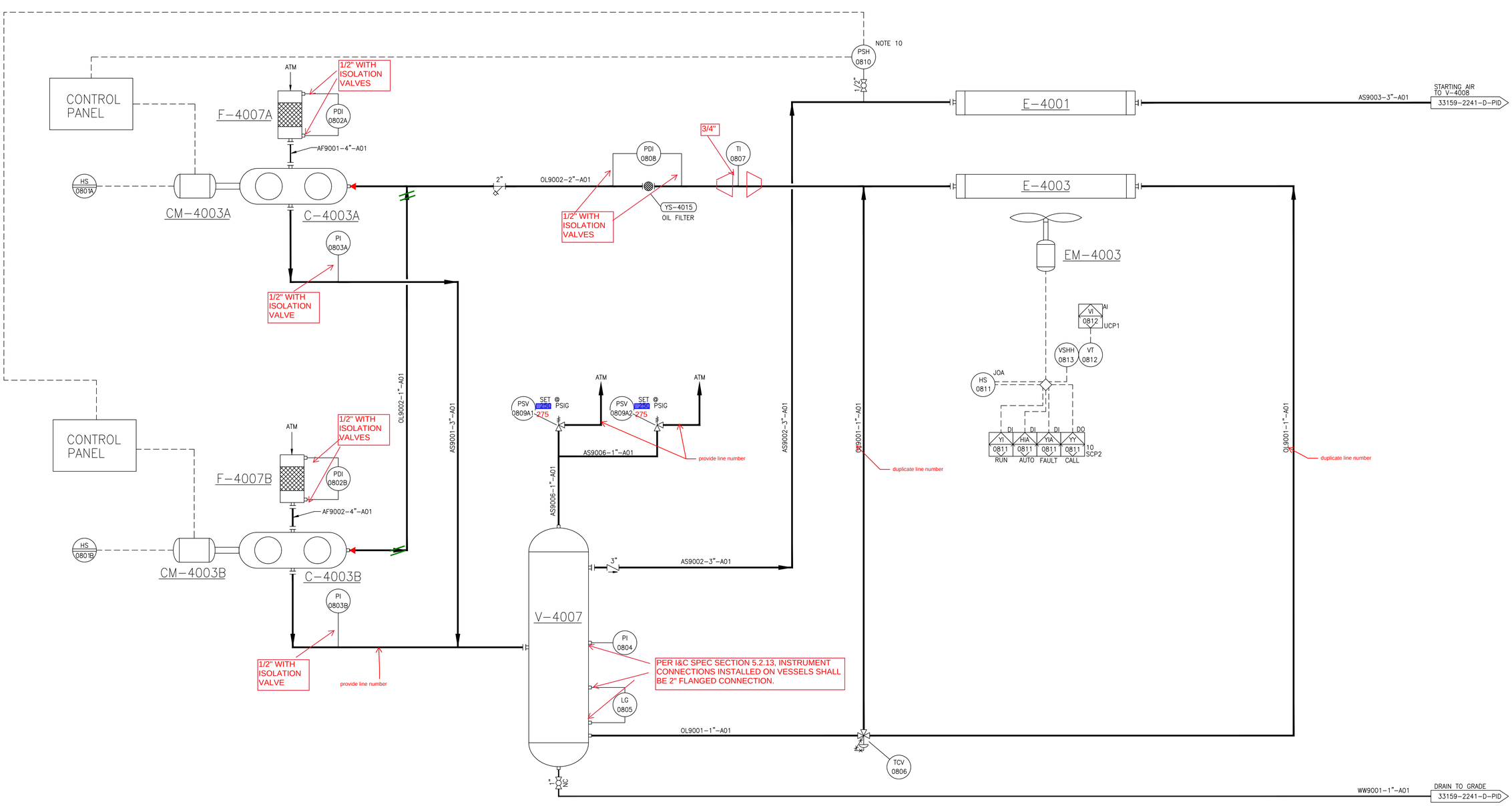
F-4007A
INLET FILTER
SIZE: XXX SQ. IN.
DESIGN. : XXX PSIG XXX °F
NOTE 1,4

F-4007B
INLET FILTER
SIZE: XXX SQ. IN.
DESIGN. : XXX PSIG XXX °F
NOTE 1,4

V-4007
OIL/GAS SEPARATOR
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:
NOTE 1,4

E-4001
STARTING AIR COOLER
DUTY:
DESIGN PRESSURE: PSIG
NO. OF TUBES:
NOTE 1,4

E-4003
OIL COOLER
DUTY:
DESIGN PRESSURE: PSIG
NO. OF TUBES:
NOTE 1,4



NOTES:
1. EQUIPMENT DETAILS TO BE CONFIRMED BY VENDOR DURING DETAIL ENGINEERING PHASE.
2. ALL INSTRUMENTS OF STARTING AIR COMPRESSOR SKID SHALL BE PROVIDED BY VENDOR.
3. ALL EQUIPMENT NUMBERS ARE PRECEDED BY "VN-C2-M" UNLESS OTHERWISE NOTED. EXAMPLE: EUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
4. VENDOR FURNISHED EUIPMENT, FOR INFORMATION ONLY, DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER PI-0100 WILL BE IDENTIFIED AS VN-A2-I-PI-0100.
6. VENDOR TO INCLUDE AFTER COOLER AFTER COMPRESSOR, METALLURGY OF AIRCOOLER SHOULD BE ADEQUATE TO MINIMIZE CORROSION, PREFERABLY SS316.
7. PSV & PCV SIZE AND SET PRESSURE TO BE CONFIRMED IN DETAIL ENGINEERING PHASE.
8. START/STOP THE AIR COMPRESSORS (LEAD/LAG).

C-4003A
STARTING AIR COMPRESSOR
CAPACITY 100 SCFM
△P: 250 PSI (NOTE 1)
HP XXX V XXX RPM (NOTE 1)

C-4003B
STARTING AIR COMPRESSOR
CAPACITY 100 SCFM
△P: 250 PSI (NOTE 1)
HP XXX V XXX RPM (NOTE 1)

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:	SB	06/28/19
CHECKED:	AY	06/28/19
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		06/28/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
STARTING AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2240-D-PID
REV: B

V-4008
CYCLONE WATER SEPARATOR

SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:

F-4009A
AIR FILTER

SIZE: CU. IN.
DESIGN. PRESS. PSIG

F-4009B
AIR FILTER

SIZE: CU. IN.
DESIGN. PRESS. PSIG

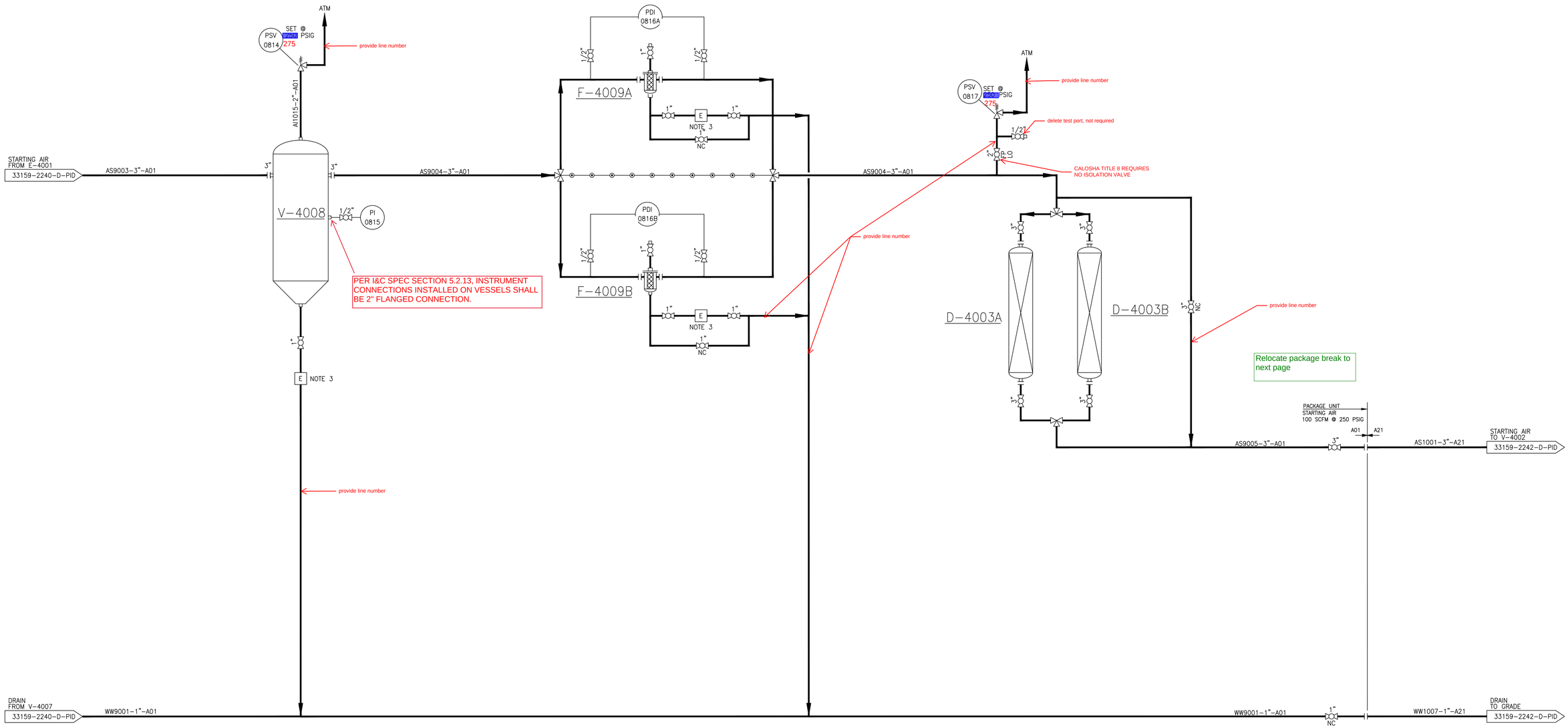
D-4003A
AIR DRYER

SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:

D-4003B
AIR DRYER

SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:

Confirm names. Previous revision used the following:
V-4008: Cyclonic Air Separator
F-4009A/B: Dryer Inlet Filter / Coalescer
D-4003A/B: Starting Air Dryer



NOTES:
1. EQUIPMENT DETAILS TO BE CONFIRMED BY VENDOR DURING DETAILED ENGINEERING.
2. PSV & PCV SIZE AND SET PRESSURE TO BE FINALIZED IN DETAILED ENGINEERING.
3. ELECTRONIC CONDENSATE DRAIN TO COLLECT IN A CONDENSATE POT WHICH CAN BE DRAINED AS NEEDED.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
B	11/01/19	AY	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	DS	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	03/29/19
DRAWN:	DS	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
STARTING AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

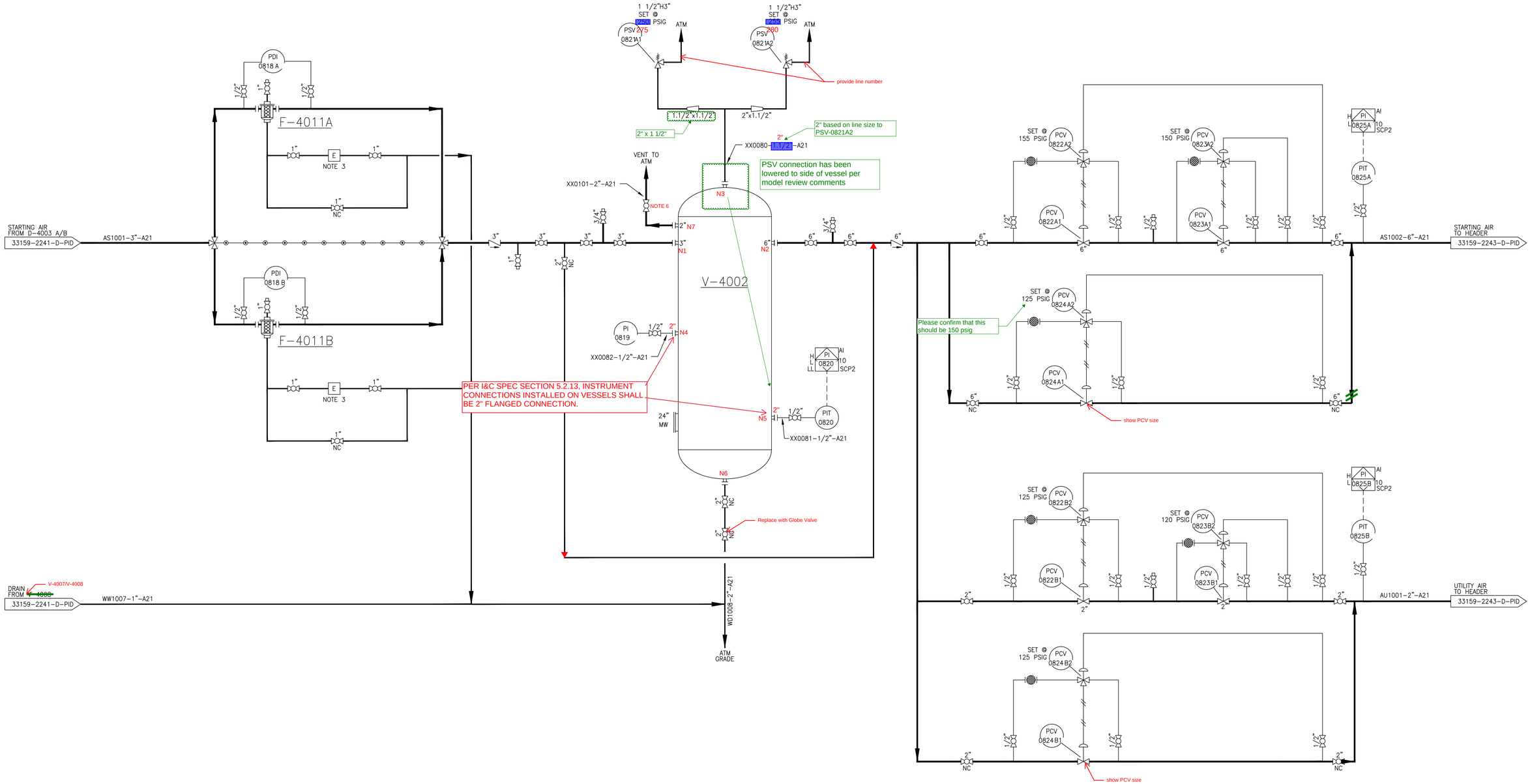
DRAWING NUMBER: 33159-2241-D-PID
REV: B

F-4011A
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

F-4011B
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

Confirm names. Previous revision used the following:
F-4011A/B: Outlet Filter

V-4002
STARTING AIR RECEIVER
SIZE: 6'-6" ID x 20'-0" T/T
DESIGN: 275 PSIG @ 140 °F
OPERATING: 200 PSIG @ 95 °F
CAPACITY: 85 BBL



NOTES:
1. EQUIPMENT DETAILS TO BE CONFIRMED BY VENDOR DURING DETAILED ENGINEERING.
2. PSV & PCV SIZE AND SET PRESSURE TO BE FINALIZED IN DETAILED ENGINEERING.
3. ELECTRONIC CONDENSATE DRAIN TO COLLECT IN A CONDENSATE POT WHICH CAN BE DRAINED AS NEEDED.
4. PRESSURE <90 PSIG ON INSTRUMENT AIR RECEIVER CANNOT START ANY UNIT IN PLANT 2.
5. LOCATE ACCESSIBLE FROM GRADE.
6. LOCATE ACCESIBLE FROM GRADE OR PROVIDE PLATFORM.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/14/19	AY	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	DS	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

BY		DATE
DESIGNED:	S.W. HEFNER	03/29/19
DRAWN:	DS	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:	P.GHOUGASSIAN	03/29/19
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
STARTING AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2242-D-PID
REV: B

STARTING
FROM V-4002
33159-2242-D-PID

AS1002-6"-A21

2"

2"

2"

2"

AS1003-2"-A21

STARTING AIR
TO CE-3400
33159-2218-D-PID

AS1004-2"-A21

STARTING AIR
TO CE-3500
33159-2223-D-PID

AS1005-2"-A21

STARTING AIR
TO CE-3600
33159-2228-D-PID

AS1006-2"-A21

STARTING AIR
TO CE-3700
33159-2233-D-PID

indicate locations of these utility srations

U53-1

U53-2

U53-3

U53-4

U53-5

U53-6

U53-7

1"x3/4"

1"

AU1002-1"-A21

AU1003-2"-A21

AU1004-1"-A21

AU1005-1"-A21

AU1006-1"-A21

AU1007-1"-A21

AU1008-1"-A21

AU1009-1"-A21

UTILITY AIR
FROM V-4002
33159-2242-D-PID

AU1001-2"-A21

AU1010-1"-A21

UTILITY AIR
TO P-4003
33159-2249-D-PID

AU1011-1"-A21

UTILITY AIR
TO P-4004
33159-2248-D-PID

AU1012-1"-A21

UTILITY AIR
TO P-4005
33159-2251-D-PID

AU1013-1"-A21

UTILITY AIR
TO P-4006
33159-2257-D-PID

2257

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SD	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:	AO	06/28/19
CHECKED:	SH	06/28/19
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
STARTING AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2243-D-PID

REV: B

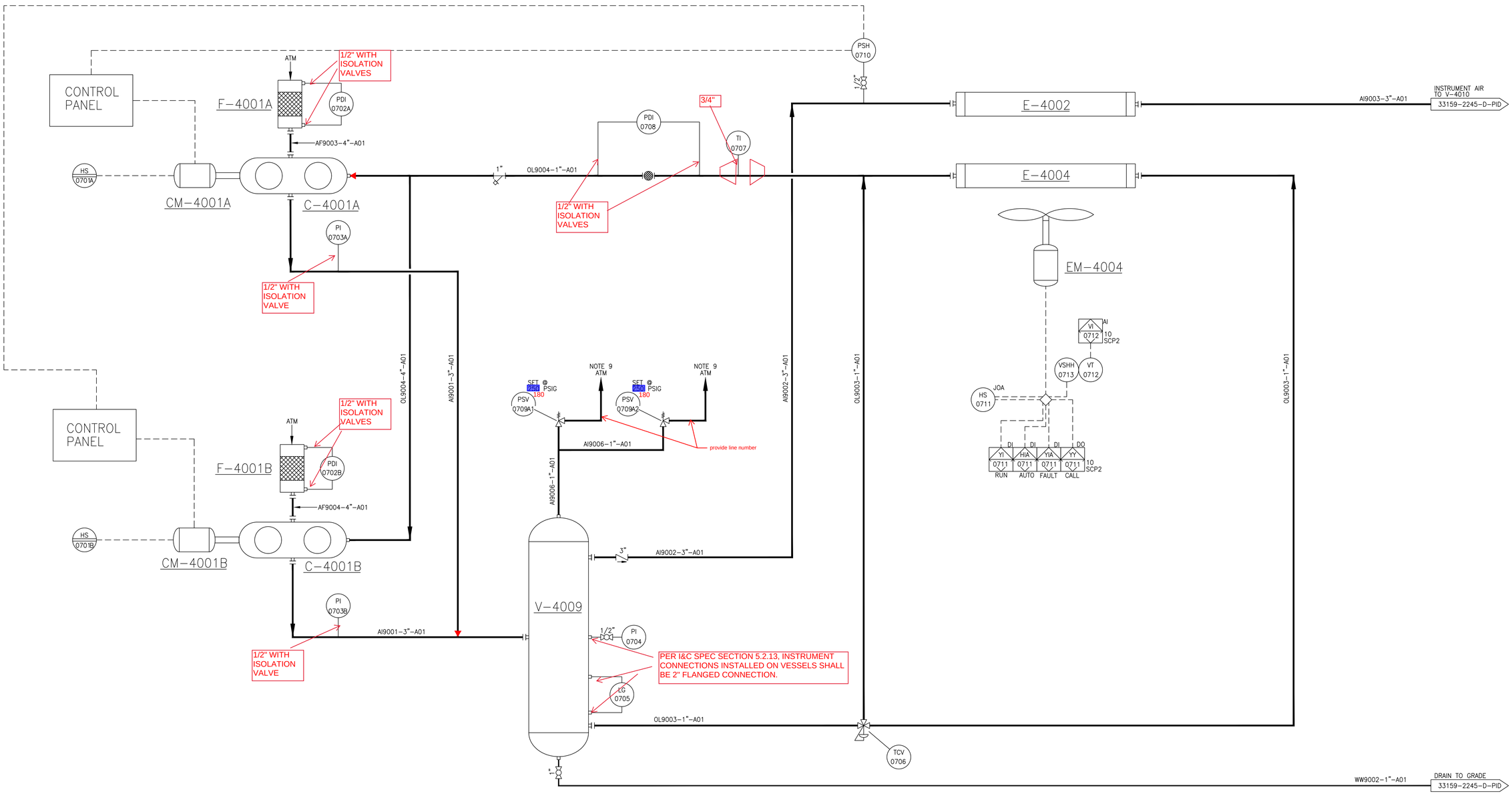
F-4001A
INLET FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG
NOTE 1, 4

F-4001B
INLET FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG
NOTE 1, 4

V-4009
OIL/GAS SEPARATOR
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:
NOTE 1, 4

E-4002
INSTRUMENT AIR COOLER
DUTY:
DESIGN PRESSURE: PSIG
NO. OF TUBES:
NOTE 1, 4

E-4004
OIL COOLER
DUTY:
DESIGN PRESSURE: PSIG
NO. OF TUBES:
NOTE 1, 4



NOTES:
1. EQUIPMENT DETAILS TO BE CONFIRMED BY VENDOR DURING DETAIL ENGINEERING PHASE.
2. ALL INSTRUMENTS OF STARTING AIR COMPRESSOR SKID SHALL BE PROVIDED BY VENDOR.
3. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
4. VENDOR FURNISHED EQUIPMENT, FOR INFORMATION ONLY, DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
5. ALL INSTRUMENT TAG NUMBERS PRECEDED BY "VN-C2-1" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER PI-0100 WILL BE IDENTIFIED AS VN-A2-I-PI-0100.
6. VENDOR TO INCLUDE AFTER COOLER AFTER COMPRESSOR, METALLURGY OF AIR COOLER SHOULD BE ADEQUATE TO MINIMIZE CORROSION, PREFERABLY SS316.
7. PSV & PCV SIZE AND SET PRESSURE TO BE CONFIRMED IN DETAIL ENGINEERING PHASE.

C-4001A
INSTRUMENT AIR COMPRESSOR
CAPACITY 100 SCFM
ΔP: 150 PSI (NOTE 1)
HP V RPM (NOTE 1)

C-4001B
INSTRUMENT AIR COMPRESSOR
CAPACITY 100 SCFM
ΔP: 150 PSI (NOTE 1)
HP V RPM (NOTE 1)

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/01/19	AY	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	03/29/19	SB	SD	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	03/29/19
DRAWN:	S.BROWN	03/29/19
CHECKED:	SD	03/29/19
PROJ APV:	M.S.MONES	03/29/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
INSTRUMENT AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2244-D-PID
REV B

V-4010
CYCLONE WATER SEPARATOR
SIZE:
DESIGN: PSIG @ °F
OPERATING: PSIG @ °F
CAPACITY:
LIQUID:

F-4003A
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

F-4003B
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

F-4004A
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

F-4004B
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

D-4001A
AIR DRYER
DESIGN PRESSURE: PSIG
POWER:

D-4001B
AIR DRYER
DESIGN PRESSURE: PSIG
POWER:

Confirm names. Previous revision used the following:
V-4010: Cyclonic Air Separator
F-4003A/B: Dryer Inlet Filter / Coalescer
D-4001A/B: Instrument Air Dryer

INSTRUMENT AIR FROM E-4002
33159-2244-D-PID
AI9003-3"-A01
AI1014-2"-A01
V-4010
PI 0715
PSV 0714
SET @ 150 PSIG 180
ATM
PDI 0716A1
PDI 0716A2
PDI 0716B1
PDI 0716B2
F-4003A
F-4003B
F-4004A
F-4004B
AI9004-3"-A01
NOTE 7
PSV 0717
provide line number
delete test port, not required
CALOSHA TITLE 8 REQUIRES NO ISOLATION VALVE
D-4001A
D-4001B
PER I&C SPEC SECTION 5.2.13, INSTRUMENT CONNECTIONS INSTALLED ON VESSELS SHALL BE 2" FLANGED CONNECTION.
Relocate package break to next page
A01
A21
PACKAGE UNIT
INSTRUMENT AIR
100 SCFM @150 PSIG
AI9005-3"-A01
AI1001-3"-A21
INSTRUMENT AIR TO V-4006
33159-2246-D-PID
Provide line number
DRAIN FROM V-4009
33159-2244-D-PID
WW9002-1"-A01
WW1009-1"-A21
DRAIN TO GRADE
33159-2246-D-PID

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/01/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VETURA COMPRESSOR STATION
INSTRUMENT AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

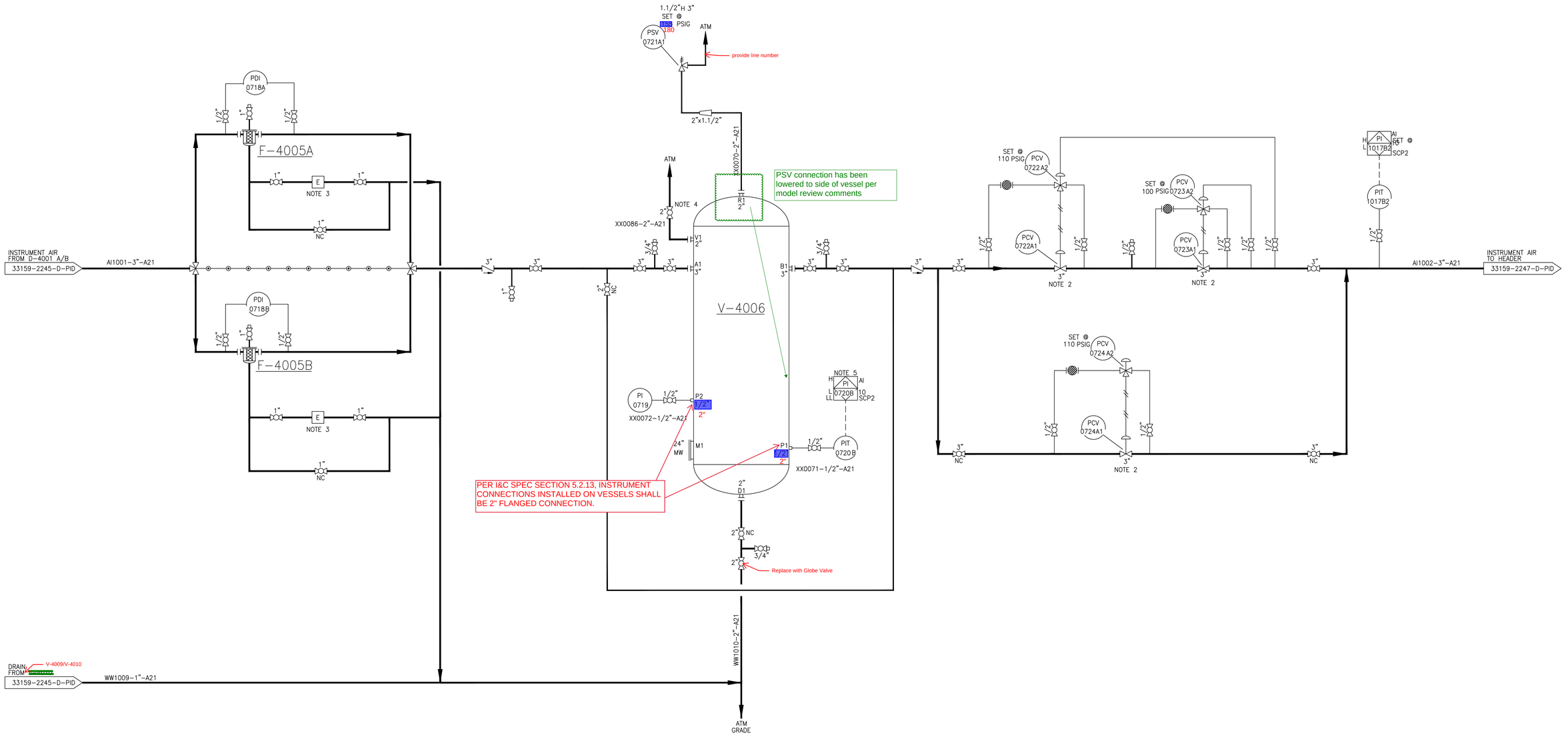
DRAWING NUMBER 33159-2245-D-PID
REV B

F−4005A
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

F−4005B
AIR FILTER
SIZE: CU. IN.
DESIGN. PRESS. PSIG

Confirm names. Previous revision used the following:
F-4005A/B: Outlet Filter

V−4006
INSTRUMENT AIR RECEIVER
SIZE: 6'-6" ID x 19'-0" T/T
DESIGN: 180 PSIG @ 140 °F
OPERATING: 125 PSIG @ 95 °F
CAPACITY: 80 BBL



NOTES:
1. EQUIPMENT DETAILS TO BE CONFIRMED BY VENDOR DURING DETAILED ENGINEERING.
2. PSV & PCV SITE & SET PRESSURE TO BE FINALIZED In DETAILED ENGINEERING.
3. ELECTRIC CONDENSATE DRAIN TO COLLECT IN A CONDENSATE POT WHICH CAN BE DRAINED AS NEEDED.
4. LOCATE ACCESSIBLE FROM GRADE. OR PROVIDE PLATFORM.
5. START / STOP COMPRESSORS (LEAD/LAG).

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	11/13/19	RT	SH	MN		E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	AO	SH	MN		E15043	ISSUED FOR REVIEW	91651.000

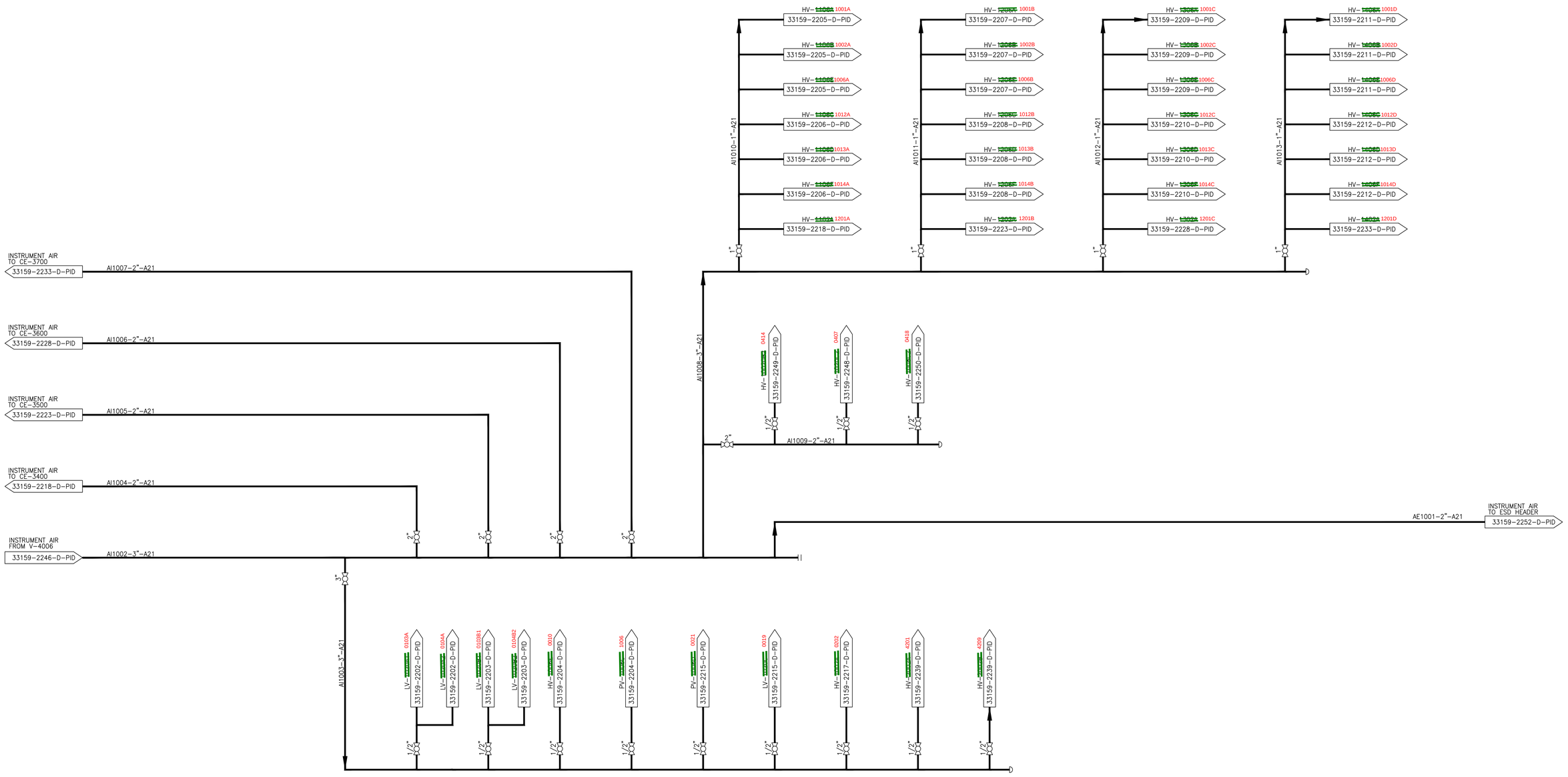
	BY	DATE
DESIGNED:	S.W.HENFER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE:

VENTURA COMPRESSOR STATION
INSTRUMENT AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159−2246−D−PID
REV B



REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	09/20/2019	AO	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HENFER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
INSTRUMENT AIR SYSTEM
PLANT 2 COMPRESSORS
PIPING & INSTRUMENT DIAGRAM

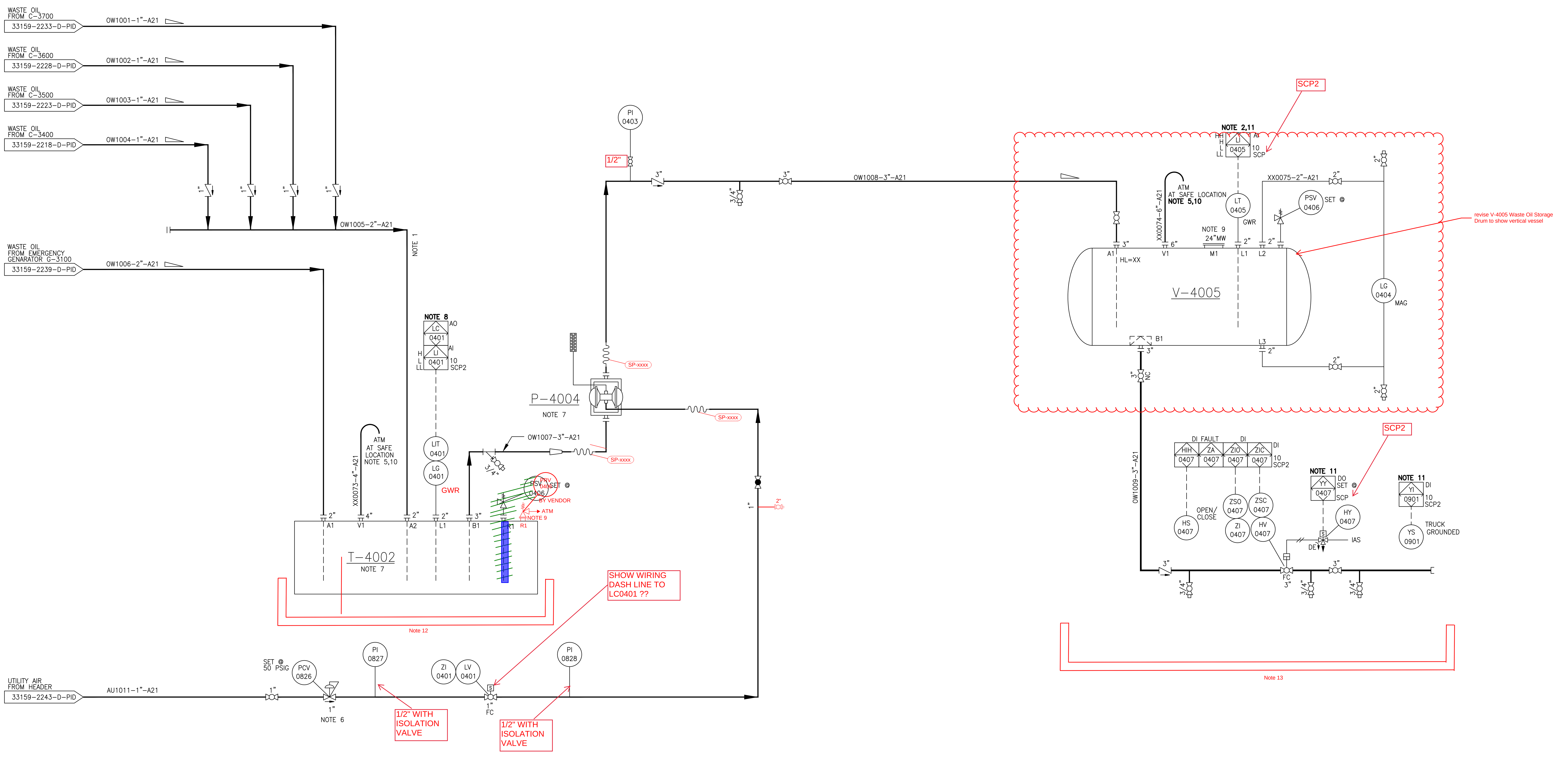
DRAWING NUMBER: 33159-2247-D-PID

REV: B

T-4002
COMPRESSOR AREA OIL WASTE TANK
SIZE: 4'-0" WIDE x 4'-0" LENGTH x 3'-0" HIGH
DESIGN: ATM PSIG @ 300 °F
OPERATING: ATM PSIG @ 160 °F
CAPACITY: 360 GALS

DESIGN: ATM PSIG @ 140 F
OPERATING: ATM PSIG @ 95 F

V-4005
WASTE OIL STORAGE DRUM
SIZE: 5'-0" ID x 15'-0" T/T
DESIGN: 10/FV PSIG @ 140 °F
OPERATING: ATM PSIG @ 95 °F
CAPACITY: 2100 GAL



NOTES:
1. OILY WATER FROM COMPRESSOR BUILDING.
2. EQUIPMENT DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
3. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-0100.
4. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER TI-3401 WILL BE IDENTIFIED AS VN-C2-I-TI-3401.
5. DISCHARGE SHALL BE MINIMUM OF 10 FT ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STRUCTURES WITHIN A 25 FT RADIUS.
6. ~~SINGLE CONTAINMENT OF VESSELS V-4003, V-4004, V-4005 AND PUMP P-4001 , P-4002.~~ Pumps P-4001, P-4002, P-4003, P-4004, P-4005, P-4005, and vessels T-4001, T-4002, T-4003, V-4003, V-4004, V-4005, and V-4012 located in containment areas.
7. EQUIPMENT IS INSULATED FOR PERSONAL PROTECTION.
8. PERMISSIVE TO OPERATE THE PUMP P-4004 VIA LV-1020C1 (LOW-LOW LEVEL ON TANK T-4002 AND HIGH-HIGH LEVEL ON V-4005). ← NOTE 8, UPDATE VALVE TAG NUMBER.
9. INCLUDE RELIEF FOR EMERGENCY VENTING FOR FIRE CASE. PROVIDED BY VENDOR.
10. PROVIDE 1" MESH BIRD SCREEN ON VENT OUTLET.
11. PERMISSIVE TO OPERATE VALVE HV-1020C2 (LOW-LOW LEVEL ON DRUM V-4005 OR NO GROUNDING ON UNLOADING TRUCK) ← NOTE 11, UPDATE VALVE TAG NUMBER.
12. Secondary containment for tanks T-4001/T-4002/T-4003
13. Secondary containment for vessels V-4003/V-4004/V-4005/V-4012

P-4004
~~COMPRESSOR AREA OILY WASTE PUMP~~ Waste Oil Tank Pump
CAPACITY 20 GPM
ΔP: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/14/19	RT	SH	MN		E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MN		E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W.HEFNER	06/28/19
DRAWN:		
CHECKED:		
PROJ APV:	M.S.NONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE:

VENTURA COMPRESSOR STATION
COMPRESSOR STATION UPGRADE PROJECT
WASTE OIL COLLECTION
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2248-D-PID
REV C

T-4001 (NOTE 5)
COMPRESSOR AREA OILY WASTE TANK
SIZE: 4'-0" WIDE x 4'-0" LENGTH x 3'-0" HIGH
DESIGN: ATM PSIG @ 140 °F
OPERATING: ATM PSIG @ 95 °F
CAPACITY: 360 GAL

V-4003 (NOTE 4,5)
OILY WASTE STORAGE DRUM
SIZE: 5'-0" x 15'-0" T/T
DESIGN: 10/FV PSIG @ 300 °F
OPERATING: ATM PSIG @ 200 °F
CAPACITY: 2100 GAL

DIA.
140
95

SPENT COOLING WATER FROM COOLANT DRAIN SUMP
33159-2251-D-PID
WC1082-2"-A21
line number does not match shown on P&ID 33159-2251-D-PID

UTILITY AIR FROM HEADER
33159-2243-D-PID
AU1010-1"-A21

33159-xxxx-D-PID
OILY WATER FROM COMPRESSOR AREA
WO1001-2"-A21

33159-xxxx-D-PID
OILY WATER FROM EMERGENCY GENERATOR AREA
WO1002-2"-A21

PI 0410
1/2"
1"
WO1004-1"-A21
3/4"
1"
Recommend 2". Pressure drop will be high with 1" line particularly for lube oil.

SET @ 50 PSIG
PCV 0829
1"
NOTE 7
PI 0830
ZI 0408
LV 0408
1" FC
PI 0831
XX0102-3/4"-A21
1"
1/2" WITH ISOLATION VALVE
1/2" WITH ISOLATION VALVE

F-4003
SP-xxxx
2"x1"
P-4003
2"x1"
SP-xxxx
SP-xxxx

LC 0408 DO
LIC 0408 AI
H L LL
SCP2
LIC
LI

LIT 0408
LG 0408
WO1003-1"-A21
XX0092-4"-A21
ATM AT SAFE LOCATION NOTE 10,11
XX0091-2"-A21
PSV 0409 1" X 2"
NOTE 9
PRV 0409 BY VENDOR
XX0167-1"-A21
ATM
NOTE 9
R1

2" A2 | 1" B1 | 4" V1 | 2" A3 | 4" A1 | 2" L1 | R1

T-4001
(NOTE 2)

P-4003 (NOTE 4)
COMPRESSOR AREA OILY WASTE TANK PUMP
CAPACITY 20 GPM

Note 13

NOTE 6,8
HH H L LL LI 0412 AI
SCP2

NOTE 10,11
ATM
XX0087-6"-A21
XX0089-2"-A21
PRV P413 BY VENDOR
NOTE 9
24"W ATM
LIT 0412 GWR
PSV 0413 1" X 2"
XX0166-1"-A21
2" 1" A1 | 2" A2 | 6" R1 | 6" M1 | 2" L1 | R2

HH=XX'-00"
H=XX'-00"
L=XX'-00"
LL=XX'-00"

V-4003

locate liquid level at top shell to allow indication of full liquid height
2" L2 | 2" XX0088-2"-A21 | 2"
MAG
LG 0411
locate liquid level at bottom shell to allow indication of full liquid height
2" L3 | 2" | 2"

B1 3"
3" NC
W01005-3"-A21

DI HI 0414 | FAULT ZA 0414 | DI ZIO 0414 | DI ZIC 0414
NOTE 8 DO YY 0414 SCP2
HY 0414
ZSO 0414 OPEN/CLOSE
ZSC 0414 10 SCP2
HS 0414
ZI 0414
HV 0414
DE IAS VENT
NOTE 8 DI Y1 0902 SCP2
YS 0902 TRUCK GROUNDED

3" | 3" FC NOTE 6 | 3" | 3/4" | 3/4" | 3/4"

Note 14

NOTES:
1. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I". EXAMPLE: INSTRUMENT TAG NO. LI-4500 WILL BE IDENTIFIED AS VN-C2-I-LI-4500.
2. OILY WATER OF COMPRESSOR STATION WILL BE COLLECTED IN THIS TANK.
3. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V-4012.
4. ~~SINGLE CONTAINMENT OF VESSELS V-4003, V-4001, V-4005 AND PUMP P-4001, P-4002 & P-4003.~~ Pumps P-4001, P-4002, P-4003, P-4004, P-4005, P-4005, and vessels T-4001, T-4002, T-4003, V-4003, V-4004, V-4005, and V-4012 located in containment areas.
5. DETAILING OF OILY WASTE SYSTEM TO BE PROVIDED BY DETAIL ENGINEERING CONTRACTOR.
6. HIGH-HIGH LEVEL IN VESSEL V-4003 SHALL STOP PUMP P-4003.
7. VENT SIZE TO BE CONFIRMED IN DETAIL ENGINEERING PHASE.
8. PERMISSIVE TO OPERATE VALVE HV-1008B2 (LOW-LOW LEVEL ON DRUM V-4003 OR NO GROUNDING ON UNLOADING TRUCK)
9. PROVIDE RELIEF FOR EMERGENCY VENTING FOR FIRE CASE. PRV PROVIDED BY VENDOR
10. DISCHARGE SHALL BE MINIMUM 10 FEET ABOVE THE HIGHEST ADJACENT PLATFORM OR WALKWAYS OR STRUCTURES WITHIN A 25 FEET RADIUS.
11. PROVIDE 1" MESH BIRD SCREEN ON VENT OUTLET.
12. LEVEL GAUGE ON TANK SHOULD BE VISIBLE TO THE TRUCK DRIVER DURING THE LOADING PROCESS.
13. Secondary containment for tanks T-4001/T-4002/T-4003
14. Secondary containment for vessels V-4003/V-4004/V-4005/V-4012

Or low level in T-4001

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO.	DESCRIPTION	WOA
C	11/01/19	AY	SH	SA	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	SA	MSN	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	SA	MSN	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S. GHOSH	06/11/16
DRAWN:	R. KRISHNA	06/11/16
CHECKED:	D. PANDIT	06/11/16
PROJ APV:	S. ASFOUR	06/11/16
SCG ENG APV:	D. MANSKA	06/11/16

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
COMPRESSOR STATION UPGRADE PROJECT
OILY WASTE COLLECTION
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2249-D-PID
REV C

F-4014 (NOTE 7,9)
LUBE OIL FILTER
SIZE: XXXX CU. IN.
DESIGN. PRESS. 92 PSIG

V-4004 (NOTE 4,7)
ENGINE OIL STORAGE DRUM
SIZE: 5'-0" x 15'-0" T/T
DESIGN: 10 50/FV PSIG @ 200 °F
OPERATING: ATM PSIG @ AMB °F
CAPACITY: 2100 GAL

SCP2

DI FAULT DI DI
HI 0418 | ZA 0418 | ZIO 0418 | ZIC 0418 | 10 SCP1

NOTE 11 DO YY 0418 10 SCP1
NOTE 11 DI YI 0903

OPEN/CLOSE
HS 0418 | ZSO 0418 | ZSC 0418 | ZI 0418 | HV 0418
HY 0418
YS 0903 TRUCK GROUND
DE | IAS

2" OL1001-2"-A21 FC 2 NOTE 3

NOTE 2,11
HH H L LL LI 0415 AI 10 SCP2
LIT 0415 GWR

ATM
AT SAFE LOCATION
NOTE 13

PSV 0409 SET @ 110 PSIG
NOTE 13 PRV 0409 BY VENDOR
24" MIN → ATM

6" 2" N1 | 2" L1 | 2" V1 | M1 | 2" A1 | 2" L2 | 2" | 2" x 3/4"

HH=48"
LL=12"
LLL=6"

V-4004

MAG NOTE 2
LG 0416

B1 3" NO | L3 2" | 2" | 3/4"

OL1004-2"-A21

NOTE 10
FO 0423
2" 10

PDI 0422 H AI 10 SCP2
PDIT 0422
1/2" | 1/2"

2" OL1003-2"-A21 2" 2"
1/2"
F-4014

3/4" 2" 1/2" PI 0421

PSV 0420 1" x 2" SET @ 110 PSIG
2"x1"

OL1005-2"-A21

LUBE OIL TO C-3700 33159-2233-D-PID OL1006-2"-A21
LUBE OIL TO C-3600 33159-2228-D-PID OL1007-2"-A21
LUBE OIL TO C-3500 33159-2223-D-PID OL1008-2"-A21
LUBE OIL TO C-3400 33159-2218-D-PID OL1009-2"-A21
LUBE OIL TO G-3100 33159-2239-D-PID OL1010-2"-A21

NOTE 2 DO YY 0419 10 SCP1
RUN DI AUTO DI FAULT DI YS 0419 | HIA 0419 | YSA 0419 10 SCP1
JOA HS 0419

PM-4001
P-4001
OL1002-3"-A21
Y-STRAINER
3/4" (Note 15)

Per SCG design criteria and agreement during development of equipment datasheets, 2" drain to be added to vessel.

revise to show vertical vessel for V-4004 Engine Oil storage Drum

Note 5

NOTES:
1. LEVEL GAUGE SHOULD BE VISIBLE TO THE TRUCK DRIVER DURING THE LOADING PROCESS.
2. PERMISSIVE TO OPERATE THE PUMP P-4001 (LOW-LOW LEVEL ON DRUM V-4004).
3. CONNECTION FOR LUBE OIL LOADING, DETAILS TO BE PROVIDED DURING DETAIL ENGINEERING PHASE.
4. ALL EQUIPMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-M-" UNLESS OTHERWISE NOTED. EXAMPLE: EQUIPMENT TAG NUMBER V-0100 WILL BE IDENTIFIED AS VN-C2-M-V0100.
5. ~~SINCE DRAINAGE OF TRUCK'S 1000-GALLON LUBE OIL TANK IS NOT~~ Pumps P-4001, P-4002, P-4003, P-4004, P-4005, P-4005, and vessels T-4001, T-4002, T-4003, V-4003, V-4004, V-4005, and V-4012 located in containment areas.
6. ALL INSTRUMENT TAG NUMBERS ARE PRECEDED BY "VN-C2-I" UNLESS OTHERWISE NOTED. EXAMPLE: INSTRUMENT TAG NUMBER PSV-4502 WILL BE IDENTIFIED AS VN-C2-I-PSV-4502.
7. DETAILS OF LUBE OIL SYSTEM TO BE PROVIDED BY DETAIL ENGINEERING CONTRACTOR.
8. HIGH-HIGH LIQUID LEVEL CLOSES XV-4401 NOTE 8, UPDATE VALVE TAG NUMBER.
9. F-4014 DETAILS TO BE CONFIRMED DURING DETAIL ENGINEERING PHASE.
10. SIZE OF FO TO BE FURNISHED DURING DETAIL ENGINEERING PHASE.
11. PERMISSIVE TO OPERATE THE LOADING VALVE (HIGH-HIGH LEVEL ON DRUM V-4004 OR NO GROUNDING ON LOADING TRUCK)
12. PROVIDE 1" MESH BIRD SCREEN ON VENT OUTLET.
13. PROVIDE RELIEF FOR EMERGENCY VENTING FOR FIRE CASE. PRV PROVIDE BY VENDOR
14. LEVEL GAUGE ON TANK SHOULD BE VISIBLE TO THE TRUCK DRIVER DURING THE LOADING PROCESS.
15. P-4001 suction line to be drained periodically for water build up.

P-4001 (NOTE 4)
ENGINE OIL CHARGE PUMP
20 GPM
10

REV	DATE	DRAWN	CHECKED	PRJ APV	SCC APV	ENG FILE NO	DESCRIPTION	WDA
C	11/15/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

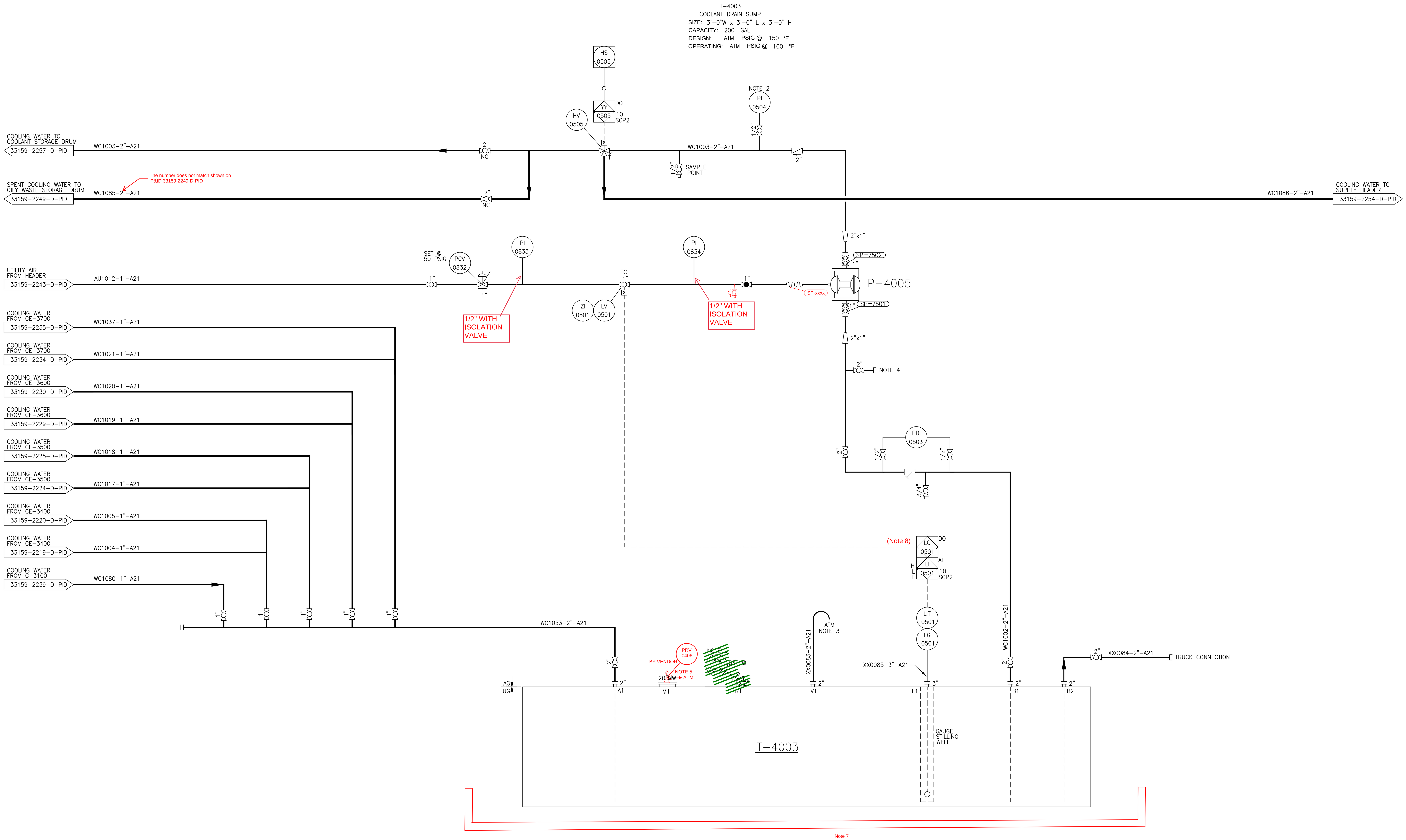
BY	DATE
DESIGNED: S.W. HEFNER	06/28/19
DRAWN: SB	06/28/19
CHECKED: F. PAPADOPOL	06/28/19
PROJ APV: M.S. MONES	06/28/19
SCC ENG APV:	
ENG FILE NO: E15043	
WDA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
LUBE OIL SYSTEM
PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER 33159-2250-D-PID
REV C



P-4005
WASTE COOLANT PUMP
CAPACITY: 10 GPM

NOTES :
1. ALL ENGINEERING INSTRUMENT TAG NUMBER PRECEDED WITH "VN-C2-I" UNLESS OTHERWISE NOTED.
2. MAKE VISIBLE FROM PUMP.
3. PROVIDE 1" MESH BIRD SCREEN ON VENT OUTLET.
4. CONNECTION FOR PORTABLE DIAPHRAGM PUMP.
5. EMERGENCY VENTING FOR FIRE CASE. PRV PROVIDED BY VENDOR.
6. ALL ENGINEERING EQUIPMENT TAG NUMBERS PRECEDED BY "VN-C2-M" UNLESS OTHERWISE NOTED.
7. Pumps P-4001, P-4002, P-4003, P-4004, P-4005, P-4005, and vessels T-4001, T-4002, T-4003, V-4003, V-4004, V-4005, and V-4012 located in containment areas.

8. Low low level in T-4003 shall stop pump P-4003.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	MA	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	06/28/19
DRAWN:	SB	06/28/19
CHECKED:	F. PAPADOPOL	06/28/19
PROJ APV:	M.S. MONES	06/28/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

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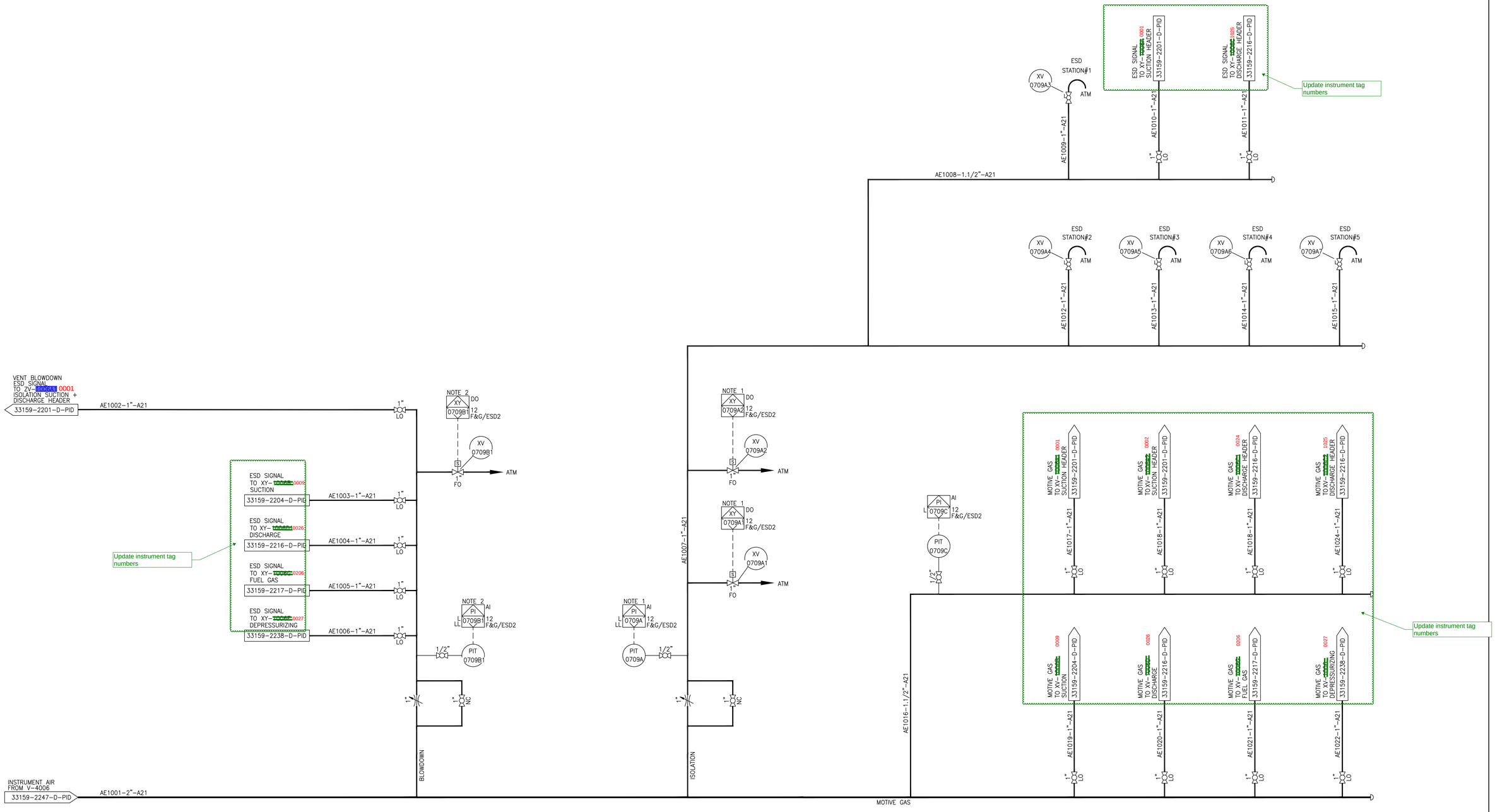
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
PLANT 2
COOLANT DRAIN SUMP
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER 33159-2251-D-PID REV C



NOTES:
1. CONFIRMED FIRE/HIGH-HIGH LEL ON COMPRESSOR BUILDING OR LOW-LOW PRESSURE ON THE ISOLATION LOOP WILL DE-ENERGIZE ESD VALVES.
2. LOW-LOW PRESSURE ON THE BLOWDOWN LOOP OR ONE MINUTE DELAY AFTER ANY ESD ISOLATION SEQUENCE INITIATED WILL DE-ENERGIZE ESD VALVES.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/15/19	AY	SWH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SWH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SEB	SWH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	05/30/19
DRAWN:	S.E. BROWN	06/14/19
CHECKED:	F. PAPADOPOL	06/17/19
PROJ APV:	M.S. NONES	06/17/19
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

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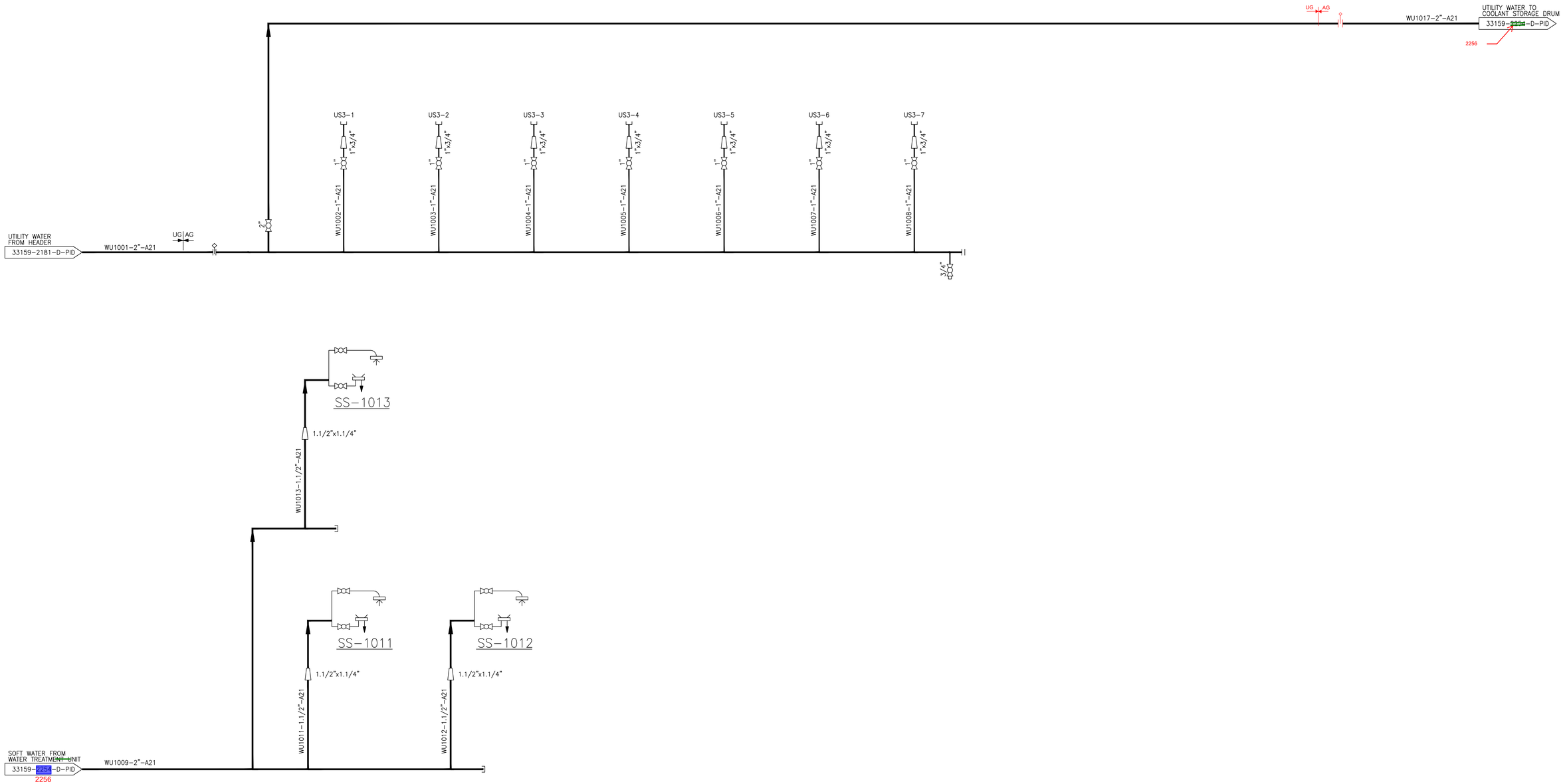
DWG CLASS: 38 | DWG DIST: 114 | SCALE: NONE

VENTURA COMPRESSOR STATION
ESD HEADER
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2252-D-PID | REV: C



NOTES:
1. AREA BENEATH SAFETY SHOWER & EYEWASH STATION INSTALLED AT GRADE LEVEL TO BE PAVED WITH CONCRETE & SLOPED TOWARDS A CATCH BASIN.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MSN	PGG	E15043	ISSUED FOR REVIEW	91651.000

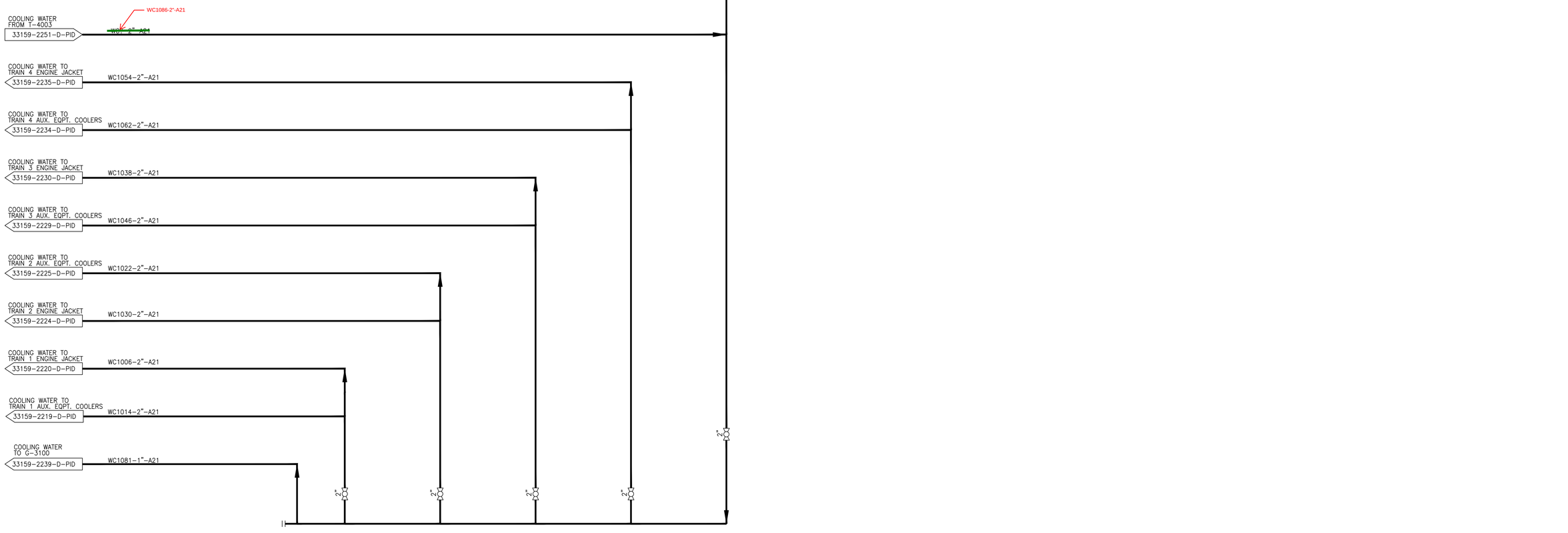
BY	DATE
DESIGNED: S.W. HEFNER	06/28/19
DRAWN: S.E. BROWN	06/28/19
CHECKED: F. PAPADOPOL	06/28/19
PROJ APV: M.S. MONES	06/28/19
SCG ENG APV:	
ENG FILE NO: E15043	
WOA: 91651	

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 | DWG DIST: 114
SCALE: NONE

VENTURA COMPRESSOR STATION
UTILITY WATER SYSTEM
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2253-D-PID
REV: C



REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	09/20/19	AY	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000
A	06/28/19	SB	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	06/28/19
DRAWN:	SB	06/28/19
CHECKED:	F. PAPADOPOL	06/28/19
PROJ APV:	M.S. MONES	06/28/19
SCG ENG APV:		

ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38 DWG DIST: 114
SCALE: NONE

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VENTURA COMPRESSOR STATION
COOLING WATER HEADER
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2254-D-PID
REV: B

V-4011
CONDENSATE DRIP DRUM
SIZE: 3'-0" ID x 9'-0" T/T
DESIGN: 150/FV PSIG @ 140 °F
OPERATING: 100 PSIG @ 95 °F
CAPACITY: 475 GAL

CONDENSATE FROM FILTER/SEPARATOR, V-4000A
33159-2202-D-PID
OX1002-2"-D61

CONDENSATE FROM FILTER/SEPARATOR, V-4000B
33159-2203-D-PID
OX1004-2"-D61

CONDENSATE FROM DISCHARGE SCRUBBER, V-4001
33159-2215-D-PID
OX1007-2"-D61

3/4" LOW POINT DRAIN

3/4" HIGH POINT VENT

3"x2"

N1

2" N2

LT 0107 GWR

NOTE 10
HH H LI 0107 AI 10 SCP1

SCP2

PSV 0031
SET @ 150 PSIG
1"E 2"
3"x2"
XX0076-3"-A22
VENT TO SAFE LOCATION

2"x1"
XX0076-2"-A22
1/2"

2" SP

4"x2"

4" N4

ATM
FLAME ARRESTOR
XX0077-4"-A22
HV 0033
4"
(NOTE 5)
4" NC
1/2"
PI 0032

N5

N6

XX0078-2"-A22
2"
3/4"

NOTE 9
LG 0108 MAG

24" MW M1

TI 0109

V-4011

HHLL = 2'-6"

2" S/A 1 N3

PER I&C SPEC SECTION 7.1.5, ALL TEMPERATURE CONNECTIONS TO VESSELS SHALL BE 2" ANSI FLANGED.

N7
2"
XX0079-2"-A61

N10

N9
XX0103-2"-A61
2" ID

N8
2"
3/4"

3" NC

GW1011-3"-A21

SCP2

NO NOTE 11 ON THIS P&ID.

DI FAULT HIH 0110 ZA 0110
DI ZIO 0110 ZIC 0110
DI 10 SCP2

NOTE 11
YY 0110 DO 10 SCP1

NOTE 11
YI 0904 DI 10 SCP2

ZSO 0110 ZSC 0110
OPEN/CLOSE
HS 0110
ZI 0110 HV 0110

HY 0110
DE IAS

YS 0904 TRUCK GROUNDED

3" 3" FC 3" 3" 3" 3"

Note 11

NOTES:
1. ALL INSTRUMENT ENGINEERING TAG NUMBERS ARE PRECEDED BY "VN-C2" UNLESS OTHERWISE NOTED. EXAMPLE INSTRUMENT DRAWING TAG NUMBER "PI-0546" WILL BE IDENTIFIED AS "VN-C2-I-PI-0546".
2. VACCUM TRUCK TO BE USED FOR SPILL CONTAINMENT CLEANUP.
3. ENSURE TRUCK CONNECTION IS WITHIN CONTAINMENT AREA.
4. LOCATE LOW POINT DRAIN IN THE TRENCH PROVIDE UTILITY AIR STATION NEARBY FOR DRAINING USING AIR DRIVEN PUMP.
5. VENT VALVE NEEDS TO BE OPEN DURING CONDENSATE DRAINING.
6. ALL EQUIPMENT ENGINEERING TAG NUMBERS ARE PRECEDED BY "VN-C2-M" UNLESS OTHERWISE NOTED.
7. ADD CONNECTION FOR PORTABLE CONTAINER. OPERATIONS TO PROVIDE BOTH HOSE AND CONTAINER.
8. PSV, CONTROL VALVE AND BLOWDOWN LINE SIZES TO BE CONFIRED DURING DETAIL ENGINEERING PAHSE.
9. LEVEL GAUGE ON TANK SHOULD BE VISIBLE TO THE TRUCK DRIVER DURING THE LOADING PROCESS.
10. HIGH-HIGH LEVEL ON TANK SHOULD CLOSE VALVES LV-1020A1/A2; LV-1020B1/2 AND LV-1020C.

NOTE 10, UPDATE VALVE TAG NUMBERS.

11. Single secondary containment for 4000A/B, V3100, V4011, V-4013.

REV	DATE	DRAWN	CHECKED	PRJ APV	SCC APV	ENG FILE NO	DESCRIPTION	WOA
C	11/01/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
B	09/20/19	AY	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000
A	01/29/18	JC	BM	CR	LB	E15043	ISSUED FOR REVIEW	91651.000

BY	DATE
DESIGNED: L.ALBINGER	01/29/18
DRAWN: J.CERDA	01/29/18
CHECKED: B.MOJICA	01/29/18
PROJ APV: C.RIESCH	01/29/18
SCC ENG APV: L.BULLOCK	01/29/18

ENG FILE NO: E15043
WOA: 91651

SoCalGas
A Sempra Energy utility

DWG CLASS: 38 DWG DIST: 103
SCALE: NONE

VENTURA COMPRESSOR STATION CONDENSATE DRIP DRUM PIPING & INSTRUMENT DIAGRAM

DRAWING NUMBER: 33159-2255-D-PID
REV: C

UTILITY WATER
FROM HEADER
33159-2253-D-PID

~~WU1017-2"-A21~~
~~WU1020-2"-A21~~
~~2254~~
2253

2"x1"
1"
2"x1"

FI
0506
AI
10
SCP2

FQI
0506

M

1" 1" 1" 1"

WATER TREATMENT UNIT
(WATER SOFTENER)

Please confirm - cooling water from V-4012 is sent to the header on PID 2254

WC1021-2"-A21
COOLING WATER
TO V-4012
33159-2257-D-PID

WU1009-2"-A21
SOFT WATER TO
SAFETY/EYEWASH STATIONS
33159-2253-D-PID

WU1022-2"-A21

WU1023-3/4"-A21
MAKE-UP WATER
TO TRAIN 1
33159-2219-D-PID

WU1024-3/4"-A21
MAKE-UP WATER
TO TRAIN 2
33159-2224-D-PID

WU1025-3/4"-A21
MAKE-UP WATER
TO TRAIN 3
33159-2229-D-PID

WU1026-3/4"-A21
MAKE-UP WATER
TO TRAIN 4
33159-2234-D-PID

WU1027-3/4"-A21
MAKE-UP WATER TO
EMERGENCY GENERATOR
33159-2239-D-PID

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
A	11/14/19	AO	SH	MSN		E15043	ISSUED FOR REVIEW	91651.000

	BY	DATE
DESIGNED:	S.W. HEFNER	11/14/19
DRAWN:	A. OLLERO	11/14/19
CHECKED:	F. PAPADOPOL	11/14/19
PROJ APV:	M.S. MONES	11/14/19
SCG ENG APV:		

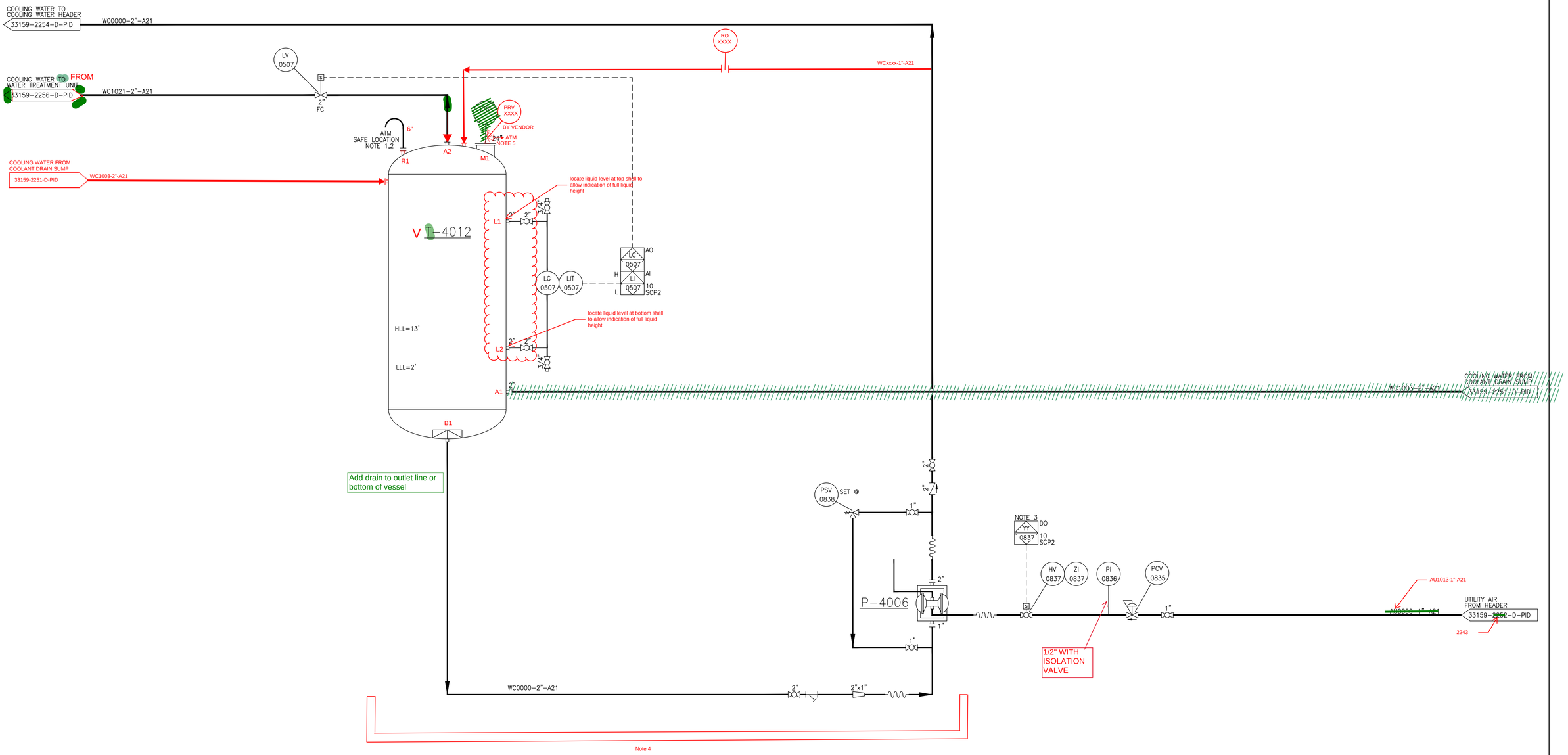
ENG FILE NO: E15043
WOA: 91651
DWG CLASS: 38
DWG DIST: 114
SCALE: NONE

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
WATER TREATMENT UNIT
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER: 33159-2256-D-PID
REV: A

V-4012
COOLANT STORAGE DRUM
SIZE: 5'-0"D X 15'-0"T/T
DESIGN: 10/FV PSIG @ 140 °F
OPERATING: ATM PSIG @ 95 °F
CAPACITY: 2200 GAL



NOTES:
1. DISCHARGE SHALL BE MINIMUM OF 10 FT ABOVE THE HIGHEST ADJACENT PLATFORMS OR WALKWAYS OR STURCTURES WITHIN 25 FT RADIUS.
2. PROVIDE 1" MESH BIRD SCREEN ON VENT OUTLET.
3. REFILL WITH FRESH COOLANT WHEN ANY OF THE LV 1610A/B/C/D OR LV-1510 A/B/C/D ARE ENERGIZED.

4. Pumps P-4001, P-4002, P-4003, P-4004, P-4005, P-4005, and vessels T-4001, T-4002, T-4003, V-4003, V-4004, V-4005, and V-4012 located in containment areas.

5. PROVIDE RELIEF FOR EMERGENCY VENTING FOR FIRE CASE. PRV PROVIDED BY VENDOR.

P-4006
COOLANT CHARGE PUMP
CAPACITY 20 GPM
△P: PSI
HP V RPM

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG. FILE NO	DESCRIPTION	WOA
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SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
COOLANT STORAGE DRUM
PIPING & INSTRUMENTATION DIAGRAM

DRAWING NUMBER 33159-2257-D-PID
REV A

E15043 - Ventura Compressor Modernization Project - Detailed Design, Construction, Comissioning and Startup Phases

Rev.B

Date: 03/03/2020

Estimated Gas Engineering Support (FTE/Month) - *Should count both Company Employees and Contractors/SMEs*

Schedule summary																																															
Year--->	2020					2021												2022												2023												2024					
Quarter--->	3		4			1			2			3			4			1			2			3			4			1			2			3			4			1			2		
Month--->	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Detailed Design																																															
Procurement Award P.O.s																																															
Procurement Deliverables																																															
Construction																																															
Commissioning & Start-up																																															
																			Reimbursable Phase -->	<-- Lump Sum Phase																											
Disciplines																																															
Gas Process Engineering	0.5	1	1	2.5	2	1.5	0.5	0.50	0.5	0.5	0.5	0.5	0.5	1	1.5	1	0.5	1.5	0.5	0.5																											
Design Drafting	1	1	4	4	4	4	4	4	3	3	3	3	3	3	4	4	4	4	4	1	1	1																									
Pipeline Engineering	0.29	0.29	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.47	0.47	0.47	0.47	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.18	0.18	0.18	0.18					
Civil/Structure/Architecture	1.04	1.04	1.04	1.69	1.69	1.04	1.04	1.04	1.04	1.04	1.22	1.22	1.22	2.82	2.82	2.82	2.07	2.07	2.07	1.69	1.69	1.22																									
Mechanical Engineering	2	2	4	4	4	4	4	4	3	3	3	3	3	3	4	4	4	3	3	5	5	5	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	3	3	3					
Electrical Engineering	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
Instrumentation & Controls	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5					
Engineering IT	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5					
MQM	1	1	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3					
Total	**12.3**	**12.8**	**19.9**	**21.0**	**20.5**	**19.4**	**18.4**	**18.4**	**16.4**	**16.4**	**16.6**	**19.6**	**19.6**	**21.7**	**24.2**	**23.7**	**22.5**	**23.5**	**19.5**	**18.2**	**17.7**	**17.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**10.2**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**9.1**	**10.2**	**10.2**	**10.2**	**10.2**					

Feasibility Study of Potential Alternatives

Ventura Compressor Station Modernization Project

MARCH 2022

Prepared by SoCalGas
with technical input from
Dudek, Burns & McDonnell, and SPEC Services

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AACE	American Association of Cost Engineers
ALUC	Airport Land Use Commission
CARB	California Air Resources Board
CDFW	California Department of Fish and Wildlife
CPUC	California Public Utilities Commission
CUP	conditional use permit
CWA	Clean Water Act
DOT	U.S. Department of Transportation
ESD	emergency shutdown
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GO	General Order
GRC	General Rate Case
HP	horsepower
kV	kilovolt
MM	million
MW	megawatt
NAS	Naval Air Station
NPDES	National Pollutant Discharge Elimination System
NWP	Nationwide Permit
OEM	original equipment manufacturer's
psi	pounds per square inch
PSPS	Public Safety Power Shutoffs
PTC	permit to construct
RP	Recommended Practice
SAA	streambed alteration agreement
SCE	Southern California Edison Company
SOAR	Save Open-Space and Agricultural Resources
SR	State Route
VCAPCD	Ventura County Air Pollution Control District
VCFD	Ventura City Fire Department

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Executive Summary

SoCalGas®[1] operates an integrated energy delivery system composed of pipelines, compressor stations, storage fields, and regulator stations, designed to provide safe and reliable service to its customers. SoCalGas relies on this as part of a network to deliver energy to residential, business, industrial, and agricultural customers throughout Southern California. Notably, the integrated energy system's reliance on the reliability and resiliency attributes of the gas system, including to meet the peak ramping demands of dispatchable electric generation when renewables are otherwise unavailable, is expected to increase even though overall gas throughput may decline. The gas system similarly provides an existing mechanism capable of transporting increasingly cleaner gaseous fuels in alignment with decarbonization goals. SoCalGas also emphasizes that activities necessary to maintain and enhance safety cannot be compromised. SoCalGas' core mission is to provide safe and reliable gas service. Safety is at the foundation of its operational activities, which are grounded in federal and state law as well as CPUC decisions. The planned project, as further described below, is necessary to support the safe operation of the gas system and provision of reliable gas service that is essential to customers.

The Ventura Compressor Station, located at 1555 North Olive Street in the City of Ventura, is one of these critical components, which has safely and reliably operated to meet local demand within Ventura and the Central Coast, as well as to supply the La Goleta Storage Field. The California Public Utilities Commission (CPUC), which has primary regulatory authority over SoCalGas' integrated natural gas system, has recognized the critical importance of storage to maintaining a reliable energy system, including providing fuel for electric generation and meeting the needs of residential customers, especially during winter months (Abdelaziz et al. 2021).

The existing compression equipment was installed in the 1980s, and a compressor station has been in use since at least 1923. Due to the decreased functionality and reliability of the existing 40-year-old equipment, coupled with changes in system operations related to decreasing local supply and the need to support storage of natural gas, SoCalGas has proposed to modernize the Ventura Compressor Station. The planned Ventura Compressor Station Modernization Project (planned project), which was first contemplated in 2013, would replace three existing natural gas compressors with four new natural gas compressors to maintain the same annual supply flowing through the compressor station, and construct a new compressor building and other associated improvements at the current compressor station site.

In August of 2021, the CPUC requested that SoCalGas prepare a feasibility study of the planned project that: (1) fully analyzes all options considered for the compressor station upgrade; (2) provides the basis for rejecting any alternatives that were considered, including but not limited to electric compressors for all or part of the planned project (3) discusses all alternative sites that were considered but rejected and provides SoCalGas' reasons for rejecting them; and (4) provides an explanation of how the planned project factors into both local and statewide safe and reliable service and the state's decarbonization goals. SoCalGas continues to collaborate with the CPUC and stakeholders on California's energy transition in a comprehensive and transparent manner.

Through extensive stakeholder engagement with the local community, including public meetings, community canvasing, stakeholder briefings, station tours for local officials,

[1] SoCalGas is a wholly owned subsidiary of Sempra Energy.

informational newsletters, and social media posts and dedicated project website updates, SoCalGas requested input and identified seventeen (17) potential alternatives as part of this feasibility study. Of these alternatives, seven (7) were dismissed from further consideration for failing to meet the purpose, need and objectives of the planned project or for failing to meet essential site criteria, which are criteria that must be met to construct and operate a compressor station. The potential alternatives are shown in Table ES-1 below.

The ten (10) remaining alternatives were evaluated based on operational considerations; environmental considerations; project cost; operational cost; and schedule duration. In order to assess each potential alternative option according to the same criteria, a scoring rubric was developed. These alternatives were assessed based on a desktop level analysis with cost estimates developed to a Class 5[2] and schedule estimates to a Level 1.[3] Given the relatively high-level assessment that was performed on the 10 alternatives, please note the potential for wide accuracy ranges with respect to cost and schedule. The schedule for each alternative was determined using industry standards and consulting with industry experts to determine durations for engineering, procurement, and construction. Without engaging in preliminary negotiations with the landowners, a common 24-month period was used for the land and/or right-of-way acquisition duration for each alternate location other than for the current site, which SoCalGas already owns. The duration for the alternative site locations could easily be extended due to lengthy negotiations if a voluntary transfer cannot be agreed upon or the property is currently under use by the owner(s). A duration extending beyond 24 months would impact the schedule and delay the progress of the engineering, procurement of long-lead-time equipment, and construction. These delays could add years to the estimated schedules.

The environmental analysis was performed by Dudek, a third-party environmental consulting firm, and their analysis is included in Appendix A. The criteria within the environmental rubric address topic areas that the CPUC examined in data requests as well as some other categories that are typically evaluated in a California Environmental Quality Act (CEQA) environmental impact report (EIR).[4] The scoring rubric for all five considerations – operational, environmental, project cost, operational cost, and schedule – is included in Appendix B.

Table ES-1. Ventura Compressor Modernization Project Potential Alternatives

Alternative	Identified By	Location
No Project	Community	Current site – Maintain existing site configuration and operational profile
Compressor Station Removal	Community	Current site – Remove compressor station and do not replace compression

[2] In accordance with AACE RP 87R-14 (AACE 2020), a Class 5 cost estimates is "generally prepared based on very limited information, and subsequently have wide accuracy ranges. Class 5 estimates are generally based on unclarified contingent resources…"

[3] In accordance with AACE RP 91R-16 (AACE 2020), a Level 1 schedule is "a high-level schedule that reflects key milestones and summary activities by major phase, stage or project being executed. …. Level 1 schedules provide high-level information that assist in the decision making process (go/no go prioritization and criticality of projects)."

[4] There is no discretionary permit required for the planned modernization project and consequently, environmental review under CEQA is not required. Environmental considerations evaluated by Dudek include topic areas such as, but not limited to, land use, air quality, traffic, and wildfire, which are topic areas in CEQA Guidelines Appendix G, Environmental Checklist Form.

Table ES-1. Ventura Compressor Modernization Project Potential Alternatives

Alternative	Identified By	Location
3/1 Hybrid	SoCalGas	Install a hybrid equipment configuration consisting of three electric compressors and one natural gas compressor at current site or other alternative sites
All Electric Compression	CPUC	Install an all-electric equipment configuration consisting of four new electric compressors at current site or other alternative sites
Goleta Storage Field	SoCalGas	Remove the existing horsepower from the compressor station and replace with new compression equipment at the La Goleta Storage Field approximately 40 miles north within the County of Santa Barbara
Petrochem	SoCalGas	Approximately 15-acre industrial site designated and zoned for industrial uses located approximately 13,500 feet northwest of the compressor station on the west side of State Route (SR) 33 within the County of Ventura
Petrochem – Hybrid	SoCalGas	
Planned Project	SoCalGas	Current site – Approximately 8-acre parcel located on land designated and zoned for industrial uses on the west side of City of Ventura
Current Site – Hybrid	SoCalGas	
Avocado Site – Natural Gas	Community	Approximately 15-acre agricultural site designated for open space uses and zoned for agriculture located approximately 3,000 feet west of the compressor station within the County of Ventura
Avocado Site – Hybrid	Community	
Ventura Steel – Natural Gas	SoCalGas	Approximately 10-acre industrial site with oil extraction infrastructure designated and zoned for industrial uses located approximately 8,000 feet north of the compressor station within the County of Ventura
Ventura Steel – Hybrid	SoCalGas	
Devil's Canyon Road – Natural Gas	Community	Approximately 12.88-acre oil extraction site located approximately 6,000 feet to the north of the compressor station on west side of SR-33 within the County of Ventura
Devil's Canyon Road – Hybrid	Community	
County Line – Natural Gas	SoCalGas	Approximately 12.33-acre vacant parcel of land designated and zoned for agriculture located within County of Ventura at the county line between Santa Barbara/Ventura counties approximately 12 miles northwest of the existing compressor station
County Line – Hybrid	SoCalGas	

The top three alternatives for each of the five categories are shown in Table ES-2: Results of Evaluation, below.

Table ES-2. Results of Evaluation

Ranking Order	Operational Considerations	Environmental Considerations	Project Cost	Operational Cost	Schedule
1	1A Planned Project	4B Devil's Canyon Road – Hybrid	1A Planned Project	1A Planned Project	1A Planned Project
2	3A Ventura Steel – Natural Gas	1B Current Site – Hybrid	1B Current Site – Hybrid	3A Ventura Steel – Natural Gas	1B Current Site – Hybrid
3	1B Current Site – Hybrid	3B Ventura Steel – Hybrid	4A Devil's Canyon Road – Natural Gas	4A Devil's Canyon Road – Natural Gas	4A Devil's Canyon Road – Natural Gas

Based on the analysis, Alternative 1.A: Planned Project received the highest rankings in the most categories. However, SoCalGas has selected Alternative 1.B: Current Site – Hybrid, which received the second highest rankings in the most categories, as the preferred alternative. The Devil's Canyon Road – Hybrid alternative received the highest score in the environmental considerations. However, it did so with less than 1 percent difference between it and the current site when equipped with hybrid compression technology. Further, it does not achieve high rankings in the other four categories.

SoCalGas determined that the Current Site – Hybrid alternative (1) provides greater reliability benefits due to project duration as compared to the alternative site locations; (2) provides greater oxides of nitrogen (NO_x) emissions reductions as compared to an all-gas option; and (3) reduces the project cost burden to our customers as compared to the alternative site locations.

1 Introduction

SoCalGas®[5] operates an integrated energy delivery system composed of pipelines, compressor stations, storage fields, and regulator stations, designed to provide safe and reliable service to its customers. SoCalGas relies on this network to deliver energy to residential, business, industrial, and agricultural customers throughout Southern California. As the nation's largest natural gas distribution utility, SoCalGas serves 21.8 million consumers through 5.9 million meters in more than 500 communities within its 24,000-square-mile service territory.

The Ventura Compressor Station, located at 1555 North Olive Street in the City of Ventura, has safely and reliably operated to meet local distribution needs within Ventura and the Central Coast, as well as to supply the La Goleta Storage Field. Figure 1 shows an overview of the site's location in SoCalGas' service area. However, the existing compression equipment was installed in the 1980s, and the compressor station has been in use since at least 1923. As discussed further herein, due to changes to the operating environment of SoCalGas' integrated natural gas transmission system, the functionality of the existing 40-year-old equipment, the ability to maintain system reliability, and the critical importance of maintaining adequate inventory in the La Goleta storage field, SoCalGas has proposed to modernize the compressor station, by replacing three existing natural gas compressors with four new natural gas compressors within a new compressor building and other associated improvements (planned project). The California Public Utilities Commission (CPUC) has recognized the role of compressor stations in maintaining the operational reliability and safety of the gas transmission system (CPUC 2019).

Figure 1. Regional Overview

The CPUC, which has primary regulatory authority over SoCalGas' integrated natural gas transmission system, requested[6] that SoCalGas prepare a feasibility study that: (1) fully

[5] SoCalGas is a wholly owned subsidiary of Sempra Energy.

[6] California Public Utility Commission letters dated August 5, 2021, and August 20, 2021 (CPUC 2021a, 2021b).

analyzes all options considered for the compressor station upgrade; (2) provides the basis for rejecting any alternatives that were considered, including but not limited to electric compressors for all or part of the planned project (3) discusses all alternative sites that were considered but rejected and provides SoCalGas' reasons for rejecting them; and (4) provides an explanation of how the planned project factors into both local and statewide safe and reliable service and the state's decarbonization goals.

This feasibility study for the Ventura Compressor Station analyzes potential project alternatives to determine if they meet the purpose and need of the planned project and most of the project objectives; determine if they meet essential site criteria; assess operational and environmental criteria; and finally, assess cost and schedule. In order to assess each potential alternative option according to the same criteria, a scoring rubric was developed for operational, environmental and schedule considerations. The rubric assigns point values from 0 to 9. Cost was evaluated based on the lowest to highest cost.

The criteria within the rubric address several topic areas that the CPUC examined in multiple data requests[7] regarding the Ventura Compressor Modernization Project as well as categories typically evaluated in a CEQA EIR or topic areas relevant to operational needs.[8] Operational considerations include topic areas such as safety and resiliency, electrification and power requirements, control systems, system maintenance and gas releases, and siting considerations. Environmental considerations include topic areas such as, but not limited to, air quality, greenhouse gas emissions, traffic, noise, aesthetics/visual resources, land use designation, and wildfire. Additional topic areas were added to expand the environmental evaluation to address cultural resources, natural resources, and CalEnviroScreen pollution burden.

Dudek was retained by SoCalGas to prepare an environmental evaluation as part of this feasibility study (see Appendix A). Dudek is a 700-person national, multidisciplinary environmental and engineering firm founded in 1980 and is ranked as one of the top 120 U.S. Environmental Firms (Engineering News-Record 2021). Additional technical support for SoCalGas' feasibility study analysis was provided by Burns and McDonnell (BMCD) and SPEC Services. BMCD is a 7,500-person family of companies consisting of engineers, construction professionals, architects, planners, technologists, and scientists to design and build infrastructure. SPEC Services is an engineering firm that includes over 200 people covering a broad range of disciplines, including process, mechanical, electrical, controls, civil/ structural, and pipeline engineering and design,

[7] CPUC Data Requests/SoCalGas Responses include:
- CPUC–Energy Division Data Request 1, RE: Ventura Compressor Station, Date Requested: May 12, 2021; Date Responded: May 14, 2021 (SoCalGas 2021a)
- CPUC–Energy Division Data Request 2, RE: Ventura Compressor Station, Date Requested: May 17, 2021; Date Responded: May 24, 2021 (SoCalGas 2021b)
- CPUC–Energy Division Data Request 3, RE: Ventura Compressor Station, Date Requested: June 1, 2021; Date Responded: June 4, 2021 (SoCalGas 2021c)
- CPUC–Energy Division Data Request 4, RE: Ventura Compressor Station, Date Requested: June 23, 2021; Date Responded: July 7, 2021 (SoCalGas 2021d)
- CPUC–Energy Division Data Request 5, RE: Ventura Compressor Station, Date Requested: July 23, 2021; Date Responded: August 6, 2021 (SoCalGas 2021e)
- CPUC–Safety and Enforcement Division Data Request 1, RE: Ventura Compressor Station, Date Requested: August 19, 2021; Date Responded: August 19, 2021 (SoCalGas 2021f)

[8] There is no discretionary permit required for the planned modernization project and consequently, environmental review under CEQA is not required. Environmental considerations evaluated by Dudek include topic areas such as but not limited to land use, air quality, traffic, and wildfire, which are topic areas in CEQA Guidelines Appendix G, Environmental Checklist Form.

procurement, construction management, project controls, survey, and land services, and permits.

As discussed more fully herein, the natural gas system and the planned project are integrally related to local and statewide safe and reliable energy service and the state's decarbonization goals.

1.1 System Overview, Safety, Reliability, and Decarbonization Goals

This section provides an overview of SoCalGas' natural gas system, system safety, Ventura Compressor Station safety and reliability and provides an explanation of how the planned project factors into both local and statewide safe and reliable service and the state's decarbonization goals, as requested by the CPUC in letters dated August 5, 2021, and August 20, 2021.

1.1.1 Gas System Overview

SoCalGas' service territory encompasses approximately 24,000 square miles throughout Central and Southern California, from Visalia to the Mexican border. Most of the natural gas used in California—more than 90 percent—is produced out of state including from basins in Texas and New Mexico. Transmission pipelines transport natural gas supplies from the California/Arizona border and other receipt points in Central and Southern California to areas throughout SoCalGas' service territories. Nine compressor stations located along the transmission pipelines, including the Ventura Compressor Station, provide the pressurization needed to move the gas through the pipelines.[9] Natural gas may be moved into four underground storage fields within the SoCalGas system.[10] Since out-of-state supplies of natural gas may not be enough to meet customers' needs, gas from the storage facilities is used to make up the difference. Storage fields play a critical role in providing gas supplies during colder months for heating and warmer months to support electricity generation. Natural gas may be withdrawn from storage fields and moved into transmission pipelines and then into smaller, lower-pressure distribution mains that transport the natural gas around the region and directly to commercial and industrial customers. The natural gas is then moved into even smaller and lower-pressure pipelines for delivery to homes and businesses throughout SoCalGas' service territory.

1.1.2 System Safety

At SoCalGas, the safety of our customers, employees, contractors, and the communities we serve has been, and will remain, our core value. Our tradition of safety spans more than 150 years and is the foundation of our business. As the nation's largest natural gas utility, we take our safety commitment very seriously. Our longstanding commitment to safety focuses on three primary areas – employee and contractor safety, customer and public safety, and the safety of

[9] As noted by the U.S. Energy Information Administration, "The U.S. interstate natural gas pipeline network relies on more than 1,200 natural gas compressor stations to maintain the continuous flow of natural gas between supply area and consumers. Compressor stations are 'pumping' facilities that advance the flow of natural gas. They are usually situated between 50 and 100 miles apart along the length of a natural gas pipeline system and are designed to operate on a nonstop basis" (USEIA 2007).

[10] The four natural gas storage fields are Aliso Canyon (northern San Fernando Valley near Porter Ranch), Honor Rancho (Santa Clarita near the State Route 126 and Interstate 5 interchange), La Goleta (Goleta south of University of California, Santa Barbara), and Playa del Rey (north of Los Angeles International Airport).

our gas system. This safety focus is embedded in all we do and is the foundation for who we are – from initial employee training, to the installation, operation and maintenance of our utility infrastructure, and to our commitment to provide safe and reliable service to our customers. We strive to continuously improve and strengthen our safety performance by setting clear measurable goals, assessing our safety performance, reviewing and questioning approaches and assumptions, integrating people and activities to promote a common approach to safety, and learning from and sharing best practices and lessons learned with our stakeholders, including our peers. This safety commitment has guided SoCalGas' past and current practice and will continue to guide our future direction. SoCalGas' overarching safety program is called the Safety Management System (SMS).

Safety Features

Natural gas energy providers, such as SoCalGas, are regulated, monitored, and inspected by a number of government agencies. Pipeline operators must comply with the Code of Federal Regulations requirements, Department of Transportation Pipeline and Hazardous Materials Safety Administration requirements (PHMSA 2018), National Code Standard requirements, and CPUC General Orders and regulations when engineering, designing, and constructing compressor stations. SoCalGas also incorporates best available technology and safety systems when retrofitting or redesigning its facilities and equipment to provide multiple layers of redundancy when it comes to system safety and reliability. Figure 2 presents a overview of the components of the SoCalGas pipeline system.

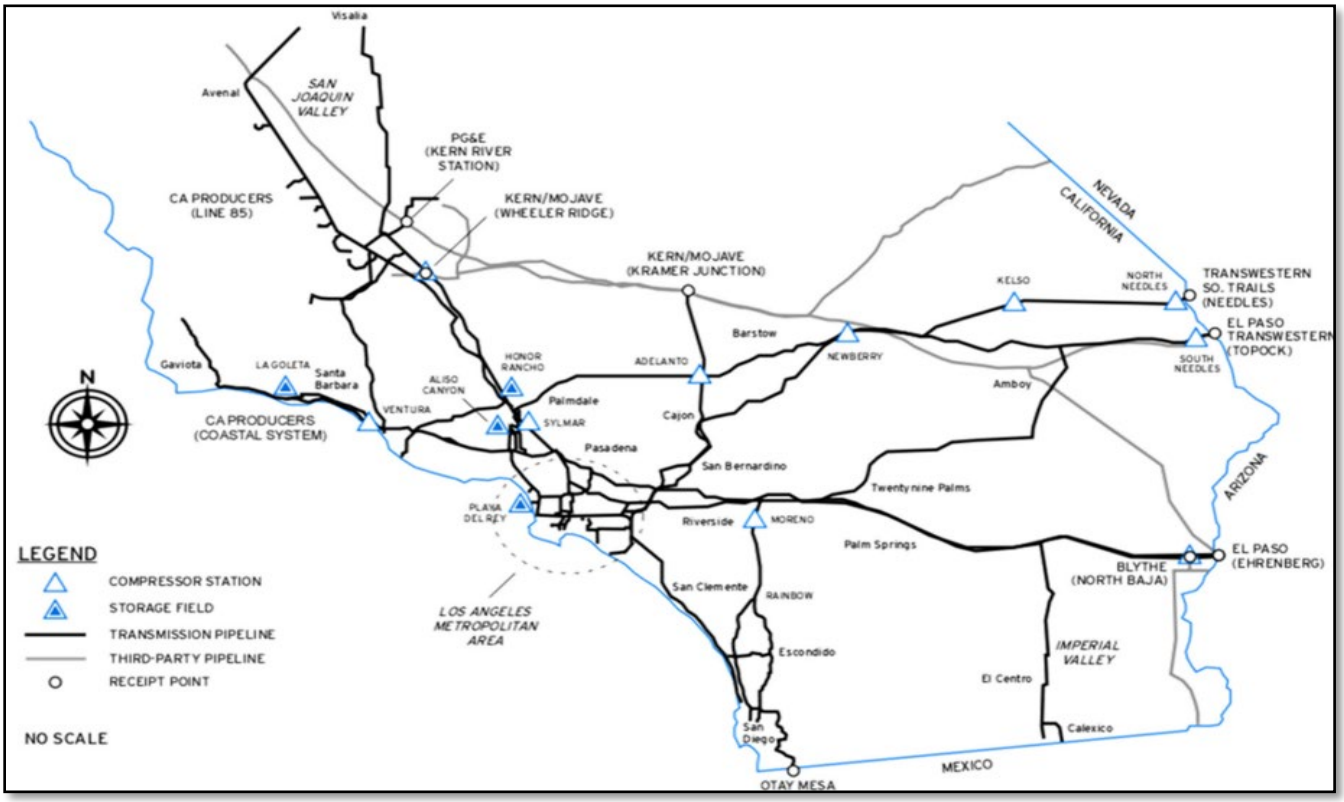


Figure 2. Gas Transmission System

The integrity of the pipeline systems that bring natural gas to homes and businesses is also under careful and routine surveillance. SoCalGas has approximately 5,000 trained employees

to respond quickly to incidents throughout the service territory. Additional safety measures include the following:

- **Leak Surveys:** SoCalGas conducts regular leak surveys by trained and qualified individuals of its pipelines and compressor stations, typically using sensitive natural gas detection equipment, and addresses leak indications found as a result of a leak survey.
- **Pipeline Patrols**: Pipeline patrols are performed by trained and qualified individuals within structured scheduled times that meet or exceed federal and state requirements to look for indications of any abnormal conditions, such as missing pipeline markers, construction activity, potential gas leaks, and other factors that can affect the safety and operation of the pipeline.
- **Corrosion Control**: In order to protect pipelines from external corrosion, SoCalGas uses pipeline coating and cathodic protection. SoCalGas also manages the quality of the natural gas in its system and manages the system's operation to prevent internal corrosion.
- **Valve Inspection**: Valves utilized for isolating pipeline segments are inspected once each year and serviced for valve casing leak detection, proper valve identification, adequate lubrication, and valve operation. There are approximately 8,500 of these valves in the transmission pipeline system.
- **Underground Vaults**: Once a year, SoCalGas performs routine maintenance and inspection on all underground vaults within its service area, which typically contain pressure-regulating or pressure-limiting equipment. Maintenance and inspection include proper operation of ventilation equipment, inspection of structural conditions, correction of water presence, and removal of trash or other foreign substances.

1.1.3 Ventura Compressor Station Safety and Reliability

SoCalGas' SMS encompasses all aspects of safety relevant to SoCalGas' business, including employee safety, contractor safety, customer safety, public safety, and system safety. It applies to all SoCalGas assets and operations as well as to all employees, from senior management to those on the frontline. Our staff at the Ventura Compressor Station work and live in the Ventura community and impart the value of safety in every task.

Safety

The Ventura Compressor Station meets all applicable federal and state requirements for safety. SoCalGas performs specific testing and inspections at the Ventura Compressor Station as required by the Code of Federal Regulations, California Air Resources Board (CARB) and CPUC General Order 112-E and other relevant local regulations (e.g., Ventura County Air Pollution Control District [VCAPCD]). The station, including its piping, safety, and fire equipment, is equipped with continuous remote/onsite monitoring equipment, and is also subject to in-person testing and inspection, as further described below. SoCalGas also is in regular communication with first responders, including the Ventura City Fire Department (VCFD), which is the primary emergency response agency for an emergency natural-gas-related incident at the Ventura Compressor Station. The VCFD also reviews and approves the facility's hazardous materials business plan and spill prevention, control, and countermeasure plan. In advance of routine maintenance activities, SoCalGas contacts the VCFD to maintain open communication. Additionally, SoCalGas' Emergency Services Department conducts annual briefings with first

responders in Ventura and across its service territory so that they are educated about how to respond to a natural gas incident.

The Ventura Compressor Station is among the many SoCalGas facilities subject to the statewide California Air Resources Board (CARB) Oil and Gas Methane Regulation, per California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10: Climate Change, Article 4, Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities, which has been in effect since January 1, 2018. This regulation includes quarterly third-party leak detection and repair (LDAR) inspections. The purpose of this regulation is to establish greenhouse gas emission standards for natural gas facilities and serve the purposes of the California Global Warming Solutions Act, Assembly Bill 32, as codified in Sections 38500–38599 of the California Health and Safety Code. The rule is intended to minimize methane leakage associated with gas storage, processing, and transmission. The rule also includes time frames for conducting timely repairs and re-inspections should a component be found to be leaking methane.

There are a multitude of regular tests and inspections that occur at the Ventura Compressor Station, which include the following:

- **Daily**: Facility rounds/remote monitoring
- **Weekly**: Hazardous materials storage area audio-visual inspections
- **Monthly**: Fire and safety equipment inspection; preventive maintenance and inspections per original equipment manufacturer's (OEM) specifications; spill prevention, control, and countermeasure inspections
- **Quarterly**: Fire and gas detector testing and inspections; emission testing; third-party leak inspections per CARB's statewide Oil and Gas Methane Regulation; preventive maintenance and inspections per OEM specifications
- **Semi-annual**: Structural support integrity inspections; preventive maintenance and inspections per OEM specifications; internal environmental compliance audits and inspections
- **Annual**: Third-party fire equipment inspections, servicing, and testing; emergency shutdown (ESD) system testing and inspections; third-party emission testing; preventive maintenance and inspections per OEM specifications; valve maintenance and inspections; relief valve and transmitter inspections and testing; internal leak inspections
- **Other as needed**: Stormwater compliance evaluations every rain event

When performing system testing, natural gas is released into onsite piping that feeds into SoCalGas' local distribution system. When a compressor or onsite pipeline is taken out of service for scheduled maintenance SoCalGas uses state of the art technology to reduce/eliminate the venting of natural gas to atmosphere. Releases are accounted for in SoCalGas' greenhouse gas annual emission report.

Reliability

The Ventura Compressor Station is situated to support the Central Coast and meet reliability needs. It is the last compressor station on SoCalGas' Coastal System and the main feed to customers in Ventura and on the Central Coast. A compressor station has been in use at the planned project site since 1923 and the current equipment has been onsite since the 1980s. Customer demand on the Coastal System has been relatively stable over the last 10 years;

however, locally produced gas supplies have decreased significantly over the same period.[11] With the loss of local supply and performance constraints due to aging equipment, the compressor station has had to run more frequently in order to meet customer demand and maintain gas storage supply in the La Goleta Storage Field. SoCalGas has made use of natural gas supply from Pacific Gas and Electric Company (PG&E) that is delivered to the distribution system at Morro Bay to supplement the local demand, thereby facilitating injection at the La Goleta Storage Field. However, these operational modifications are not sufficient to address the long-term changes, such as the loss of local production, to the system. Gas supplies transported through the Ventura Compressor Station are now the primary source of supply for the La Goleta Storage Field because local supplies no longer meet injection needs. For these reasons, SoCalGas sought CPUC authorization for compressor station modernization in the 2016 and 2019 General Rate Case (GRC).[12]

1.1.4 Decarbonization Goals

Reducing carbon intensity across all economic sectors is foundational to achieving California's net zero GHG emission goals. It requires energy efficiency, renewable electricity, renewable gases, long duration storage, carbon management, and other technologies to be viable at scale. A successful energy transition requires leadership, innovation, effective policy, and broad collaboration. SoCalGas set a goal to achieve net zero greenhouse emissions in its operations and the energy it delivers by 2045. These steps are in alignment with the State of California.

The State is working on many decarbonization efforts with the goal of achieving carbon neutrality by 2045. The Ventura Compressor Station Modernization Project, along with the others recognized by Commission Decision D.19-09-051 on SoCalGas' integrated gas transmission system, will support both local and statewide decarbonization efforts. Furthermore, SoCalGas continues to integrate electric equipment across its infrastructure to create hybrid operating systems that further reduce potential emissions.

The reliability services and capabilities provided by the gas grid are increasingly being called upon to support decarbonization goals and complement renewable resource deployment. For example, "renewable natural gas (RNG) is produced from food waste, farms, landfills, and even sewer systems. It can rapidly cut greenhouse gas emissions because it takes more climate

[11] Over time, locally produced gas supplies on SoCalGas' transmission system downstream of the Ventura Compressor Station have dropped from approximately 15,029,633 million cubic feet in 2011 to 1,534,807 million cubic feet in 2020 (SoCalGas 2021a).

[12] As noted in Commission Decision D.19-09-051 on SoCalGas' 2019 GRC application, the CPUC authorized the planned compressor modernization project and the necessary funding, recognizing the importance of maintaining operational reliability and safety of the gas transmission system, and finding that: "With respect to the requested amounts for this GRC, we note that other largescale projects are being planned specifically for the Ventura Compressor Station and the Honor Rancho Compressor Station (and the Moreno Compressor station for SDG&E [San Diego Gas & Electric®]). Because we recognize the importance of the proposed projects and the role of compressor stations in maintaining operational reliability and safety of the gas transmission system, we find that it is prudent and reasonable to authorize the proposed projects and for SoCalGas to have the necessary funding to conduct these projects (and Moreno Compressor station for SDG&E). At this point, we do not find it necessary to deviate from current GRC practice and authorize funding only for specific projects because of the large scope covered in the GRC and because of the many challenges associated with planning and executing multiple and large projects within a specified timeframe. We do however encourage SoCalGas to place a high priority on critical projects under this category as most of its compressors are over 50 years old and because of key risks that need to be mitigated in this area. Therefore, we find that the requested amounts for Compressor Stations should be authorized" (D.19-09-051 at pp. 116–117).

pollution out of the air" (Kovaleski 2019). The CPUC recently issued Decision 22-02-025 on biomethane standards to implement Senate Bill 1440 Biomethane Procurement Program which sets "biomethane (i.e., renewable natural gas and/or bio-synthetic natural gas) procurement targets to reduce short-lived climate pollutant emissions ... establish a cost-effective means of procurement and adopt provisions to achieve additional co-benefits, as well as timetables for each investor-owned utility providing gas service in California to achieve specified procurement targets" (CPUC 2022). California's Low-Carbon Fuel Standard, which requires companies that sell transportation fuels in the state to lower their products' carbon intensity, is causing increased interest in dairy renewable natural gas to address the emissions linked to climate change (Dvorak 2022). Biogas from cow manure, which is around 60% methane, is piped to a processing facility that collects gas and purifies it for injection into the pipeline (Dvorak 2022). Calgren Dairy Fuels completed a dairy renewable natural gas facility in Pixley, California, the first of its kind in the state. The biogas captured by the facility is processed and piped into the SoCalGas system. As noted by Walt Dwelle, principal owner of Calgren Renewable Fuels: "This facility alone will eventually capture methane produced from the manure of more than 75,000 cows, preventing about 130,000 tons of greenhouse gas from entering the atmosphere each year, the equivalent of taking more than 25,000 passenger cars off the road for a year" (Kovaleski 2019).

SoCalGas is integrating green hydrogen into the pipeline network to support hard to electrify industries – like dispatchable electric generation, high heat industries and heavy-duty trucks. There's a growing consensus among academics, industry leaders, community stakeholders and regulators that solar, wind and batteries alone cannot achieve California's target of carbon neutrality by 2045 – a goal SoCalGas shares for its own operations.

The California Energy Commission (CEC) observed that the gas system is integral to the electric grid because the gas system is "being used to integrate renewables" by "meet[ing] peak and net peak demand."[13] Advancement of renewable resources has changed the way electricity is generated and driven increased "inter-dependencies between gas and electric systems."[14] As noted by Katherine Blunt in the Wall Street Journal, "grid operators around the country have recently raised concerns that the intermittence of some electricity sources is making it harder for them to balance supply and demand, and could result in more shortages" (Blunt 2022). As the electric grid incorporates an increasing amount of renewable resources, it is likely less natural gas will be used for electric generation on an annualized basis. Despite this, the gas system will be called upon to fill gaps when renewable resources cannot meet demand due to intermittent supply, increased levels of end-use electrification, increases in extreme weather events, and wildfires such as the 2018 Thomas Fire that affected both Ventura and Santa Barbara Counties.

As such, deliveries of just–in-time natural gas are increasing for thermal generation, albeit overall generation is decreasing. In recent years due to changes in regulations related to cooling systems for natural gas electric generation, in-state gas fired generation has decreased by almost 13,000 megawatts (MW).[15] Despite this decline in gas generation capacity, gas throughput on SoCalGas' integrated transmission system has risen largely to support

[13] *See* CEC, "Overview of California Gas Reliability Issues," presented at the Integrated Energy Policy Report Joint Agency Workshop on Summer 2021 Reliability, Session 3: Gas Reliability Issues and Polar Vortex, held on July 9, 2021. Available at: https://www.energy.ca.gov/event/workshop/2021-07/iepr-joint-agency-workshop-summer-2021-electric-and-natural-gas-0.

[14] Ibid.

[15] See 2021 Draft IEPR, Volume II, p. 33.

dispatchable generation.[16] For example, in 2020, in significant measure most peak hour gas deliveries from SoCalGas' system were to serve dispatchable electric generators and electric system ramping needs more so than to serve peak hour core customer thermal load. For example, of the 77 hours in 2020 when deliveries to either core customers or dispatchable electric generators exceeded 100,000 Dekatherms/hour (Dths/hr) (equivalent to ~ 2.4 billion cubic feet/day (Bcf/d) of capacity), 62 hours were to serve dispatchable electric generators while 15 hours served core customers. This requires consistent and reliable compression of gas in the pipelines to be able to move high quantities of gas quickly.

1.2 Feasibility Study Methodology

SoCalGas appreciates the collaboration with the community and CPUC on the Ventura Compressor Station Project. We understand the public's concern for safety at this facility and all SoCalGas facilities. SoCalGas is committed to clear, open, transparent, and frequent communication to work collaboratively with the communities and local municipalities in which our facilities are located and with regulatory agencies with oversight of our facilities. This feasibility study represents SoCalGas' diligent and earnest assessment of the Ventura Compressor Station and the feasibility of potential alternative site locations and equipment configurations.

There is no prescriptive format or template for a feasibility study. As such, SoCalGas developed this study based on the foundational purpose, need and objectives of the project, essential site criteria and five core considerations – operational, environmental, project cost, operational cost, and schedule – described herein.

1.2.1 Purpose, Need, and Objectives of the Project

SoCalGas considered project alternatives based on safety, reliability, resiliency, environmental, and community considerations; ratepayer impacts; and cost and schedule in relationship to the planned project's objectives. The purpose of the planned Ventura Compressor Modernization Project is to:

1. Continue providing reliable compression to supply residential, business, industrial, and agricultural customers with gas in Ventura and along the Central Coast of California;
2. Enhance reliability by modernizing aging infrastructure; and
3. Support gas deliveries to the La Goleta Storage Field, a critical part of the region's energy infrastructure.

The need for the planned project is driven by changes to the operating environment of SoCalGas' integrated gas transmission system, the functionality of the existing 40-year-old equipment, the ability to maintain sufficient pressure in the existing pipelines, and the critical importance of maintaining adequate inventory in the La Goleta Storage Field.

The objectives of the planned project are to:

- Replace compression infrastructure installed in the 1980s with new equipment that complies with applicable Ventura County Air Pollution Control District (VCAPCD)

[16] SoCalGas' internal modeling analysis.

requirements and supports California's climate goals and SoCalGas' climate goals to reach net zero carbon emissions by 2045.

- Meet system operational requirements, including adequate horsepower to compress gas, and address changes in the natural gas transmission system that necessitate flexibility such that the equipment can provide sufficient compression to supply the La Goleta Storage Field and customers north of the Ventura Compressor Station as well as meeting local distribution needs in Ventura.
- Safely construct and operate the compressor station by complying with safety regulations including, but not limited to, U.S. Department of Transportation (DOT) regulations.
- Maintain compatibility with local agency land use designations and zoning by utilizing existing industrial land with adequate acreage to minimize land use conflicts and minimize disturbance to undeveloped land as practicable.
- Minimize environmental impacts, such as loss of environmentally sensitive habitat, impacts to sensitive wildlife species, and impacts to historical and Native American resources.
- Minimize significant hillside grading, dust generation, and installation of retaining walls.
- Minimize the need to relocate pipelines and other infrastructure and maintain adequate separation to reduce potential landslide risk and maintain resiliency.
- Consider availability of electric infrastructure if a hybrid natural gas and electric compressor configuration is contemplated.
- Consider proximity to and the design pressure of the existing pipeline system.
- Safeguard ratepayer funds by evaluating project costs in a prudent manner and in accordance with CPUC direction.

1.2.2 Essential Site Criteria

Essential site criteria are those criteria that must be met to construct and operate a compressor station. They include the following:

1. Property acreage is at least 8 acres but ideally 10 acres or larger, especially for sites with slopes greater than an average of 15% to account for graded cut/fill slopes. The site must also be held by private property owners or SoCalGas (not a local, state, or federal agency).

   SoCalGas operates nine (9) compressor stations on its integrated gas transmission system. The property acreage of these compressor stations vary in size from less than an acre to more than 100 acres, with a median size of 39 acres and an average size of roughly 40 acres. To safely operate a compressor station, adequate space within and around buildings and pipelines is necessary, which is dependent on the operational needs of the particular facility. The existing station is operating on 8 acres but given that the median compressor station size for SoCalGas' 9 compressor stations is 39 acres and the average compressor station size is 40 acres, at least 10 acres is needed for a new compressor station to provide for operational needs and to address slopes/grading.

2. The site is compatible with Federal Aviation Administration (FAA) requirements for land use.

   The FAA sets forth guidance for development near airports and land use compatibility. This guidance is typically implemented at the regional level by Airport Land Use Commissions (ALUC).[17] Certain types of land uses are limited or prohibited near airports for safety reasons, such as industrial-scale land uses and utility-scale solar arrays, due to glare. The compressor station location must comply with FAA requirements.

3. The site is not within a Federal Emergency Management Agency (FEMA) mapped floodway.

   FEMA regulatory floodways are defined as "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height" (FEMA 2020). Further, "[t]he community is responsible for maintaining the floodway to mitigate flood hazards; the community must not allow any activities causing a rise in the Base Flood Elevation (BFE) in the regulatory floodway" (FEMA 2019). Development within a floodway is typically restricted and as such, placing a compressor station in a regulatory floodway would be inconsistent with FEMA flood requirements.

1.2.3 Five Core Considerations

The evaluation of alternative options accounts for operational and environmental considerations that go beyond the foundational elements of the purpose, need, and objectives of the planned project and the essential site criteria. In addition, the feasibility study evaluates project cost, operational cost, and schedule. Cost is evaluated because as stated in the California Public Utilities Code Section 701.1(a)1, "a principal goal of electric and natural gas utilities' resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity." Schedule is also evaluated because as stated in the CPUC's Decision D.19-09-051 on SoCalGas' 2019 GRC application, "We do however encourage SoCalGas to place a high priority on critical projects under this category as most of its compressors are over 50 years old and because of key risks that need to be mitigated in this area" (D.19-09-051 at pp. 116-117). The consideration of schedule aligns with the CPUC's input.

Operational, environmental, and schedule subcategories were rated on a scale of 0-9, with 9 being the highest score an alternative could receive and 0 being the lowest score. The point values for each subcategory were added together to come up with a separate total score for the operational, environmental, and schedule considerations. The project cost and operational cost were ranked from lowest cost to highest cost based on total dollar value.

- **Operational Considerations**: there are five subcategories: (1) auxiliary and control systems, (2) backup power requirements, (3) emergency access, (4) geotechnical engineering constraints, and (5) proximity to distribution system.

[17] The California Public Utilities Code, Sections 21670 et seq., requires the County Board of Supervisors to establish an ALUC in each county with an airport operated for the benefit of the public. The Code also sets forth the range of responsibilities, duties, and powers of the ALUC. In Ventura County, the Board of Supervisors has designated the Ventura County Transportation Commission to act as the ALUC for the County (VCALUC 2000).

The operational considerations evaluation process included a team of six SoCalGas staff members with subject matter expertise in pipeline operations, mechanical engineering, and civil engineering. Each staff member evaluated each alternative and assigned a point score in accordance with the rubric (Appendix B).

- **Environmental Considerations**: there are three categories within which environmental topic areas are addressed:

    - *Operational Subcategories*: (1) air quality, (2) greenhouse gas emissions, (3) land use designation, (4) CalEnviroScreen pollution burden, (5) wildfire, (6) aesthetics/visual, and (7) noise.

    - *Onsite Construction Subcategories*: (1) slope/topography/grading, (2) traffic – construction, (3) air quality, (4) greenhouse gas emissions, (5) cultural resources, (6) natural resources, and (7) noise.

    - *Offsite Construction Subcategories*: (1) traffic – roadway construction, (2) utilities/service systems, (3) noise, (4) air quality, (5) greenhouse gas emissions, (6) natural resources, and (7) cultural resources.

  Environmental considerations were evaluated by Dudek – see Appendix A – and are based on topic areas that the CPUC examined in multiple data requests as well as categories typically evaluated in a CEQA EIR.[18] Dudek assigned a point score for each subcategory that was subtotaled by category (Operational, Onsite Construction, Offsite Construction) and then the total score was calculated.

- **Project Cost**: project cost estimates using American Association of Cost Engineers (AACE) accepted industry practices for two subcategories: (1) property / right-of-way acquisition and (2) engineering and procurement.

  Project costs were developed by SoCalGas, with support from BMCD and SPEC Services, and in accordance with AACE Recommended Practices (RP) 10S-90 for the various alternatives. Project costs were normalized and assigned a score.

- **Operational Cost**: operational cost estimates using AACE accepted industry practices for three subcategories: (1) fuel costs; (2) annual maintenance costs, and (3) fuel modification.

  Operational costs were developed by SoCalGas, with support from BMCD and SPEC Services, and in accordance with AACE RP 10S-90 for the various alternatives. Operational costs were normalized and assigned a score.

- **Schedule**: project duration to assess most timely process for three subcategories: (1) project permitting complexity; (2) property/ROW acquisition; and (3) construction duration.

  Schedules were developed by SoCalGas, with technical support from BMCD and SPEC Services, for each alternative. Schedule estimates were also based on accepted industry

[18] There is no discretionary permit required for the planned modernization project and as a result, environmental review under CEQA is not required.

standards using AACE RP 91R-16, "Schedule Development" (AACE 2020). Schedules were normalized and assigned a score.

1.2.4 Evaluation Process

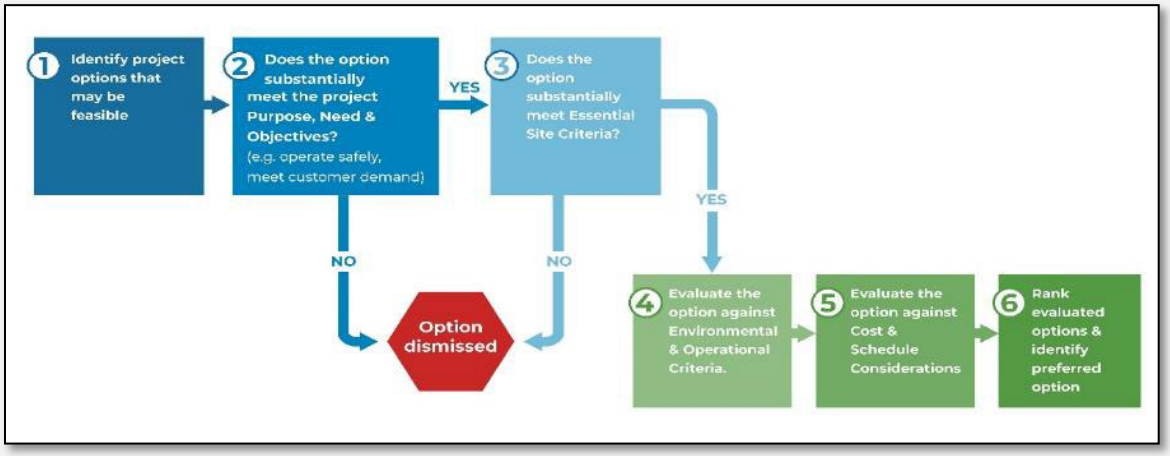
The feasibility study identifies potential alternatives to the planned project for further evaluation, shown in Table 1: Ventura Compressor Station Modernization Project Potential Alternative Options, and on Figure 1: Potential Alternative Site Locations. These potential alternatives take into consideration direction from the CPUC and conversations with the community as a part of SoCalGas' Town Halls hosted in October 2021.[19] All alternatives suggested by the community and the CPUC were considered as part of this analysis.

In addition to the alternative options suggested by the community, SoCalGas identified potential new sites by considering the essential site criteria and purpose, need, and objectives. Because urbanized areas generally do not have 10-acre parcels (or larger acreage with the potential to subdivide into a smaller 10-acre parcel), the screening process focused on more rural areas with larger parcel sizes outside city limits. These areas tended to be west-northwest of the compressor station or southeast within the agricultural areas near the cities of Oxnard and Camarillo. Steep slopes are also a consideration for the hillsides adjacent to the City of Ventura due to grading and visibility. Several mapped FEMA flood hazard areas are associated with the Arundell Barranca, the Santa Clara River and its tributaries, and coastal marine wetlands that are southeast of the compressor station and with the Ventura River to the northwest of the compressor station (FEMA 2022). Proximity to the Oxnard, Camarillo, and Naval Air Station (NAS) Point Mugu airports also constrains land use due to compliance with FAA requirements. Finally, although not identified as essential site criteria, proximity to and the design pressure of the existing pipeline system were considered at a macro level related to constructability and cost.[20] Alternatives have been evaluated according to the feasibility study process shown in Exhibit 1: Feasibility Study Evaluation Flowchart.

[19] As part of SoCalGas' effort to hear from and respond to the community's concerns, allow for feedback, and answer questions, SoCalGas convened a series of town hall meetings in October 2021 to engage with the greater Ventura area community. Four of the sessions were held in person at the Museum of Ventura County and three were held virtually on the Microsoft Teams platform. All sessions provided the presentations and questions and answers in both English and Spanish. A total of 44 individuals participated in the town hall meetings.

[20] Pipelines are designed to a certain maximum allowable operating pressure in accordance with federal and state requirements.

Exhibit 1. Feasibility Study Evaluation Flowchart



Source: SoCalGas.

Feasibility Study Evaluation Process

- Step 1: Potential alternative site locations and equipment configurations are identified.
- Step 2: The alternatives are analyzed to determine if they meet the purpose and need of the planned project and most (though not necessarily all) of the project objectives. If an alternative does not, it is dismissed from further consideration.
- Step 3: The remaining alternatives are analyzed to determine if they meet essential site criteria, such as minimum site acreage. If an alternative does not, it is dismissed from further consideration.
- Step 4: Those alternatives that meet the purpose, need, and most objectives and meet essential site criteria are assessed based on operational and environmental criteria and assigned a total technical score. The scoring rubric is provided in Appendix B: Feasibility Study Scoring Rubric.
- Step 5: The alternatives are then considered based on cost and schedule to implement and are assigned a total cost/schedule score according to the rubric.
- Step 6: At the conclusion of the analysis, the alternatives are ranked based on a total score and then the preferred option is identified.

The alternatives that have been developed are shown in Table 1.

Table 1. Ventura Compressor Modernization Project Potential Alternatives

Alternative	Identified By	Location/Configuration
Alternatives Considered and Dismissed		
No Project	Community	Current site – Maintain existing site configuration and operational profile

Table 1. Ventura Compressor Modernization Project Potential Alternatives

Alternative	Identified By	Location/Configuration
Compressor Station Removal	Community	Current site – Remove compressor station and do not replace compression
3/1 Hybrid	SoCalGas	Install a hybrid equipment configuration consisting of three electric compressors and one natural gas compressor at current site or other alternative sites
All Electric Compression	CPUC	Install an all-electric equipment configuration consisting of four new electric compressors at current site or other alternative sites
Goleta Storage Field	SoCalGas	Remove the existing horsepower from the compressor station and replace with new compression equipment at the La Goleta Storage Field approximately 40 miles north within the County of Santa Barbara
Petrochem	SoCalGas	Approximately 15-acre industrial site designated and zoned for industrial uses located approximately 13,500 feet northwest of the compressor station on the west side of State Route 33 within the County of Ventura
Petrochem – Hybrid	SoCalGas	
Alternatives Carried Forward for Analysis		
1.A: Planned Project	SoCalGas	Current site – Approximately 8-acre parcel located on land designated and zoned for industrial uses on the west side of City of Ventura
1.B: Current Site – Hybrid	SoCalGas	
2.A: Avocado Site – Natural Gas	Community	Approximately 15-acre agricultural site designated for open space uses and zoned for agriculture located approximately 3,000 feet west of the compressor station within the County of Ventura
2.B: Avocado Site – Hybrid	Community	
3.A: Ventura Steel – Natural Gas	SoCalGas	Approximately 10-acre industrial site with oil extraction infrastructure designated and zoned for industrial uses located approximately 8,000 feet north of the compressor station within the County of Ventura
3.B: Ventura Steel – Hybrid	SoCalGas	
4.A: Devil's Canyon Road – Natural Gas	Community	Approximately 12.88-acre oil extraction site designated for open space uses and zoned for agriculture located approximately 6,000 feet to the north of the compressor station on west side of SR-33 within the County of Ventura
4.B: Devil's Canyon Road – Hybrid	Community	
5.A: County Line – Natural Gas	SoCalGas	Approximately 12.33-acre vacant parcel of land designated and zoned for agriculture located within County of Ventura at the county line between Santa Barbara/Ventura counties approximately 12 miles northwest of the existing compressor station
5.B: County Line – Hybrid	SoCalGas	

*Reasons for dismissing alternatives are discussed in Section 2.

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2 Alternatives Considered and Dismissed or Outside Scope of Analysis

This section provides an overview of alternatives to the planned project that were considered by SoCalGas but dismissed from further consideration for reasons described in greater detail in the following sections.

2.1 Alternatives Dismissed for Failing to Achieve Purpose/Need/Objectives

Certain alternatives were considered and dismissed from further evaluation because they do not meet the purpose, need, and most objectives of the planned project as identified in Step 2 of the evaluation process.

2.1.1 No Project

The No Project Alternative would result in maintaining the existing compressor station as it is currently configured (existing baseline setting). The existing compression equipment, consisting of three 1,100-horsepower (HP) compressors installed in the 1980s, would continue to be housed in the existing compressor building and would operate based on similar or reduced natural gas operational system demand.[21] The office trailer would provide office and administrative facilities for station staff; warehousing/storage would remain in the temporary storage containers. Piping and other supporting onsite infrastructure for both the transmission system and the distribution system would remain the same.

Rationale for Dismissing Alternative

The No Project Alternative would not meet the stated purpose and need of the planned project. The existing three 1,100 HP compressors were installed in the 1980s. Over time, locally produced gas supplies on SoCalGas' transmission system downstream of the Ventura Compressor Station have dropped from approximately 15,029,633 million cubic feet in 2011 to 1,534,807 million cubic feet in 2020 (SoCalGas 2021a). The loss in local production causes the Ventura Compressor Station to operate more frequently and with greater variability to move gas north, placing greater strain on already aging equipment. Maintenance events and days per year where one or more compressors were out of service for maintenance as of May 19, 2021,

[21] The basis for natural gas requirements and supplies in California are mandated by the California Public Utilities Commission (CPUC) in Decision 95-01-039, which defined the requirement for SoCalGas, Pacific Gas and Electric Company, San Diego Gas & Electric®, Southwest Gas Corporation, City of Long Beach Energy Resources Department, and Southern California Edison to publish the California Gas Report. The most recent edition is the 2020 California Gas Report, which forecasts natural gas usage through 2035, accounting for energy efficiency and building electrification (reach codes). The report states that "utility-driven, statewide natural gas demand is projected to decline at an average rate of 1.0 percent each year through 2035" but "Nevertheless, gas-fired generation and energy storage will continue to be primary technologies to support long-term increases in electricity usage and integrate increasing quantities of intermittent renewable electric generation into the electric grid" (CGEU 2020). See also SoCalGas' Data Request 4 (SoCalGas 2021b).

were 73 and 461, respectively (SoCalGas 2021a).[22] In addition, replacement parts are becoming more difficult to obtain because of the age of the equipment. SoCalGas has already made changes to how it operates the main units in an effort to maximize the station's availability. Based on the natural gas forecast of the 2020 California Gas Report (CGEU 2020), natural gas use is anticipated to slowly decline with greater emphasis on renewable sources such as solar and wind, placing a greater emphasis on operational flexibility and the ability of equipment to ramp up and down quickly.

In 2012, SoCalGas retained a consultant to evaluate three compressor stations on SoCalGas' integrated transmission system, specifically Blythe, Moreno, and Ventura. Compression equipment at Ventura in 2012 consisted of three natural gas compressors at 1,100 HP each, the same equipment that is currently onsite. The results of the engineering analysis concluded that future operations will likely require a wide range of operating points, making flexibility for the station paramount. Additional horsepower is needed for daily fluctuations in loads, not to expand the system beyond existing levels of service. Without replacing the aging compressors and adding more horsepower, future operational needs would not be met and supplies at the La Goleta Storage Field would be affected. Storage fields play a critical role in providing gas supplies when supplies are not available from the out of state sources. The significant decrease in the local gas production and relatively stable demand has placed additional reliance on the La Goleta Storage Field to reliably provide service. Gas supplies transported through the Ventura Compressor Station (including supply from PG&E that is delivered at Morro Bay to supplement the local demand) are the primary source of supply for the La Goleta Storage Field, because local supplies no longer meet injection needs. The No Project Alternative would meet some of the stated objectives. The facility would continue to comply with safety and air quality regulations. The use of the property would remain consistent with the City of Ventura land use designation of "Industry" and zoning of "M-2 General Industrial," and the property size is sufficient for a compressor station (City of Ventura 2019, 2020). Potential environmental impacts would be minimized because there would be no construction or operational changes, and no grading would occur, because pipeline or other infrastructure relocation would be unnecessary. However, the No Project Alternative would not replace older compression infrastructure, causing potential impacts to reliability because the equipment would not meet changing system operational requirements.

As described above, the No Project Alternative would not provide sufficient compression to meet future operational needs, would not modernize aging infrastructure, would not maintain supplies to the La Goleta Storage Field, and would meet only some of the stated objectives. For these reasons, the No Project Alternative was dismissed.

2.1.2 Compressor Station Removal

The Compressor Station Removal Alternative would result in the decommissioning of the existing compressor station and removal of the onsite infrastructure, without relocating compression to

[22] SoCalGas interprets a "maintenance event" as an event where operations needed to perform planned or unplanned maintenance activities on a specific compressor unit or any equipment related to a specific compressor unit or an event that may result in a reduction in the station gas throughput.

a new location. Compression from the Ventura Compressor Station to move natural gas north to Santa Barbara and San Luis Obispo counties would no longer be provided.[23]

Rationale for Dismissing Alternative

The Compressor Station Removal Alternative would not meet the stated purpose and need of the planned project. SoCalGas is required to provide firm natural gas service, including to core customers (primarily residences and small businesses). As a result, SoCalGas must maintain reliable service to customers across its service territory. The Ventura Compressor Station is sited specifically to support the Central Coast, supplying natural gas to more than a quarter-million people for activities such as cooking and heating. It is the last compressor station on SoCalGas' system and is the main feed to customers in Ventura and on the Central Coast to meet reliability needs. The removal of compression would eliminate the ability to supply natural gas to customers in Ventura and along the Central Coast, would fail to modernize existing infrastructure (although the existing infrastructure would be removed), and would not enable deliveries to the La Goleta Storage Field.

The Compressor Station Removal Alternative would meet some of the stated objectives. The removal of the compressor station would be performed in accordance with all applicable safety requirements and the use of the property would remain consistent with the City of Ventura land use designation and zoning (City of Ventura 2019, 2020). However, this option would not meet the gas system's operational requirements. In addition, potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, could occur due to grading, trenching, and removal/disposal of pipeline materials and soil spoils. Additionally, future use of the property could be developed in accordance with the Ventura Municipal Code, which allows by right many industrial uses that could also cause environmental impacts (e.g., noise, lighting, glare, emissions).

As described above, the Compressor Station Removal Alternative would not provide sufficient compression to meet operational needs, would not modernize aging infrastructure, would not maintain supplies to the La Goleta Storage Field, and would meet only some of the stated objectives. For these reasons, the Compressor Station Removal Alternative was dismissed.

2.1.3 3/1 Hybrid Compression

The 3/1 Hybrid Compression option would result in the installation of three new 1,900 HP electric compressors and one 1,900 HP natural gas compressor. Electricity would be provided by the Southern California Edison (SCE) electric grid and require a new onsite substation and potentially one new circuit, with an additional circuit for redundancy. Some onsite electric generation could be provided from rooftop-mounted solar panels and electric storage could be provided by an onsite battery energy storage system (BESS). One new natural gas compressor would be installed. A new compressor building would be constructed to house the equipment. As with the

[23] M-2 General Industrial land uses allowed by Ventura Municipal Code Section 24.262.020 – Uses – Permitted include but are not limited to administrative, business, and professional services; automotive and accessories; drinking establishments; equipment rentals and sales; government services; food and fish processing; oil equipment services; recreation services; wholesaling and distribution; and major wireless telecommunication facilities. Additional land uses may be permitted under a director permit (e.g., farmer's market) or a use permit (e.g., farm employee housing, recycling services) (City of Ventura 2021).

planned project, a new office building and a new warehouse would be constructed and any structures currently onsite would be removed.

Rationale for Dismissing Alternative

The 3/1 Hybrid Compression Alternative would not meet the stated purpose and need of the planned project. As discussed in Section 2.1.2: Compressor Station Removal Alternative, SoCalGas has a mandate to provide natural gas service to customers on the Central Coast and within its entire service area. Locally, wildfire risk is an ever-present threat. The 2017/2018 Thomas Fire was started during a high wind event that caused energized SCE power lines to arc and emit molten aluminum particles on dry vegetation igniting the fire (CALFIRE/VCFPD 2019). "Unlike electric systems in Europe, distribution and transmission lines in the U.S. were typically built overhead instead of buried underground, which makes them more vulnerable to high winds and other weather" (Blunt 2022). SCE has initiated Public Safety Power Shutoffs (PSPS) events during subsequent high wind conditions. An equipment configuration with three electric compressors affected by a PSPS event or disrupted due to fire damage or destroyed power lines would leave only one compressor functional. Under most operational conditions, the customers cannot be served with only one compressor in service and this situation could jeopardize the ability for long-term storage injection. Moreover, although unlikely, if the one natural gas compressor was also out of service during a PSPS event, reliability would be further compromised and supplies to the Coastal System and customers would be affected.

Offsite and onsite design features to offset the potential risk of PSPS events were considered. Based on preliminary analysis, approximately 5 MW of electric power would be needed and may be available on SCE distribution-level service. To minimize the risk of loss of power during a PSPS event, two unique power lines of at least 12 kilovolts (kV) that interconnect to two different circuits at two different substations could be installed. The exact size and location would need to be developed in consultation with SCE. This option presents several challenges due to SCE circuit availability and need to construct additional offsite electrical infrastructure.

Onsite generation would require approximately 5 MW. Solar, battery energy storage and fuel cells were evaluated. A utility-scale solar power plant may require between 5 and 10 acres per megawatt (MW) of generating capacity (USEIA 2021). Given the baseline power needed, a minimum of 30 acres to 60 acres would be necessary, which would not be feasible on the existing or potential alternative locations. A battery energy storage system (BESS) could offer onsite generation capabilities. BESS consist of individual batteries grouped into modules that are housed in climate-controlled containers typically 20 to 40 feet in length, about 10 feet in height and 10 feet in width. Data varies for the available capacity of a container and the longevity with which a BESS system can continue to function within design parameters, but the operational lifetime of the BESS could exceed 15 years (Dubarry et al. 2021). Based on these parameters, a BESS could be incorporated for supplemental power for administrative needs (e.g., office building) and potentially to provide supplemental power to electric compressors in the event of a power failure. However, "most large-scale batteries currently use lithium-ion technology, and can discharge for about four hours at most" (Blunt 2022). The length of time that a BESS could supply power would be contingent on the size and capacity of the BESS, likely between 3 to 5 days at most. Fuel cells, which directly convert chemical energy to electricity with pure water and heat as the only byproducts (USDOEEERE 2015), also could offer redundant power supply in the event of a power failure.

Even with design features incorporated to minimize risk from loss of power of the three electric compressors, the higher potential to lose all service with one natural gas compressor would

conflict with the mandate to provide natural gas service to customers on the Central Coast and within its entire service area. As a mainline compressor station, the station's ability to continue to serve customers at a rate sufficient to avoid a widespread disruption is paramount. In the event of a PSPS or prolonged power outage, service would be dependent on the capacity of the supplemental electric sources and amount of natural gas contained in the La Goleta Storage Field at the time of the outage.

The 3/1 Hybrid Compression option would meet some of the stated objectives. Three new electric and one natural gas compressors would meet VCAPCD and safety regulations and would be capable of meeting operating requirements when not impacted by a loss of electric power. Some potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, could occur due to grading, trenching, and installation of new electric infrastructure. Consistency with the land use designation and zoning and site size would be dependent on the site selected. New or reconductored offsite electric lines would be required.

As described above, the 3/1 Hybrid Compression Alternative would not provide reliable compression in the event of a power failure, would not enhance reliability, could jeopardize supplies to the La Goleta Storage Field, and would meet only some of the stated objectives. For these reasons, the 3/1 Hybrid Compression Alternative was dismissed.

2.1.4 All-Electric Compression

The All-Electric Compression option would result in the installation of four new 1,900 HP electric compressors. Electricity would be provided by the SCE electric grid and require a new onsite substation and potentially one new circuit, with an additional circuit for redundancy. Some onsite electric generation could be provided from rooftop-mounted solar panels and electric storage could be provided by an onsite BESS that would be sufficient to support the office/administrative electric load. No natural gas compressors would remain or be installed. A new compressor building would be constructed to house the equipment. As with the planned project, a new office building and a new warehouse would be constructed and any structures currently onsite would be removed.

Rationale for Dismissing Alternative

The All-Electric Compression option would not meet the stated purpose and need of the planned project. As discussed in Section 2.1.2: Compressor Station Removal Alternative, SoCalGas has a mandate to provide natural gas service to customers on the Central Coast and within its entire service area. The reliability of the Ventura Compressor Station is critical. If SoCalGas lost electric power with an all-electric compressor option, this could impact customers due to the inability to move gas up the Central Coast to serve customer demand and to replenish the La Goleta Storage Field. With increasing frequency, PSPS on the SCE electric grid destabilize the energy delivery system and compromise reliability. Locally, wildfire risk is an ever-present threat. The Ventura community was affected by the Thomas Fire that began in December 2017, resulting in damage to more than 280,000 acres and destroying more than 1,000 buildings. Power was lost during the fire for several hours and subsequently SCE has initiated PSPS events during high wind conditions.

Additionally, the electrical load for four new electric compressors would require onsite infrastructure, such as a substation. Based on preliminary analysis, approximately 8 MW of electric power would be needed, which would require distribution-level service on two unique power lines of at least 12 kV or 16 kV each, or 8 MW of backup generation onsite. According to

the Solar Energy Industries Association, "depending on the specific technology, a utility-scale solar power plant may require between 5 and 10 acres per megawatt (MW) of generating capacity" (SEIA 2021). The existing site is only 8 acres in size and proposed new locations are roughly 15 acres in size, rendering utility-scale solar onsite infeasible. Also, as discussed above, BESS and fuel cells could provide supplemental power but the duration the power would be available is likely no longer than 5 days.

As a mainline compressor station, the station's ability to continue to serve customers at a rate sufficient to avoid a widespread disruption is paramount. In the event of a PSPS or prolonged power outage, service would be dependent on the capacity of supplemental electric sources and the amount of natural gas contained in the La Goleta Storage Field at the time of the outage.

The All-Electric Compression Alternative would meet some of the stated objectives. New electric compressors would meet safety regulations and would be capable of meeting operating requirements when not impacted by a loss of electric power. Some environmental impacts, especially related to dust generation, noise, and visual/aesthetics, could occur due to grading, trenching, and installation of new electric infrastructure. Consistency with the land use designation and zoning and site size would be dependent on the site selected. New or reconductored offsite electric lines would be required.

As described above, the All-Electric Compression Alternative would not provide reliable compression in the event of a power failure, would not enhance reliability, could jeopardize supplies to the La Goleta Storage Field, and would meet only some of the stated objectives. For these reasons, the All-Electric Compression Alternative was dismissed.

2.1.5 La Goleta Storage Field

The La Goleta Storage Field Alternative ("Goleta Alternative") would result in the installation of new compression equipment at the La Goleta Storage Field. The Ventura Compressor Station provides the necessary pressure to supply the Coastal System north of the Ventura Compressor Station and to support injection at the La Goleta Storage Field. Natural gas currently enters the La Goleta Storage Field at a pressure that enables the existing onsite equipment to boost pressure to overcome the differential between the storage field and pipeline. With the loss of compression at the Ventura Compression Station, new compression equipment would be installed to offset the loss of pipeline pressure currently provided by the Ventura Compressor Station and support injection.

Rationale for Dismissing Alternative

The Goleta Alternative would not meet the stated purpose and need of the planned project. The installation of new compression equipment at the La Goleta Storage Field would serve some of the essential functions of the Ventura Compressor Station but would not achieve the same operational benefits as the planned project. In general, it is less efficient and requires greater horsepower to compress at the end of a pipeline system rather than at the beginning. Additionally, the loss of pressure on the transmission lines serving the Coastal System north of the Ventura Compressor Station could impact the distribution pipeline systems north of the Ventura Compressor Station under winter demand conditions. Additional improvements to the Coastal System, such as rebuilding or replacing regulator stations and large customer meter sets or installing new pipelines, may be required. SoCalGas' current design for the planned project would allow the station to support customer demand north of Ventura during a high-sendout condition should gas supply from the La Goleta Storage Field be unavailable, or during

milder demand conditions to preserve the inventory at the storage field for the winter heating season. Simply replacing the Ventura Compressor Station with incremental compression at the La Goleta Storage Field for injection purposes would not achieve this function; the extent of the additional improvements that would be required are unknown, but it may include new transmission pipeline between the compressors and the transmission mainline, an assessment of the capability of the existing compressors at the La Goleta Storage Field to perform this new transmission function, and a complex control system to operate the compressors in injection or transmission mode.

The Goleta Alternative would meet some of the stated objectives. The alternative would comply with applicable safety regulations, Santa Barbara County Air Pollution Control District requirements and maintain compatibility with the County of Santa Barbara land use designation and zoning as well as the County of Santa Barbara land use designation and zoning of the La Goleta Storage Field ("UT – Public Utility" and "PU – Public Utilities," respectively) (County of Santa Barbara 2022). However, potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, could occur due to grading, trenching, and installation of new infrastructure. Environmental resource constraints, such as cultural and natural resources, that are known to be present at the La Goleta Storage Field, could be impacted by the installation of new compression equipment.

As described above, the Goleta Alternative would not provide sufficient compression to meet operational needs, would not enhance reliability, and would meet only some of the stated objectives. For these reasons, the Goleta Alternative was dismissed.

2.2 Alternatives Dismissed for Failing to Meet Essential Site Criteria

One alternative was considered and dismissed from further evaluation because it does not meet the essential site criteria as identified in Step 3 of the evaluation process. The alternative that was considered and the rationale for why it was dismissed are identified in Section 2.2.1.

2.2.1 Petrochem Site

The Petrochem Site option was developed by SoCalGas. This site is located approximately 12,000 feet north of the compressor station property to the west of State Route (SR) 33 within the jurisdiction of the County of Ventura. This site is not located on the existing transmission pipeline corridor and is privately owned; therefore, any future project would require the involvement of the landowner, either through easement acquisition, property purchase, or exercise of eminent domain. The property is approximately 15 acres on land currently developed with industrial uses, including oil extraction infrastructure, and is designated "Industrial" and zoned by the County of Ventura as "M3-10,000 sf – General Industrial, 10,000 sf minimum parcel size" (Ventura County 2020, 2021b). The slope of the property is less than 5 percent and would require onsite grading related to over-excavation and recompaction for structural foundations and grading to relocate and install pipelines. Access to the site is provided by multiple driveways off Crooked Palm Road that meet SoCalGas and emergency responder access requirements.

Transmission and distribution pipelines would need to be rerouted from the existing compressor station property to the new site location, requiring grading, trenching, and pipeline installation, and would potentially require acquisition of additional pipeline right-of-way. Given the fact that the site is developed with existing industrial uses, other utility connections for electrical, potable

water, sewer, and telecommunications are assumed to be available onsite and would require minimal upgrades. Water, sewer service, electricity, and telecommunications demand would be anticipated to be consistent with the existing compressor station.

A new office and a warehouse similar in size to the planned project structures would be constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, would be installed to help screen the perimeter wall and minimize visibility of the compressor station.

Purpose and Need

The Petrochem Site option would meet the stated purpose and need for the planned project. Four new compressors (either four gas or two gas and two electric) would replace the existing aging equipment and would meet the VCAPCD air emission and DOT safety requirements. Both transmission and distribution pipelines would need to be routed to the new location, which would be feasible predicated on detailed engineering design. The proposed 7,600 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The Petrochem Site Alternative would meet some of the stated objectives. This alternative would replace existing infrastructure with new equipment that would meet VCAPCD and safety regulations and be capable of meeting operating requirements, including during power outages. The 15-acre site is sufficient to build a new compressor station. The use of the property would be consistent with the Ventura County land use designation of "Industrial" and the zoning "M3-10,000 sf." However, potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, would occur due to grading, trenching, and installation of new infrastructure.

As described above, the Petrochem Site Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives. For these reasons, the Petrochem Site Alternative was carried forward for consideration related to essential site criteria.

Essential Site Criteria

The Petrochem Site option does not meet all the essential site criteria, as noted below and shown on Figure 3.

- The existing property is at least 10 acres in size for a new compressor station.
- The nearest airport to the property is the Oxnard Airport, which is approximately 9.85 miles to the southeast (VCALUC 2000). The use as a compressor station is compatible with the FAA land use regulations as stated in the *Airport Comprehensive Land Use Plan for Ventura County Final Report* (VCALUC 2000).[24]
- The site has several areas of mapped FEMA floodway (Zone AE) and areas without a base flood elevation identified (FEMA 2021b). The floodway occupies a significant portion of the site and as such, this site does not meet the essential site criteria.

[24] The Airport Comprehensive Land Use Plan for Ventura County Final Report addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

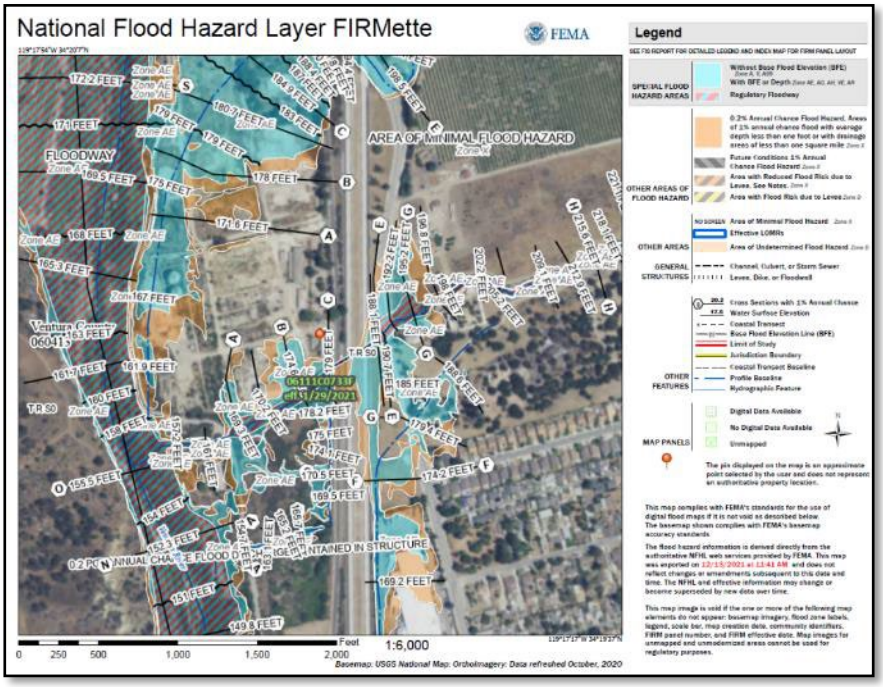

Figure 3. National Flood Hazard Layer FIRMette

Source: FEMA 2021b.

As such, the Petrochem Site option was dismissed from further consideration because of mapped FEMA floodway.

2.3 Other Alternatives Outside the Scope of the Feasibility Study

As previously noted, this feasibility study has been prepared in response to CPUC letters dated August 5, 2021, and August 20, 2021, which specifically request that SoCalGas "hold a public forum to present (1) full analysis of all options considered for the compressor station upgrade, (2) the basis for rejecting all alternatives, including but not limited to electric compressors for all or part of the project, (3) all alternative sites that were considered and SoCalGas' reasons for rejecting them, and (4) an explanation of how this project factors into both local and statewide safe and reliable service and the state's decarbonization efforts" (CPUC 2021). There are potential alternatives outside the scope of this feasibility study, such as relocating to non-industrial land uses farther away from the compressor station, that have not been evaluated given the focus of this analysis.

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3 Alternatives Carried Forward for Further Analysis

This section provides a description of each alternative option, including the planned project, that was carried forward for detailed environmental and operational analysis. For the purpose of developing the alternative options, certain general construction assumptions are provided based on regulatory requirements, industry best management practices, and SoCalGas gas standards.[25] Specific construction assumptions for individual alternatives are described in the section for that respective alternative. For simplicity, measurements for linear distance, square footage, and grading (volume) have been rounded to the nearest hundred. Additionally, on January 6, 2022, representatives from SoCalGas' Construction Department, Gas Transmission Department, and Gas Engineering Department visited each alternative site location and viewed them from publicly accessible areas or from land with SoCalGas access rights to assess site conditions.

General Construction Assumptions

- Pipeline alignments and staging areas are conceptual and do not account for geotechnical, civil, environmental, utility, or other constraints. These factors would be addressed during preliminary engineering design.
- All quantities for linear distance, square footage, and grading are rounded to the nearest hundred.
- A hybrid compressor station would include two natural gas compressors and two electric compressors, with each unit having approximately 1,900 HP.
- A hybrid compressor station would require a 5 MW increase in the electric service capacity.
- New structures would be approximately 20,300 square feet total and the same approximate size (rounded to the nearest hundred square feet) and height for each alternative, as follows:
  - Compressor building: 10,000 square feet and 52.5 feet in height.
  - Warehouse: 5,200 square feet and 27.5 feet in height.
  - Office: 4,700 square feet and 16.5 feet in height.
  - Generator enclosure (850-kilowatt generator): 400 square feet and 16.5 feet in height.
- A perimeter block wall 8 feet in height would be required for security purposes.
- The new compressor station would require approximately 10 acres of land.
- Any new compressor station would require two suction pipelines and two discharge pipelines, consistent with the existing compressor station.
- Minimum easement width for ongoing operations (e.g., repair, maintenance, vehicular access, inspection, vegetation management) is 25 feet for one pipeline and 50 feet for two adjacent pipelines.
- A 25-foot temporary workspace easement would be required in addition to the 50-foot permanent non-exclusive easement.

[25] SoCalGas' gas standards, including operations and maintenance procedures, are developed to comply with federal and state pipeline safety regulations.

- A permanent exclusive easement of 50 feet by 75 feet would be required for mainline valves.
- A 50-foot by 75-foot workspace would be required for new mainline valves.
- Transmission pipeline requires a minimum trench width of 28 inches and a minimum trench depth of 64 inches.
- Pipeline spacing must be a minimum of 60 inches of horizontal separation and 24 inches of vertical separation between natural gas pipelines and electrical, water, sewer, and telecommunications pipelines/conduit.
- One staging area is required for each alternative option that would be used for pipe storage, parking, and, temporary offices, welding activities, and other such temporary activities.
- Consistent with Ventura County Fire Protection District (VCFPD) Standard 501, "Fire Apparatus Access Standard," emergency access roads must be a minimum of 24 feet wide and not exceed a slope greater than 20 percent, with turnouts every 150 feet.
- Grading cross slopes are dependent upon soil type and generally cannot exceed a 2:1 (horizontal:vertical) ratio.
- A disturbance footprint of 3.95 acres was assumed for the primary compressor station (exclusive of other site grading and utility connections), which includes over-excavation and recompaction.
- Subsurface utility potholing would be required for any new or relocated pipeline to identify potential conflicts and to address them in the engineering design.
- All grading quantities are estimates.[26] Ultimately, over-excavation, recompaction, rough grading, and other earthwork would be designed and implemented based on licensed geotechnical and civil engineers' recommendations.
- For cross-county pipeline installations, geotechnical borings will be required to validate slope stability for pipeline design and routing.
- To the extent feasible, new pipelines and infrastructure would be placed within existing SoCalGas easements/right-of-way or public right-of-way rather than private property or public land (e.g., parks, schools).
- If an alternative location is selected that is not currently owned by SoCalGas, the company would acquire in fee property on which the compressor station would be located.
- As part of any necessary site acquisition process, any prior industrial contamination and well abandonment would be addressed by the seller, not SoCalGas.[27] Easement and/or fee acquisition would require coordination with and concurrence of the affected landowners. Eminent domain would be used as a last resort.
- Construction equipment is addressed in Appendix A and specifically the air quality analysis and reflects the different equipment for hillside sites and for level sites.
- SCE Interconnection:

[26] Grading is defined by the City of Ventura as "removal of soil or deposition of fill or combination thereof, including but not limited to, overexcavation and recompaction" (City of Ventura 2017). Grading is defined by the County of Ventura as "excavation (cut), fill, or any combination of excavation and fill" (Ventura County 2016).

[27] It is assumed that remediation activities would be handled under the oversight of the California Department of Toxic Substances Control (DTSC 2022). Oil well abandonment may also require oversight and approval by the California Geologic Energy Management Division (CalGEM 2022).

- SCE assumptions were developed using SCE's Southern California Edison Power Site Search Tool (SCE 2022).
- Any electrical alignment, pole placement, or electrical infrastructure requires SCE review and approval, which typically occurs after a Method of Service agreement has been established.
- Interconnection to the SCE system is assumed to occur by installing new poles to connect to the nearest existing circuit that runs from the site location to the Casitas Substation or to the Carpinteria Substation (County Line site only).
- For new poles, lightweight steel poles approximately 50 feet in height and spaced approximately every 100 to 150 feet would be required.
- Foundations would be approximately 2 feet in diameter and 7 feet in depth and require approximately 2 cubic yards of grading.
- Pole placement would be based on engineering design and field conditions but are assumed to be sited to avoid environmental resources to the extent feasible.
- Any new power pole inset is expected to require a temporary construction workspace of 50 feet by 50 feet (2,500 square feet) around each pole, which may result in temporary disturbance to ground cover.
- Vehicular access would be required to each pole location.

3.1 Alternative 1.A: Planned Project

The planned project was developed by SoCalGas at the existing Ventura Compressor Station site, located within the City of Ventura. The site is owned by SoCalGas and land use onsite consists of a compressor station, which has been present in some form since at least 1923 and has existed in its current configuration since the 1980s. The site is designated by the Ventura City General Plan as "Industry" and is zoned by the Ventura City municipal code as "M-2 General Industrial." Industrial uses surround the site on the north, west, and south. The EP Foster Elementary School is located across Olive Street to the east of the site.

This alternative would result in the construction of a new compressor building and installation of four new natural gas engine-driven compressors (referred to throughout as "natural gas compressors") at 1,900 HP each at the site. The existing three 1,100 HP natural gas reciprocating compressors would remain in operation until the new equipment is commissioned and in service. The existing compressors would then be decommissioned and removed and the old compressor building demolished. The existing office trailer and storage containers would be demolished/removed after a new office and a warehouse are constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, would be installed to help screen the perimeter wall and minimize visibility of the compressor station. Access to the site via a driveway at least 24 feet wide is currently available and would be maintained to meet SoCalGas and emergency responder access requirements.

3.1.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 1.A: Planned Project are presented below and in Table 2.

- Other than ingress and egress to the site, construction activities would occur onsite or on an immediately adjacent eastern staging area.
- Construction of the compressor station, including pad grading, buildings, and compressors, would take approximately 24 to 36 months.

Table 2. Alternative 1.A Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	8.42 acres
Project Site – Demolition	22,000 square feet Office Trailer: 1,500 square feet Storage Containers: 1,500 square feet Compressor Building, Piping, and Equipment: 19,000 square feet
Project Site - Grading	6,375 cubic yards
Offsite – New Pipeline	0
Offsite – Roads	0
Offsite – Staging Area	2.5 acres
SCE Circuit, Substation, and System Name	Grandad Circuit 16 kilovolts Casitas Substation Santa Clara 220/66 System
Offsite – New Electrical Poles	0 Existing electrical service sufficient for natural gas option
Estimated Number of Properties Affected*	3

Note:
* Properties affected include the site, access, infrastructure, and staging areas.

3.1.2 Purpose, Need, and Objectives

The Alternative 1.A, the planned project, would meet the stated purpose and need for the planned project. The planned project would replace the existing aging equipment with four new natural gas compressors. The new equipment would meet the VCAPCD air emission requirements and safety requirements. The natural gas compressors would continue to operate even if there was a loss of power and would be available to move gas up the Central Coast and into the La Goleta Storage Field. As the overall energy delivery system in California continues to change due to the dispatching of renewable resources and electrification of buildings and vehicles, the ability of equipment to operate under variable conditions is critical. Solar and wind energy are intermittent and storage technology is not yet sufficient to store utility-scale power, which makes the resilience of the natural gas system for direct customer use and to support electric power generation imperative. The proposed combined 7,600 HP would maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The planned project would meet all stated objectives. New natural gas compressors would replace existing infrastructure with new equipment that would meet VCAPCD and safety regulations and would be capable of meeting operating requirements, including during power outages. The use of the property would remain consistent with the City of Ventura land use designation and zoning. The property is sufficient in size for the equipment configuration. Potential environmental impacts from construction would be minimized because all work would occur on the existing property.

As described above, the planned project would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet all stated objectives. For these reasons, the planned project was carried forward for consideration related to essential site criteria.

3.1.3 Essential Site Criteria

The planned Ventura Compressor Station Project site would meet all the essential site criteria.

- The existing property is 8 acres in size.
- The nearest airport to the property is the Oxnard Airport, which is approximately 9 miles to the southeast. This airport is served by Runway 7-25, which is 5,950 feet long by 100 feet wide, is aligned east–west, and has a threshold of 1,372 feet for obstacle clearance safety (VCALUC 2000). The site's use as a compressor station is compatible with the FAA land use regulations as stated in the *Airport Comprehensive Land Use Plan for Ventura County Final Report* (VCALUC 2000).[28]
- The site is designated by FEMA as "Area with Reduced Flood Risk Due to Levee Zone X" and is not within a floodway (FEMA 2021a).

Therefore, the planned project was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4, Environmental and Operational Considerations.

3.2 Alternative 1.B: Current Site – Hybrid

The Ventura Compressor Station – Hybrid Alternative was proposed by the CPUC and would result in two new natural gas compressors at 1,900 HP each and two new electric compressors at 1,900 HP each at the existing Ventura Compressor Station property. The existing three 1,100 HP natural gas compressors would remain in operation until the new equipment is commissioned and in service. The existing compressors would then be decommissioned and removed and the old compressor building demolished. The new compressors would be installed in a new compressor building. The existing temporary office trailer and storage containers would be demolished/removed. A new office and a warehouse would be constructed onsite, similar to the planned project. New electric lines would be required to meet onsite electric demand from the new electric compressors. Based on preliminary analysis, approximately 5 MW of electric power are needed, which would require distribution-level service on one unique power line of at least 16 kV and potentially an onsite substation. It is assumed that this conduit could be placed on existing SCE poles that interconnect with the existing station.

[28] The Airport Comprehensive Land Use Plan for Ventura County Final Report addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

3.2.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 1.B: Current Site – Hybrid are presented below and in Table 3.

- Construction of the compressor station, including pad grading, buildings, and compressors, and electrical interconnection would take approximately 30 to 36 months.

Table 3. Alternative 1.B Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	8.42 acres
Project Site – Demolition	22,000 square feet Office Trailer 1,500 square feet Storage Containers 1,500 square feet Compressor Building, Piping and Equipment: 19,000 square feet
Project Site - Grading	6,375 cubic yards
Offsite – New Pipeline	0
Offsite – Roads	0
Offsite – Staging Area	2.5 acres
Offsite – Pipeline Ground Disturbance	0
SCE Circuit, Substation, and System Name	San Nicholas Circuit 16 kilovolts Casitas Substation Santa Clara 220/66 System (SCE 2021a)
Offsite – New Electrical Poles	None required - existing electrical connection onsite assumed to be adequate to connect with San Nicholas Circuit
Estimated Number of Properties Affected*	3

Note:
* Properties affected include the site, access, infrastructure. and staging areas.

3.2.2 Purpose, Need, and Objectives

The Ventura Compressor Station – Hybrid Alternative would meet the stated purpose and need for the planned project. A hybrid compressor configuration would replace the existing aging equipment with two new natural gas compressors and two new electric compressors. The new gas compressors would meet the VCAPCD's air emission requirements and the electric driven compressors would be non-emitting equipment and therefore would not be subject to VCAPCD's requirements. By providing two natural gas and two electric compressors, the compressor station would have the redundancy needed in the event of a loss of electric power. The natural gas compressors would continue to operate even if the electric compressors were offline and would be available to move gas up the Central Coast and into the La Goleta Storage Field. As the overall energy delivery system in California continues to change due to the dispatching of renewable resources and electrification of buildings and vehicles, the ability of equipment to operate under variable conditions is critical. Solar and wind energy are intermittent and storage technology is not yet sufficient to store utility-scale power, which makes the resilience of the natural gas system for direct customer use and to support electric power generation imperative.

A hybrid compressor station with the proposed combined 7,600 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The Ventura Compressor Station – Hybrid Alternative would meet most of the stated objectives. New natural gas and electric compressors would replace existing infrastructure with new equipment that would meet VCAPCD and safety requirements and be capable of meeting operating requirements, including during power outages due to the redundancy with natural gas compressors. The use of the property would remain consistent with the City of Ventura land use designation and zoning. The property is sufficient in size for a hybrid equipment configuration. Potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, could occur due to installation of new electric infrastructure.

As described above, the Ventura Compressor Station – Hybrid Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet most of the stated objectives. For these reasons, the Ventura Compressor Station – Hybrid Alternative was carried forward for consideration related to essential site criteria.

3.2.3 Essential Site Criteria

As discussed in Section 3.1.3, the Ventura Compressor Station site would meet all the essential site criteria. As such, the Ventura Compressor Station – Hybrid Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.3 Alternative 2.A. Avocado Site – Natural Gas

The Avocado Site – Natural Gas Alternative was suggested by members of the public at SoCalGas' town hall in October 2021. This site is located approximately 3,000 feet west of the compressor station property on the existing transmission pipeline corridor within the jurisdiction of the County of Ventura. The site is privately owned; therefore, any future project would require the involvement of the landowner, either through a voluntary transfer of needed land rights or through the exercise of eminent domain.[29]

The property is approximately 15 acres and is designated "Open Space" and zoned by the County of Ventura as "AE-40 ac – Agricultural Exclusive, 40 acres minimum parcel size" (Ventura County 2020, 2021b). The Ventura County general plan "Open Space" land use designation encompasses land or water that is essentially unimproved and devoted to an open-space use, including land for preservation of natural resources, managed production of resources, outdoor recreation, public health and safety, and to promote efficient municipal services and avoid urban sprawl (Ventura County 2020). The Ventura County zoning ordinance AE-40 zone "is to preserve and protect commercial agricultural lands as a limited and irreplaceable resource, to preserve and maintain agriculture as a major industry in Ventura County and to protect these areas from the encroachment of nonrelated uses which, by their nature, would have detrimental effects

[29] As a public utility, SoCalGas has the ability to condemn land through the eminent domain process. Eminent domain is the process by which a government agency or utility can take property for public benefit as long as the property owner is adequately compensated. The eminent domain process is usually exercised only as a last resort.

upon the agriculture industry" (Ventura County 2021a). Additionally, the property is within an area governed by the Save Open-Space and Agricultural Resources (SOAR) initiative.[30]

The surrounding area is primarily developed with agricultural uses and low-density residential development (the nearest residence is approximately 0.7 miles away) and the specific site is used for agricultural purposes, including a portion of which is an avocado orchard. The slope of the property ranges from 0 percent to 70 percent and would require grading and potentially the installation of retaining walls or soil nails to create a level pad for compressor equipment and operational needs. To meet acceptable engineering design standards, a 2:1 slope is typically required, which requires a larger footprint than the actual building pad ("catch points"); given the slope of the site, significant grading to create a level site would be required.

Access to the site via a driveway at least 24 feet wide would be needed to meet SoCalGas and emergency responder access requirements. The access road would require grading and potentially retaining walls to achieve an acceptable grade suitable for fire truck access.

Distribution pipelines would need to be rerouted from the existing compressor station property to the new site location, requiring grading, trenching, pipeline installation, and potentially acquisition of additional pipeline right-of-way. Additionally, other utility connections for electricity, potable water, sewer, and telecommunications would be required. These may be able to be collocated in a utility trench if minimum separation between the utilities can be maintained. It may be feasible to locate the utility trench within the new access road. Otherwise, multiple trenches would be necessary. Electric and telecommunications lines may be located on aboveground utility poles. Water, sewer service, electricity, and telecommunications demand would be anticipated to be consistent with the existing compressor station.

Once access, site grading, and utilities are provided, four new natural gas compressors with 1,900 HP each would be installed in a new compressor building similar to the planned project. A new office and a warehouse similar in size to the planned project structures would be constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, would be installed to help screen the perimeter wall and minimize visibility of the compressor station.

3.3.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 2.A: Avocado Site – Natural Gas are presented below and in Table 4.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 60 to 70 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Avocado Site would take approximately 6 to 12 months, which would happen concurrently with the onsite work.

[30] Ventura County voters first approved the countywide SOAR initiative in 1998. In general, and subject to certain exceptions, SOAR requires countywide voter approval of any (1) substantive change to the General Plan's Agricultural, Open Space, or Rural land use goals or policies and (2) re-designation of land with these General Plan land use designations. In November 2016, Ventura County voters renewed the County's SOAR initiative and extended its provisions through 2050 (Ventura County 2020).

- Additional acreage would be added to account for required slope cutbacks. Soil nail walls would potentially be used to minimize need for slopes and onsite fill/compaction. Fill soil creates challenges for structural and equipment foundations. Soil nails would allow for a level site with fewer slopes to procure, grade, and maintain.
- Site grading and layout would be performed to integrate into the existing site contours to the extent feasible.

Table 4. Alternative 2.A Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	15.06 acres
Project Site – Demolition	0
Project Site – Grading	1.3 million cubic yards Assumes cut and fill balance onsite
Offsite – Pipeline Corridor 1	3,019 square feet
Offsite - Pipeline Corridor 2	1,563 square feet
Offsite - Water/Sewer Lines	36,945 square feet
Main Line Valve Connection 1	3,750 square feet
Main Line Valve Connection 2	3,750 square feet
Offsite – Roads	Resurface and widen 12,315 linear feet of Taylor Ranch Road to 24 feet, with assumed existing width of 12 feet
Offsite – Staging Area	5.63 acres
SCE Circuit, Substation, and System Name	Grandad Circuit 16 kilovolts Casitas Substation Santa Clara 220/66 System (SCE 2021a)
Offsite – New Electrical Poles	0 Assumes collocated utility trench because electrical demand would not be significant
Estimated Number of Properties Affected*	4

3.3.2 Purpose and Need

The Avocado Site – Natural Gas Alternative would meet the stated purpose and need for the planned project. Four new 1,900 HP natural gas compressors would replace the existing aging equipment and would meet the VCAPCD air emission and safety requirements. The proposed 7,600 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The Avocado Site – Natural Gas Alternative would meet some of the stated objectives. New natural gas compressors would replace existing infrastructure with new equipment that would meet VCAPCD and safety regulations and would be capable of meeting operating requirements,

including during power outages. The 15-acre site is sufficient to build a new compressor station. However, the use of the property would not be consistent with the Ventura County land use designation of Open Space or the zoning AE-40 acres. Additionally, the property is within an area governed by the SOAR initiative. Potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, would occur due to grading, trenching, and installation of new infrastructure. The location is highly visible from the surrounding community because the site is on a hillside above West Ventura.

As described above, the Avocado Site – Natural Gas Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives. For these reasons, the Ventura Compressor Station – Hybrid Alternative was carried forward for consideration related to essential site criteria.

3.3.3 Essential Site Criteria

The Avocado Site would meet all the essential site criteria.

- The existing property is approximately 15 acres in size.
- The nearest airport to the property is the Oxnard Airport, which is approximately 9.5 miles to the southeast. The use as a compressor station is compatible with the FAA land use regulations as stated in the Airport Comprehensive Land Use Plan for Ventura County Final Report (VCALUC 2000).[31]
- The site is designated by FEMA as having no flood risk (FEMA 2021a).

As such, the Avocado Site – Natural Gas Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.4 Alternative 2.B: Avocado Site – Hybrid

The Avocado Site – Hybrid Alternative was proposed by SoCalGas to take into consideration feedback provided during town halls in October 2021 and CPUC input to consider electric compressors. This alternative would be identical to the Avocado Site – Natural Gas Alternative except that compression would be provided by two 1,900 HP natural gas compressors and two 1,900 HP electric compressors. Installation of electric compressors would increase the electric demand for the compressor station. Based on preliminary analysis, approximately 5 MW of electric power would be needed, which would require distribution-level service on one unique power line of at least 16 kV. An onsite substation would also be required.

3.4.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 2.B: Avocado Site – Hybrid are presented below and in Table 5.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 60 to 70 months.

[31] The Airport Comprehensive Land Use Plan for Ventura County Final Report addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Avocado site would take approximately 6 to 12 months, which would happen concurrently with the onsite work.
- Additional acreage would be added to account for required slope cutbacks. Soil nail walls would potentially be used to minimize need for slopes and onsite fill/compaction. Fill soil creates challenges for structural and equipment foundations. Soil nails would allow for a level site with fewer slopes to procure, grade, and maintain.
- Site grading and layout would be performed to integrate into the existing site contours.

Table 5. Alternative 2.B Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	15.06 acres
Project Site – Demolition	0
Project Site – Grading	1.3 million cubic yards Assumes cut and fill balance onsite
Offsite – Pipeline Corridor 1	3,019 square feet
Offsite - Pipeline Corridor 2	1,563 square feet
Offsite - Water/Sewer Lines	36,945 square feet
Main Line Valve Connection 1	3,750 square feet
Main Line Valve Connection 2	3,750 square feet
Offsite – Roads	Resurface and widen 12,315 linear feet of Taylor Ranch Road to 24 feet, with assumed existing width of 12 feet
Offsite – Staging Area	5.63 acres
SCE Circuit, Substation, and System Name	Grandad Circuit 16 kilovolts Casitas Substation Santa Clara 220/66 System (SCE 2021a)
Offsite – New Electrical Poles	30 poles
Offsite –Electric Poles – Grading	60 cubic yards
Estimated Number of Properties Affected*	4

Note:
* Properties affected include the site, access, infrastructure, and staging areas.

3.4.2 Purpose and Need

As with the Avocado Site – Natural Gas Alternative, the hybrid alternative would meet the stated purpose and need. The use of electric compressors with natural gas compressors would provide the necessary redundancy to meet operational needs. This alternative would provide sufficient compression to meet operational needs, would enhance reliability, and would maintain supplies to the La Goleta Storage Field.

As with the Avocado Site – Natural Gas Alternative, the hybrid alternative would meet some of the stated objectives. However, the use of electric compressors would increase electric demand and therefore require additional electric infrastructure to support the project, consequently requiring more grading and overhead electric conduit.

Because the Avocado Site – Hybrid Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives, this alternative was carried forward for consideration related to essential site criteria.

3.4.3 Essential Site Criteria

As noted in Section 3.3.3, the Avocado Site would meet all essential site criteria. Therefore, the Avocado Site – Hybrid Alternative was carried forward for consideration of environmental and operational criteria, as discussed in Section 4.

3.5 Alternative 3.A: Ventura Steel – Natural Gas

The Ventura Steel – Natural Gas Alternative was developed by SoCalGas. This site is located approximately 7,000 feet north of the compressor station property to the east of North Ventura Avenue within the jurisdiction of the County of Ventura. This site is not located on the existing transmission pipeline corridor and is privately owned; therefore, any future project would require the involvement of the landowner, either through a voluntary transfer of needed land rights or through the exercise of eminent domain. The property is approximately 10 acres, on land currently developed with industrial uses, including oil extraction infrastructure, and is designated "Industrial" by the Ventura County general plan and zoned by the Ventura County zoning ordinance as "M3-10,000 sf – General Industrial, 10,000 sf minimum parcel size" (Ventura County 2020. 2021b). The majority of the site is less than 10 percent slope and would require onsite grading related to over-excavation and recompaction for structural foundations and grading to relocate and install pipelines. Access to the site is provided by multiple driveways off North Ventura Avenue and East Shell Road that currently meet SoCalGas and emergency responder access requirements.

Transmission and distribution pipelines would need to be rerouted from the existing compressor station property to the new site location, requiring grading, trenching, pipeline installation, and potentially acquisition of additional pipeline right-of-way. Given the fact that the site is developed with existing industrial uses, other utility connections for electricity, potable water, sewer, and telecommunications are assumed to be available onsite and would require minimal upgrades. Water, sewer service, electricity, and telecommunications demand would be anticipated to be consistent with the existing compressor station.

Four new natural gas compressors with 1,900 HP each would be installed in a new compressor building similar to the planned project. A new office and a warehouse similar in size to the planned project structures would be constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, could be installed to help screen the perimeter wall and minimize visibility of the compressor station.

3.5.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 3.A: Ventura Steel – Natural Gas are presented below and in Table 6.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 36 to 48 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Ventura Steel site would take approximately 12 months, which would happen concurrently with the onsite work.
- Road closures Ventura Avenue would be necessary, and in order to maintain traffic flow, one lane would be closed for 6 months, then the alternate lane would be closed for 6 months, with traffic control measures in place for the duration of the work.

Table 6. Alternative 3.A Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	10 acres
Project Site – Demolition	49,850 square feet Building 1: 10,600 square feet Building 2: 11,130 square feet Building 3: 24,000 square feet Building 4: 4,200 square feet
Project Site – Grading	4,500 cubic yards
Pipeline Corridor 1	39,685 square feet
Pipeline Corridor 2	38,876 square feet
Water/Sewer Lines	0 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	282 square feet
Offsite – Staging Area	4.69 acres
SCE Circuit, Substation, and System Name	Canet Circuit Casitas Substation Santa Clara 220/66 kilovolts (SCE 2021a)
Offsite – New Electrical Poles	0 Assumes existing electrical service is sufficient for natural gas option
Offsite – Electric Poles – Grading	0
Offsite – Roads	3,600 linear feet of new 12-foot-wide road for construction access to new pipeline corridor Assumes existing access from School Canyon Road and Crimea Street Fire Road is adequate

Table 6. Alternative 3.A Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Estimated Number of Properties Affected*	12

Note:
* Properties affected include the site, access, infrastructure. and staging areas.

3.5.2 Purpose and Need

The Ventura Steel – Natural Gas Alternative would meet the stated purpose and need for the planned project. Four new 1,900 HP natural gas compressors would replace the existing aging equipment and would meet the VCAPCD air emission requirements and safety requirements. Both transmission and distribution pipelines would need to be routed to the new location, which would be feasible predicated on detailed engineering design and availability of right-of-way. The proposed 7,600 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The Ventura Steel – Natural Gas Alternative would meet some of the stated objectives. New natural gas compressors would replace existing infrastructure with new equipment that would meet VCAPCD and safety requirements and would be capable of meeting operating requirements, including during power outages. The 10-acre site is sufficient to build a new compressor station. The use of the property would be consistent with the Ventura County land use designation of "Industrial" and the zoning "M3-10,000 sf." However, potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, would occur due to grading, trenching, and installation of new infrastructure.

As described above, the Ventura Steel – Natural Gas Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives. For these reasons, the Ventura Steel – Natural Gas Alternative was carried forward for consideration related to essential site criteria.

3.5.3 Essential Site Criteria

The Ventura Steel site would meet all the essential site criteria.

- The existing property is approximately 10 acres in size.
- The nearest airport to the property is the Oxnard Airport, which is approximately 8.75 miles to the southeast (VCALUC 2000). The use as a compressor station is compatible with the FAA land use regulations as stated in the *Airport Comprehensive Land Use Plan for Ventura County Final Report* (VCALUC 2000).[32]
- The site is designated by FEMA as having no flood risk (FEMA 2021b).

[32] The Airport Comprehensive Land Use Plan for Ventura County Final Report addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

As such, the Ventura Steel – Natural Gas Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.6 Alternative 3.B: Ventura Steel – Hybrid

The Ventura Steel – Hybrid Alternative was proposed by SoCalGas to take into consideration CPUC input to consider electric compressors. This alternative would be identical to the Ventura Steel – Natural Gas Alternative except that compression would be provided by two 1,900 HP natural gas compressors and two 1,900 HP electric compressors. Installation of electric compressors would increase the electric demand for the compressor station. Based on preliminary analysis, approximately 5 MW of electric power would be needed, which would require distribution-level service on one unique power line of at least 16 kV. An onsite substation would also be required.

3.6.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 3.B: Ventura Steel – Hybrid are presented below and in Table 7.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 36 to 48 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Ventura Steel site would take approximately 12 months, which would happen concurrently with the onsite work.

Table 7. Alternative 3.B Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	10 acres
Project Site – Demolition	49,850 square feet Building 1: 10,600 square feet Building 2: 11,130 square feet Building 3: 24,000 square feet Building 4: 4,200 square feet
Project Site – Grading	4,500 cubic yards
Pipeline Corridor 1	39,685 square feet
Pipeline Corridor 2	38,876 square feet
Water/Sewer Lines	0 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	282 square feet
Offsite – Staging Area	4.69 acres
SCE Circuit, Substation, and System Name	San Nicholas Circuit Casitas Substation Santa Clara 220/66 kilovolts
Offsite – New Electrical Poles	2 poles Interconnect to the San Nicholas Circuit

Table 7. Alternative 3.B Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Offsite – Electric Poles – Grading	4 cubic yards
Offsite – Roads	3,600 linear feet of new 12-foot-wide road for construction access to new pipeline corridor Assumes existing access from School Canyon Road and Crimea Street Fire Road is adequate
Estimated Number of Properties Affected*	12

Note:
* Properties affected include the site, access, infrastructure, and staging areas.

3.6.2 Purpose and Need

As with the Ventura Steel – Natural Gas Alternative, the hybrid alternative would meet the stated purpose and need. The use of electric compressors with natural gas compressors would provide the necessary redundancy to meet operational needs. This alternative would provide sufficient compression to meet operational needs, would enhance reliability, and would maintain supplies to the La Goleta Storage Field.

As with the Ventura Steel – Natural Gas Alternative, the hybrid alternative would meet some of the stated objectives. However, the use of electric compressors would increase electric demand and therefore require additional electric infrastructure to support the project, consequently requiring more grading and overhead electric conduit.

Because the Ventura Steel – Hybrid Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives, this alternative was carried forward for consideration related to essential site criteria.

3.6.3 Essential Site Criteria

As noted in Section 3.5.3, the Ventura Steel site would meet all essential site criteria. Therefore, the Ventura Steel – Hybrid Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.7 Alternative 4.A: Devil's Canyon Road – Natural Gas

The Devil's Canyon Road – Natural Gas Alternative was suggested by members of the public at SoCalGas' town hall in October 2021. This site is located approximately 5,300 feet northwest of the compressor station property within the jurisdiction of the County of Ventura. The site is privately owned; therefore, any future project would require the involvement of the landowner, either through a voluntary transfer of needed land rights or through the exercise of eminent domain.

The property is approximately 12.88 acres, privately owned, currently used for oil extraction, and designated by the Ventura County general plan as "Open Space" and zoned by the Ventura

County zoning ordinance as "OS-160 ac, Open Space, 160 acres minimum parcel size" with a Habitat Connectivity Corridor mapped along the Ventura River (Ventura County 2020, 2021b). The Ventura County general plan states that the Open Space land use designation encompasses land or water that is essentially unimproved and devoted to an open-space use, including land for preservation of natural resources, managed production of resources, outdoor recreation, public health and safety, and to promote efficient municipal services and avoid urban sprawl (Ventura County 2020). The Ventura County Code states that "the purpose of [the OS] zone is to provide for any of the following on parcels or areas of land or water that are essentially unimproved: … The managed production of resources, including but not limited to: forest lands, rangeland, agricultural lands and areas of economic importance for the production of food or fiber; areas required for recharge of groundwater basins; bays, estuaries, marshes, rivers and streams which are important for the management of commercial fisheries; and, areas containing major mineral deposits, including those in short supply" (Ventura County 2021a). The area is developed with oil extraction uses. The slope of the property ranges between 0 percent and 30 percent, with the majority of the site less than 10 percent, and would require grading for over-excavation and recompaction for building foundations and utility trenching.

Access to the site is provided by multiple driveways off Shell Road that meet SoCalGas and emergency responder access requirements. Transmission and distribution pipelines would need to be rerouted from the existing compressor station property to the new site location, requiring grading, trenching, pipeline installation, and potentially acquisition of additional pipeline right-of-way. Given the fact that the site is developed with existing industrial uses, other utility connections for electricity, potable water, sewer, and telecommunications are assumed to be available onsite and would require minimal upgrades. Water, sewer service, electricity, and telecommunications demand would be anticipated to be consistent with the existing compressor station.

Once access, site grading, and utilities are provided, four new 1,900 HP natural gas compressors would be installed in a new compressor building similar to the planned project. A new office and a warehouse similar in size to the planned project structures would be constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, could be installed to help screen the perimeter wall and minimize visibility of the compressor station.

3.7.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 4.A: Devil's Canyon Road – Natural Gas are presented below and in Table 8.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 24 to 30 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Devil's Canyon Road site would take approximately 6 to 12 months, which would happen concurrently with the onsite work.

Table 8. Alternative 4.A Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	12.88 acres
Project Site – Demolition	156,645 square feet Piping/Equipment/Building
Project Site – Grading	4,500 cubic yards
Pipeline Route 1	23,963 square feet
Pipeline Route 2	23,963 square feet
Water/Sewer Lines	0 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	0 square feet
Offsite – Staging Area	6.27 acres
SCE Circuit, Substation, and System Name	Circuit 00423 Casitas Substation Subtransmission 66 kilovolts
Offsite – New Electrical Poles	0 Assumes existing electrical service is sufficient for natural gas option
Offsite –Electric Poles – Grading	0 cubic yards
Offsite – Roads	1,892 linear feet Assumes existing access serving facility requires minor leveling and resurfacing
Estimated Number of Properties Affected*	5

Notes:
* Properties affected include the site, access, infrastructure, and staging areas

3.7.2 Purpose and Need

The Devil's Canyon Road – Natural Gas Alternative would meet the stated purpose and need for the planned project. Four new 1,900 HP natural gas compressors would replace the existing aging equipment and would meet the VCAPCD air emission and safety requirements. Both transmission and distribution pipelines would need to be routed to the new location, which would be feasible predicated on detailed engineering design. The proposed 7,600 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The Devil's Canyon Road – Natural Gas Alternative would meet some of the stated objectives. New natural gas compressors would replace existing infrastructure with new equipment that would meet VCAPCD and safety regulations and be capable of meeting operating requirements, including during power outages. The 12.88-acre site is sufficient to build a new compressor station. The property is designated by the Ventura County general plan as "Open Space" and zoned "OS-160-acres, Open Space 160 acres minimum parcel size" with the Habitat Connectivity and Wildlife Corridors overlay zone. The use of the property would not be consistent with the intent of the Ventura County general plan OS designation or the Ventura County OS-160-acre

zoning because the intent of both the land use designation and the zoning is to preserve land or water that is essentially unimproved and devoted to an open-space use (Ventura County 2021). Potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, would occur due to grading, trenching, and installation of new infrastructure.

As described above, the Devil's Canyon Road – Natural Gas Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives. For these reasons, the Devil's Canyon Road – Natural Gas Alternative was carried forward for consideration related to essential site criteria.

3.7.3 Essential Site Criteria

The Devil's Canyon Road site would meet all the essential site criteria.

- The existing property is approximately 12.88 acres in size.
- The nearest airport to the property is the Oxnard Airport, which is approximately 8.90 miles to the southeast. The use as a compressor station is compatible with the FAA land use regulations as stated in the *Airport Comprehensive Land Use Plan for Ventura County Final Report* (VCALUC 2000).[33]
- The site is designated by FEMA as having no flood risk; however, the eastern property is adjacent to the Ventura River and the access road crosses the river and is mapped Zone AE, which is a regulatory floodway (FEMA 2021d).

As such, the Devil's Canyon Road – Natural Gas Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.8 Alternative 4.B: Devil's Canyon Road – Hybrid

The Devil's Canyon Road – Hybrid Alternative was proposed by SoCalGas to take into consideration CPUC input to consider electric compressors. This alternative would be identical to the Devil's Canyon Road – Natural Gas Alternative except that compression would be provided by two 1,900 HP natural gas compressors and two 1,900 HP electric compressors. Installation of electric compressors would increase the electric demand for the compressor station. Based on preliminary analysis, approximately 5 MW of electric power would be needed, which would require distribution-level service on one unique power line of at least 16 kV. An onsite substation would also be required.

3.8.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 4.B: Devil's Canyon Road – Hybrid are presented below and in Table 9.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 24 to 30 months.

[33] The *Airport Comprehensive Land Use Plan for Ventura County Final Report* addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the Devil's Canyon Road site would take approximately 6 to 12 months, which would happen concurrently with the onsite work.

Table 9. Alternative 4.B Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	12.88 acres
Project Site – Demolition	156,645 square feet Piping/Equipment/Building
Project Site – Grading	4,500 cubic yards
Pipeline Route 1	23,963 square feet
Pipeline Route 2	23,963 square feet
Water/Sewer Lines	0 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	0 square feet
Offsite – Staging Area	6.27 acres
SCE Circuit, Substation, and System Name	Circuit 00423 Casitas Substation Subtransmission 66 kilovolts
Offsite – New Electrical Poles	40 Assumes existing electrical service is sufficient for natural gas option
Offsite –Electric Poles – Grading	80 cubic yards
Offsite – Roads	1,892 linear feet Assumes existing access serving facility requires minor leveling and resurfacing
Estimated Number of Properties Affected*	5

Notes: SCE = Southern California Edison.
* Properties affected include the site, access, infrastructure, and staging areas.

3.8.2 Purpose and Need

As with the Devil's Canyon Road – Natural Gas Alternative, the hybrid alternative would meet the stated purpose and need. The use of electric compressors with natural gas compressors would provide the necessary redundancy to meet operational needs. This alternative would provide sufficient compression to meet operational needs, would enhance reliability, and would maintain supplies to the La Goleta Storage Field.

As with the Devil's Canyon Road – Natural Gas Alternative, the hybrid alternative would meet some of the stated objectives. However, the use of electric compressors would increase electric demand and therefore require additional electric infrastructure to support the project, consequently requiring more grading and overhead electric conduit.

Because the Devil's Canyon Road – Hybrid Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives, this alternative was carried forward for consideration related to essential site criteria.

3.8.3 Essential Site Criteria

As noted in Section 3.7.3, the Devil's Canyon Road site would meet all essential site criteria; therefore, the Devil's Canyon Road – Hybrid Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.9 Alternative 5.A: County Line – Natural Gas

The County Line – Natural Gas Alternative was developed by SoCalGas. This site is located within Ventura County at the county line between Santa Barbara and Ventura counties. It is approximately 11 miles northwest of the compressor station property, generally on the existing transmission pipeline corridor. The site is privately owned; therefore, any future project would require the involvement of the landowner, either through a voluntary transfer of needed land rights or through the exercise of eminent domain. The property is approximately 12.33 acres and vacant, although it appears to have been used for agricultural purposes historically. The property is designated by the Ventura County general plan as "Open Space" and zoned by the Ventura County zoning ordinance as "AE-40 ac – Agricultural Exclusive, 40 acres minimum parcel size" and is within the area governed by the SOAR initiative (Ventura County 2020, 2021a). The area is primarily developed with agricultural uses and low-density residential development. The slope of the property ranges from 0 percent to 70 percent, with the majority between 10 and 40 percent, and would require grading and potentially the installation of retaining walls to create a level pad for compressor equipment and operational needs. To meet acceptable engineering design standards, a 2:1 slope is typically required, which requires a larger footprint than the actual building pad ("catch points").

Access to the site via a driveway at least 24 feet wide would be needed to meet SoCalGas and emergency responder access requirements. There is an existing access road; however, because its width varies some sections of the road would need to be widened. The access road would require minimal grading to achieve an acceptable grade suitable for fire truck access.

Distribution pipelines would need to be rerouted from the existing compressor station property to the new site location, requiring trenching and pipeline installation, and potentially acquisition of additional pipeline right-of-way. Additionally, other utility connections for electricity, potable water, sewer, and telecommunications would be required. These may be able to be collocated in a utility trench if minimum separation between the utilities can be maintained. Otherwise, multiple trenches would be necessary. Electric and telecommunications lines may be located on aboveground utility poles. Water, sewer service, electricity, and telecommunications demand would be anticipated to be consistent with the existing compressor station.

Once access, site grading, and utilities are provided, five new 1,900 HP natural gas compressors would be installed in a new compressor building similar to the planned project. An additional compressor would be required for this site to overcome a greater pressure differential due to the location being farther north than the other alternative sites (approximately 11 miles). A new office and a warehouse similar in size to the planned project structures would be constructed onsite. A perimeter block wall 8 feet in height would be required for security purposes. Cameras

and lighting would also be required for operational needs and security. Landscaping, such as trees or hedges, could be installed to help screen the perimeter wall and minimize visibility of the compressor station.

3.9.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 5.A: County Line – Natural Gas are presented below and in Table 10.

- Construction of the compressor station, including pad grading, onsite utility installations, buildings, and compressors, would take approximately 60 to 70 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the County Line site would take approximately 6 months, which would happen concurrently with the onsite work.

Table 10. Alternative 5.A: County Line – Natural Gas – Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	12.33 acres
Project Site – Demolition	0 square feet Existing agricultural field
Project Site – Grading	600,000 cubic yards Cut and fill balance onsite
Pipeline Route 1	19,973 square feet
Water/Sewer Lines	7,497 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	3,197 square feet
Offsite – Staging Area	3.92 acres
SCE Circuit, Substation, and System Name	Circuit 01950 Carpinteria Substation Subtransmission 66 kilovolts
Offsite – New Electrical Poles	0 Assumes collocated utility trench because electrical demand would not be significant
Offsite –Electric Poles – Grading	0 cubic yards
Offsite – Roads	2,499 linear feet Assumes existing access serving site requires minor leveling and resurfacing
Estimated Number of Properties Affected*	5

Note:
* Properties affected include the site, access, infrastructure, and staging areas.

3.9.2 Purpose and Need

The County Line – Natural Gas Alternative would meet the stated purpose and need for the planned project. Five new 1,900 HP natural gas compressors would replace the existing aging equipment and would meet the VCAPCD air emission and safety requirements. The proposed 9,500 HP would also maintain sufficient pressure in the existing pipelines and adequate inventory in the La Goleta Storage Field.

The County Line – Natural Gas Alternative would meet some of the stated objectives. New natural gas compressors would replace existing infrastructure with new equipment that would meet VCAPCD and DOT safety regulations and would be capable of meeting operating requirements, including during power outages. The 12.33-acre site is sufficient to build a new compressor station. However, the use of the property would not be consistent with the Ventura County land use designation of Open Space or the zoning AE-40 acres. Additionally, the property is within an area governed by the SOAR initiative. Potential environmental impacts, especially related to dust generation, noise, and visual/aesthetics, would occur due to grading, trenching, and installation of new infrastructure. The location is visible from the surrounding community because the site is on a hillside to the southeast of SR-150.

As described above, the County Line – Natural Gas Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives. For these reasons, the County Line – Natural Gas Alternative was carried forward for consideration related to essential site criteria.

3.9.3 Essential Site Criteria

The County Line site would meet all the essential site criteria.

- The existing property is approximately 12.33 acres in size.
- The nearest airport to the property is the Oxnard Airport, which is approximately 19 miles to the southeast. The use as a compressor station is compatible with the FAA land use regulations as stated in the *Airport Comprehensive Land Use Plan for Ventura County Final Report* (VCALUC 2000).[34]
- The site is designated by FEMA as having no flood risk; however, the northwesterly perimeter along an existing access road is mapped Zone A, a special flood hazard area without a base flood elevation (FEMA 2021c).

As such, the County Line – Natural Gas Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

3.10 Alternative 5.B: County Line – Hybrid

The County Line – Hybrid Alternative was proposed by SoCalGas to take into consideration CPUC input to consider electric compressors. This alternative would be identical to the County Line – Natural Gas Alternative except that compression would be provided by two 1,900 HP natural gas compressors and

[34] The Airport Comprehensive Land Use Plan for Ventura County Final Report addresses the Camarillo, Oxnard, Santa Paula, and NAS Point Mugu airports (VCALUC 2000).

three 1,900 HP electric compressors. Installation of electric compressors would increase the electric demand for the compressor station. Based on preliminary analysis, approximately 5 MW of electric power would be needed, which would require distribution-level service on one unique power line of at least 16 kV. An onsite substation would also be required.

3.10.1 Alternative-Specific Construction Assumptions

The construction assumptions for Alternative 5.B: County Line – Hybrid are presented below and in Table 11.

- Construction of the compressor station, including pad grading, access road, onsite utility installations, buildings, and compressors, would take approximately 60 to 70 months.
- Given the location of the existing transmission pipelines, installation/interconnection of the pipelines to a new compressor station at the County Line site would take approximately 6 to 12 months, which would happen concurrently with the onsite work.

Table 11. Alternative 5.B: County Line – Hybrid – Construction Assumptions/Estimates

Project Component	Assumptions and Estimates
Project Site Acreage	12.33 acres
Project Site – Demolition	0 square feet Existing agricultural field
Project Site – Grading	600,000 cubic yards Cut and fill balance onsite
Pipeline Route 1	19,973 square feet
Water/Sewer Lines	7,497 square feet
Main Line Valve Connection	7,500 square feet
Depressurization Line	3,197 square feet
Offsite – Staging Area	3.92 acres
SCE Circuit, Substation, and System Name	Circuit 01950 Carpinteria Substation Subtransmission 66 kilovolts
Offsite – New Electrical Poles	15 Assumes collocated utility trench because electrical demand would not be significant
Offsite –Electric Poles – Grading	30 cubic yards
Offsite – Roads	2,499 linear feet Assumes existing access serving site requires minor leveling and resurfacing
Estimated Number of Properties Affected*	5

Note:
* Properties affected include the site, access, infrastructure, and staging areas.

3.10.2 Purpose and Need

As with the County Line – Natural Gas Alternative, the hybrid alternative would meet the stated purpose and need. The use of electric compressors with natural gas compressors would provide the necessary redundancy to meet operational needs. This alternative would provide sufficient compression to meet operational needs, would enhance reliability, and would maintain supplies to the La Goleta Storage Field.

As with the County Line – Natural Gas Alternative, the hybrid alternative would meet some of the stated objectives. However, the use of electric compressors would increase electric demand and therefore require additional electric infrastructure to support the project, consequently requiring more grading and overhead electric conduit.

Because the County Line – Hybrid Alternative would provide sufficient compression to meet operational needs, would enhance reliability, would maintain supplies to the La Goleta Storage Field, and would meet some of the stated objectives, this alternative was carried forward for consideration related to essential site criteria.

3.10.3 Essential Site Criteria

As noted in Section 3.9.3, the County Line site would meet all essential site criteria. Therefore, the County Line – Hybrid Alternative was carried forward for consideration related to environmental and operational criteria, as discussed in Section 4.

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4 Operational and Environmental Considerations

The evaluation of alternative options necessarily accounts for operational and environmental considerations that go beyond the foundational elements of the purpose, need, and objectives of the planned project and the essential site criteria. This section provides an evaluation of the alternatives relative to five supplemental operational criteria. Environmental considerations have been evaluated by Dudek. Their analysis is incorporated in Appendix A.

In order to assess each potential alternative option according to the same criteria, a scoring rubric was developed for both the operational and environmental considerations. The rubric assigns point values from 0 to 9. The criteria within the rubric address topic areas that the CPUC examined in multiple data requests regarding the Ventura Compressor Modernization Project. Operational considerations include topic areas such as safety and resiliency, electrification and power requirements, control systems, system maintenance and gas releases, and siting considerations. Environmental considerations include topic areas such as emissions, climate change, traffic, noise, aesthetics, land use, construction impacts, and wildfire. Additional topic areas were added to expand the environmental evaluation to address cultural resources, natural resources, and CalEnviroScreen pollution burden.

4.1 Evaluation Methodology

The operational considerations evaluation process included a team of six SoCalGas staff members with subject matter expertise in pipeline operations, mechanical engineering, and civil engineering. Each staff member evaluated each alternative and assigned a point score in accordance with the rubric (included as Appendix B) and with the specific category shown in the relevant subsection below. The evaluation was based on a desktop-level analysis that was field-verified by SoCalGas' Construction Department, Gas Transmission Department, and Gas Engineering Department on January 6, 2022. The rubric scores are the average of the scores assigned by each staff member for each line item. Please refer to Appendix B for the complete scoring rubric.

4.2 Operational Assessment

This section provides an analysis of the operational considerations and each alternative option's assigned score in accordance with the scoring rubric (Appendix B).

4.2.1 Auxiliary and Control Systems

The complexity of auxiliary and control systems relates to alternative options with one operational system instead of two. With a hybrid gas and electric station, the control panel would need to be able to interface with two unique types of unit control panels, instead of one panel with one set of command controls. It would also necessitate two control philosophies, which is the directive of how to run the station based on the system needs at that time (see Table 12).

Table 12. Auxiliary and Control Systems

	0	1-2-3	4-5-6	7-8-9
Topic Area	Hybrid option that relies on SCE power for running 50% compressors	Hybrid option that does not rely on SCE power for running 50% compressors	Non-hybrid with backup power feed from SCE to run 50% compressors	Non-hybrid option with onsite backup power generation to run 50% compressors

Note: SCE = Southern California Edison.

All Natural Gas Alternatives

The natural gas alternatives would operate with only natural gas equipment, which would require one operational system. Table 13 presents the auxiliary and control systems point assessments for the natural gas alternatives. Since each option below assumes one operational system, a total of 9 points each was assigned.

Table 13. Auxiliary and Control Systems – All Natural Gas Alternatives

Alternative	Auxiliary and Control Systems Total
1.A: Planned Project	9 points
2.A: Avocado Site – Natural Gas	9 points
3.A: Ventura Steel – Natural Gas	9 points
4.A: Devil's Canyon Road – Natural Gas	9 points
5.A: County Line – Natural Gas	9 points

All Hybrid Alternatives

The hybrid alternatives would operate with both natural gas equipment and electric equipment, requiring two operational systems, which creates greater challenges when operating the compressor station. Table 14 presents the auxiliary and control systems point assessments for the hybrid alternatives. Since each option below assumes a hybrid operational system creating greater operating complexity, a total of 5 points each was assigned.

Table 14. Auxiliary and Control Systems – All Hybrid Alternatives

Alternative	Auxiliary and Control Systems Total
1.B: Ventura Compressor Station – Hybrid	5 points
2.B: Avocado Site – Hybrid	5 points
3.B: Ventura Steel – Hybrid	5 points
4.B: Devil's Canyon Road – Hybrid	5 points
5.B: County Line – Hybrid	5 points

4.2.2 Backup Power Requirements

Backup power requirements relates to the ability for the compressor station to provide sufficient horsepower to move gas into the Coastal System depending on the availability of natural gas and electric infrastructure, especially in black start conditions (see Table 15). Black start is the ability to restart the electric system after a blackout/loss of power. It is used when the grid experiences a blackout and must be restarted from scratch. Black start is central to system restoration and recovery plans for system operators (NREL 2021).

Table 15. Backup Power Requirements

	0	1-2-3	4-5-6	7-8-9
Topic Area	No operation possible without SCE power in service	Black start capability and ability to provide less than 50% horsepower without SCE power in service	Black start capability and ability to provide less than 100% down to 50% horsepower without SCE in service	Black start capability and ability to provide 100% horsepower without SCE in service

Note: SCE = Southern California Edison.

All Natural Gas Alternatives

All natural gas alternatives would be only natural gas compression and have black start capability and full compression without SCE service available. Table 16 presents the backup power requirements point assessments for the natural gas alternatives. Since each option below could have black start capability from 50% to 100% capability, a total of 6 points each was assigned.

Table 16. Backup Power Requirements – All Natural Gas Alternatives

Alternative	Backup Power Requirements Total
1.A: Planned Project	6 points
2.A: Avocado Site – Natural Gas	6 points
3.A: Ventura Steel – Natural Gas	6 points
4.A: Devil's Canyon Road – Natural Gas	6 points
5.A: County Line – Natural Gas	6 points

All Hybrid Alternatives

Hybrid alternatives would have natural gas compression and electric compression. A hybrid option would have black start capability and with backup power available could also have full compression available if power on the SCE system is lost. Table 17 presents the backup power requirements point assessments for the hybrid alternatives. Since each option below could have black start capability from 50% to 100% capability, a total of 6 points each was assigned.

Table 17. Backup Power Requirements – All Hybrid Alternatives

Alternative	Backup Power Requirements Total
1.B: Ventura Compressor Station – Hybrid	6 points
2.B: Avocado Site – Hybrid	6 points
3.B: Ventura Steel – Hybrid	6 points
4.B: Devil's Canyon Road – Hybrid	6 points
5.B: County Line – Hybrid	6 points

4.2.3 Emergency Access

Emergency access is related to roadway access for first responders, such as the fire department. The VCFPD Standard 501 "Fire Apparatus Access Standard" requires that emergency access roads be a minimum of 24 feet wide and not exceed a slope of 20 percent, with turnouts every 150 feet (VCFPD 2019). The evaluation of alternatives considers the existing site access and the extent to which roadway improvements must occur to comply with fire department requirements (see Table 18). The availability of onsite or nearby fire water infrastructure may allow the fire department to grant limited waivers for some requirements, such as turnout spacing.

Table 18. Emergency Access

	0	1-2-3	4-5-6	7-8-9
Topic Area	Emergency access exceeds 20% grade even with engineered design (including retaining walls)	New access road required or substantial improvements to existing access road	Minor modification to existing access road	No new road improvements

Note: Assessment based on desktop analysis using Google Earth field-verified by SoCalGas staff January 6, 2022.

Alternative 1.A: Planned Project/Alternative 1.B: Ventura Compressor Station – Hybrid

The planned project and a hybrid alternative at the existing compressor station would meet all applicable emergency access and safety requirements because the existing compressor station meets all access requirements. The site has access points that connect to Olive Street. The primary entrance (and main access point) is 36 feet wide. A secondary access point is 20 feet wide. The primary entrance is sufficient for fire trucks and other emergency response vehicles that connect to Olive Street. The existing facility also has fire water infrastructure onsite that meets fire department requirements. Table 19 presents the emergency access point assessments for these alternatives. This site scored a 9 because existing access meets fire department requirements and fire water infrastructure is present.

Table 19. Emergency Access – Alternatives 1.A and 1.B: Ventura Compressor Station

Alternative	Emergency Access Total
1.A: Planned Project	9 points
1.B: Ventura Compressor Station – Hybrid	9 points

Alternative 2.A: Avocado Site – Natural Gas/Alternative 2.B: Avocado Site – Hybrid

The Avocado Site would require a new access road with at least a 24-foot width and slope not exceeding 20 percent. The site has existing agricultural roads for crop access that could be widened and improved with asphalt or other paving. Given the topography of the site, grading, and potentially retaining walls, to establish an acceptable slope would be needed. A fire hydrant may also be required, which would require a new fire water line at a minimum water pressure sufficient for firefighting (typically 20 pounds per square inch [psi]). Table 20 presents the emergency access point assessments for these alternatives. This site scored a 4 because an existing access road (Taylor Ranch Road) is available however substantial grading to establish a 20 percent slope or less and sufficient width would be required.

Table 20. Emergency Access – Alternatives 2.A and 2.B: Avocado Site

Alternative	Emergency Access Total
2.A: Avocado Site – Natural Gas	4 points
2.B: Avocado Site – Hybrid	4 points

Alternative 3.A: Ventura Steel – Natural Gas/Alternative 3.B: Ventura Steel – Hybrid

The Ventura Steel site is located on an existing industrial property and as such is assumed to meet all applicable emergency access and safety requirements. The site has two access points that are sufficient for fire trucks and other emergency response vehicles and that connect to North Ventura Avenue. A fire hydrant is located at the northeast corner of Shell Road and North Ventura Avenue, approximately 100 feet from the property boundary. Table 21 presents the emergency access point assessments for these alternatives. This site scored a 9 because existing access meets fire department requirements and fire water infrastructure is present.

Table 21. Emergency Access – Alternatives 3.A and 3.B: Ventura Steel

Alternative	Emergency Access Total
3.A: Ventura Steel – Natural Gas	9 points
3.B: Ventura Steel – Hybrid	9 points

Alternative 4.A: Devil's Canyon Road – Natural Gas/Alternative 4.B: Devil's Canyon Road – Hybrid

The Devil's Canyon Road site has site access provided by an existing bridge approximately 28 feet in width that crosses the Ventura River. The bridge is sufficient in width for fire apparatus. Fire water infrastructure is located onsite. Table 22 presents the emergency access point assessments for these alternatives. This site scored a 7 because existing access meets fire department requirements however, in the event of a significant rainfall, bridge access could be affected and emergency access would have to be provided elsewhere, likely across adjacent property to the west.

Table 22. Emergency Access – Alternatives 4.A and 4.B: Devil's Canyon Road

Alternative	Emergency Access Total
4.A: Devil's Canyon Road – Natural Gas	7 points
4.B: Devil's Canyon Road – Hybrid	7 points

Alternative 5.A: County Line – Natural Gas/Alternative 5.B: County Line – Hybrid

The County Line site would require a new access road with at least a 24-foot width and slope not exceeding 20 percent. The site has existing agricultural roads for crop access that could be widened and improved with asphalt or other paving. A fire hydrant may also be required, which would require a new fire water line at a minimum water pressure sufficient for firefighting (typically 20 psi). Table 23 presents the emergency access point assessments for these alternatives. This site scored a 5 because an existing access road is available and however it would require some widening along sections of the road and surface improvements.

Table 23. Emergency Access – Alternatives 5.A and 5.B: County Line

Alternative	Emergency Access Total
5.A: County Line – Natural Gas	5 points
5.B: County Line – Hybrid	5 points

4.2.4 Geotechnical Engineering Constraints

Soil stability and underlying geology can contribute to soil movement and pipeline damage. Although detailed geologic and geotechnical evaluation under the direction of a licensed geologist, geotechnical engineer, and civil engineer is outside the scope of this feasibility study, a desktop-level evaluation using the County of Ventura's GIS-based "County View" system has been performed to determine whether known geotechnical constraints associated with high risk of faulting/seismicity, liquefaction, and subsidence are present for each alternative (Ventura

County 2021b).[35,36] Most geotechnical constraints can be addressed by implementing measures at the recommendation of a geologist, geotechnical engineer, and/or civil engineer and following standard building code requirements, such as over-excavating and recompacting soil or installing special building foundations (e.g., piers, caissons). However, significant geotechnical constraints (see Table 24) can cause greater long-term risk to infrastructure and increase overall project cost, including for long-term maintenance. As such, siting of new pipelines and infrastructure should avoid these constraints to the extent feasible.

Table 24. Geotechnical Engineering Constraints

	0	1-2-3	4-5-6	7-8-9
Topic Area	Substantial geotechnical constraints	Moderate geotechnical constraints	Minimal geotechnical constraints	No known geotechnical constraints

Note: Assessment based on desktop analysis using County of Ventura's GIS based "County View" system to evaluate liquefaction, faulting/seismicity, and landslide risk.

Alternative 1.A: Planned Project/Alternative 1.B: Ventura Compressor Station – Hybrid

The Ventura Compressor Station site is not mapped with any known earthquake faults, earthquake fault hazards, potential earthquake-induced landslide areas, or subsidence zones. The site is mapped with potential risk for soil liquefaction (Ventura County 2021b). Existing pipelines serving the compressor station also fall within the soil liquefaction area. However, the existing compressor station has not experienced any settling or foundation cracking associated with subsidence or liquefaction. No new natural gas pipelines would be required offsite for this location. New utility connections, such as aboveground electrical and telecommunication conduit, for a hybrid alternative could be sited and installed based on geotechnical field conditions. Table 25 presents the geotechnical engineering constraint point assessments for these two alternative options. This site scored a 6 because of mapped potential risk for soil liquefaction however, standard engineering design and compliance with building code requirements can reduce liquefaction risk. Furthermore, a compressor station has been onsite for almost 100 years with no known challenges from liquefaction.

Table 25. Geotechnical Engineering Constraints – Alternatives 1.A and 1.B: Ventura Compressor Station

Alternative	Geotechnical Engineering Constraints Total
1.A: Planned Project	6 points
1.B: Ventura Compressor Station – Hybrid	6 points

[35] As defined by the U.S. Geological Survey, "Liquefaction takes place when loosely packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking. Liquefaction occurring beneath buildings and other structures can cause major damage during earthquakes" (USGS 2021).

[36] As defined by the U.S. Geological Survey, "Land subsidence is a gradual settling or sudden sinking of the Earth's surface due to removal or displacement of subsurface earth materials. The principal causes include: aquifer-system compaction associated with groundwater withdrawals; drainage of organic soils; underground mining; natural compaction or collapse, such as with sinkholes or thawing permafrost" (USGS 2019).

Alternative 2.A: Avocado Site – Natural Gas/ Alternative 2.B: Avocado Site – Hybrid

The Avocado Site is not mapped with any known earthquake faults, earthquake fault hazards, liquefaction risk, or subsidence zones. The site is mapped with potential earthquake-induced landslide areas. New pipeline infrastructure and new utility connections would be required within the area mapped as a potential earthquake-induced landslide area. Table 26 presents the geotechnical engineering constraint point assessments for these alternatives. This site scored a 4 because of mapped potential landside risk from an earthquake. While engineering design and compliance with building code requirements will reduce risk, an earthquake induced landslide could cause significant damage to a compressor station.

Table 26. Geotechnical Engineering Constraints – Alternatives 2.A and 2.B: Avocado Site

Alternative	Geotechnical Engineering Constraints Total
2.A: Avocado Site – Natural Gas	4 points
2.B: Avocado Site – Hybrid	4 points

Alternative 3.A: Ventura Steel – Natural Gas/Alternative 3.B: Ventura Steel – Hybrid

The Ventura Steel site is not mapped with any known earthquake faults, earthquake fault hazards, or subsidence zones. However, there is a mapped earthquake fault to the west of SR-33/Ventura River approximately 2,500 feet from the property boundary. The site is also mapped with liquefaction risk. New pipeline infrastructure and new utility connections would be required within the area mapped with liquefaction risk. Table 27 presents the geotechnical engineering constraint point assessments for these alternatives. This site scored a 6 because of mapped potential risk for soil liquefaction however, standard engineering design and compliance with building code requirements can reduce liquefaction risk.

Table 27. Geotechnical Engineering Constraints – Alternatives 3.A and 3.B: Ventura Steel

Alternative	Geotechnical Engineering Constraints Total
3.A: Ventura Steel – Natural Gas	6 points
3.B: Ventura Steel – Hybrid	6 points

Alternative 4.A: Devil's Canyon Road – Natural Gas/Alternative 4.B: Devil's Canyon Road – Hybrid

The Devil's Canyon Road site is mapped with a known earthquake fault approximately 700 feet north of the limits of ground disturbance. However, there is no mapped earthquake fault hazard zone or subsidence zone. The site is also mapped with liquefaction risk. New pipeline infrastructure and new utility connections would be required within the area mapped with liquefaction risk and could be in proximity to the fault, although engineering design could address most of the fault risk. Table 28 presents the geotechnical engineering constraint point assessments for these alternatives. This site scored a 5 because of mapped potential risk for

soil liquefaction and proximity to a known fault. Standard engineering design and compliance with building code requirements can reduce liquefaction and risk related to seismic shaking.

Table 28. Geotechnical Engineering Constraints – Alternatives 4.A and 4.B: Devil's Canyon Road

Alternative	Geotechnical Engineering Constraints Total
4.A: Devil's Canyon Road – Natural Gas	5 points
4.B: Devil's Canyon Road – Hybrid	5 points

Alternative 5.A: County Line – Natural Gas/Alternative 5.B: County Line – Hybrid

The County Line site is mapped with a known earthquake fault approximately 500 feet north of the limits of ground disturbance. Two additional mapped faults are located near a tie-in point to the existing distribution system. However, there is no mapped earthquake fault hazard zone, subsidence zone, or liquefaction hazard. New pipeline infrastructure and new utility connections would be required and could be in proximity to the fault, and may actually cross the fault, although engineering design could address most of the fault risk. Table 29 presents the geotechnical engineering constraint point assessments for these alternatives. This site scored a 6 because of proximity to a known fault. Standard engineering design and compliance with building code requirements can reduce risk related to seismic shaking

Table 29. Geotechnical Engineering Constraints – Alternatives 5.A and 5.B: County Line

Alternative	Geotechnical Engineering Constraints Total
5.A: County Line – Natural Gas	6 points
5.B: County Line – Hybrid	6 points

4.2.5 Proximity to Distribution System

The ability to mitigate or eliminate emissions from a gas release to atmosphere for operations and maintenance (referred to as a "blowdown") is heavily influenced by the type of system that is being blown down.[37] The operating pressure of a pipeline system is a critical factor when evaluating the ability to limit or eliminate emissions during a blowdown (see Table 30). Cross compression is a technique used to help minimize release of natural gas. Portable compression equipment is used to bring down gas pressure on an isolated pipeline segment and redirect the gas downstream of the isolated segment. Cross compression requires an adjacent pipeline with an operating pressure and capacity compatible with the existing pressure conditions of the line to be vacated (AGA 2020).

The location of the compressor station in relationship to the distribution pipeline system creates the option to engineer a system that can passively collect and redirect natural gas and route to

[37] Generally defined, a blowdown is the release of gas from a pipeline to the atmosphere to relieve pressure in the pipe so that maintenance, testing, or other activities can take place (MJB&A 2016).

the distribution system instead of needing to bring additional compression equipment onsite to perform cross compression.[38]

Table 30. Proximity to Distribution System

	0	1-2-3	4-5-6	7-8-9
Topic Area	No access to distribution system without substantial pipeline installation	Distribution system greater than 0.5 miles away	Distribution system access outside of the facility and less than 0.5 miles away	Distribution system is within the facility

Alternative 1.A: Planned Project/Alternative 1.B: Ventura Compressor Station – Hybrid

The Ventura Compressor Station site is already connected to the distribution system. The planned project and a hybrid alternative at the existing site would be able to connect to the distribution system enabling passive rerouting without the need to bring cross compression equipment onsite. Table 31 presents the proximity to distribution system point assessments for these alternatives. This site scored a 9 because existing distribution lines are located within the property enabling the ability to limit or eliminate emissions during a blowdown.

Table 31. Proximity to Distribution System – Alternatives 1.A and 1.B: Ventura Compressor Station

Alternative	Proximity to Distribution System Total
1.A: Planned Project	9 points
1.B: Ventura Compressor Station – Hybrid	9 points

Alternative 2.A: Avocado Site – Natural Gas/Alternative 2.B: Avocado Site – Hybrid

The Avocado Site could not be connected to the distribution pipeline system without significant pipeline installation. The new pipeline route would connect to the south at the junction of Taylor Ranch Road/US 101. Table 32 presents the proximity to distribution system point assessments for these alternatives. This site scored a 1 because access to the existing distribution lines is more than 0.5 mile away.

Table 32. Proximity to Distribution System – Alternatives 2.A and 2.B: Avocado Site

Alternative	Proximity to Distribution System Total
2.A: Avocado Site – Natural Gas	1 point
2.B: Avocado Site – Hybrid	1 point

[38] In the event of an unplanned release or emergency, the emergency shutdown (ESD) system is designed to automatically evacuate natural gas rapidly, which may not enable cross-compression. At the Ventura Compressor Station, the ESD stack vents to atmosphere. As noted by the EPA, "rerouting combustible gases eliminates potential hazards in the operating area as well as reducing methane emissions" (EPA 2011).

Alternative 3.A: Ventura Steel – Natural Gas/Alternative 3.B: Ventura Steel – Hybrid

The Ventura Steel site would require a connection to existing distribution pipe within Ventura Avenue or a new distribution pipeline would be required from the existing compressor station site and north within Ventura Avenue. Table 33 presents the proximity to distribution system point assessments for these alternatives. This site scored a 5 because the distribution system access outside of the facility and less than 0.5 miles away.

Table 33. Proximity to Distribution System – Alternatives 3.A and 3.B: Ventura Steel

Alternative	Proximity to Distribution System Total
3.A: Ventura Steel –Natural Gas	5 points
3.B: Ventura Steel – Hybrid	5 points

Alternative 4.A: Devil's Canyon Road – Natural Gas/Alternative 4.B: Devil's Canyon Road – Hybrid

The Devil's Canyon Road site would require a distribution system connection to the east across the Ventura River and SR-33 at the Shell Road exit. Existing infrastructure potentially could be adapted to support the distribution interconnection. Table 34 presents the proximity to distribution system point assessments for these alternatives. This site scored a 2 because the distribution system access is greater than 0.5 miles away but closer to the distribution system than the Avocado Site.

Table 34. Proximity to Distribution System – Alternatives 4.A and 4.B: Devil's Canyon Road

Alternative	Proximity to Distribution System Total
4.A: Devil's Canyon Road – Natural Gas	2 points
4.B: Devil's Canyon Road – Hybrid	2 points

Alternative 5.A: County Line – Natural Gas/Alternative 5.B: County Line – Hybrid

The County Line site would require a new connection that would extend from the site north to the existing distribution pipeline system. Table 35 presents the proximity to distribution system point assessments for these alternatives. This site scored a 5 because the distribution system access is outside of the facility and less than 0.5 miles away.

Table 35. Proximity to Distribution System – Alternatives 5.A and 5.B: County Line

Alternative	Proximity to Distribution System Total
5.A: County Line – Natural Gas	5 points
5.B: County Line – Hybrid	5 points

4.3 Operational Assessment Summary

Table 36 presents the results of Sections 4.2.1 through 4.2.5 regarding the relative point values assessed for each operational consideration discussed in Section 4.2.

Table 36. Operational Assessment Summary Table

Alternative	Points
Auxiliary and Control Systems – All Natural Gas Alternatives	
1.A: Planned Project	9 points
2.A: Avocado Site – Natural Gas	9 points
3.A: Ventura Steel – Natural Gas	9 points
4.A: Devil's Canyon Road – Natural Gas	9 points
5.A: County Line – Natural Gas	9 points
Auxiliary and Control Systems – All Hybrid Alternatives	
1.B: Ventura Compressor Station – Hybrid	5 points
2.B: Avocado Site – Hybrid	5 points
3.B: Ventura Steel – Hybrid	5 points
4.B: Devil's Canyon Road – Hybrid	5 points
5.B: County Line – Hybrid	5 points
Backup Power Requirements – All Natural Gas Alternatives	
1.A: Planned Project	6 points
2.A: Avocado Site – Natural Gas	6 points
3.A: Ventura Steel – Natural Gas	6 points
4.A: Devil's Canyon Road – Natural Gas	6 points
5.A: County Line – Natural Gas	6 points
Backup Power Requirements – All Hybrid Alternatives	
1.B: Ventura Compressor Station – Hybrid	6 points
2.B: Avocado Site – Hybrid	6 points
3.B: Ventura Steel – Hybrid	6 points
4.B: Devil's Canyon Road – Hybrid	6 points
5.B: County Line – Hybrid	6 points
Emergency Access – All Alternatives	
1.A: Planned Project	9 points
1.B: Ventura Compressor Station – Hybrid	9 points
2.A: Avocado Site – Natural Gas	4 points
2.B: Avocado Site – Hybrid	4 points
3.A: Ventura Steel – Natural Gas	9 points
3.B: Ventura Steel – Hybrid	9 points
4.A: Devil's Canyon Road – Natural Gas	7 points
4.B: Devil's Canyon Road – Hybrid	7 points

Table 36. Operational Assessment Summary Table

Alternative	Points
5.A: County Line – Natural Gas	5 points
5.B: County Line – Hybrid	5 points
Geotechnical Engineering Constraints – All Alternatives	
1.A: Planned Project	6 points
1.B: Ventura Compressor Station – Hybrid	6 points
2.A: Avocado Site – Natural Gas	4 points
2.B: Avocado Site – Hybrid	4 points
3.A: Ventura Steel – Natural Gas	6 points
3.B: Ventura Steel – Hybrid	6 points
4.A: Devil's Canyon Road – Natural Gas	5 points
4.B: Devil's Canyon Road – Hybrid	5 points
5.A: County Line – Natural Gas	6 points
5.B: County Line – Hybrid	6 points
Proximity to Distribution System – All Alternatives	
1.A: Planned Project	9 points
1.B: Ventura Compressor Station – Hybrid	9 points
2.A: Avocado Site – Natural Gas	1 point
2.B: Avocado Site – Hybrid	1 point
3.A: Ventura Steel – Natural Gas	5 points
3.B: Ventura Steel – Hybrid	5 points
4.A: Devil's Canyon Road – Natural Gas	2 points
4.B: Devil's Canyon Road – Hybrid	2 points
5.A: County Line – Natural Gas	5 points
5.B: County Line – Hybrid	5 points

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5 Cost Estimate and Schedule Analysis

This section provides an analysis of cost and project schedule for each alternative option carried forward. Detailed information regarding cost estimates is included in Appendix C and schedule is in Appendix D.

5.1 Cost Estimate

SoCalGas uses accepted industry practices when estimating cost. The recognized expert in cost estimating and scheduling is the American Association of Cost Engineers (AACE). The AACE has established Recommended Practices (RPs) that are "intended to be the main technical foundation of … educational, and certification products and services. The RPs are a series of documents that contain valuable reference information that has been subject to a rigorous review process and recommended for use by the [AACE] Technical Board" (AACE 2022). Cost estimating is based on characteristics that can be used to categorize project cost estimate types as outlined in AACE RP 10S-90, "Cost Engineering Terminology." The level of project definition determines the information available to the estimating process (AACE 2021). Cost estimates are designated within a particular class from 1 to 5, based on the level of project definition available at the time of estimation. A Class 1 estimate is the closest to full project definition and maturity and a Class 5 is based on the lowest level of project definition (AACE 2021).

SoCalGas, with support from BMCD and SPEC Services, developed cost estimates in accordance with AACE RP 10S-90 for the various alternatives. Given the level of information available as of the date of this feasibility study, the planned project (Alternative 1.A) cost estimate is at Class 3 because the engineering analysis has been completed to a greater level of detail. Cost estimates for all other alternatives have been developed based on preliminary site considerations, an average site size of 15 acres, and construction assumptions outlined in Section 3 and are at Class 5.[39]

Project development costs are related to the one-time cost to implement the alternative. These costs include, but are not limited to, compressors, piping, land and easement acquisition, building materials, site and roadway grading and retaining walls, electrical conduit, power poles, and engineering design. To normalize project cost, a standard contingency of 30 percent was applied to the estimated total cost for each option. This percent contingency may overstate the

[39] In accordance with AACE RP 10S-90 (AACE 2021), cost estimates are classified as follows:
3. COST ESTIMATE CLASSIFICATION SYSTEM, CLASS 3 ESTIMATE – (Typical level of project definition required: 10% to 40% of full project definition.) Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. Class 3 estimates are typically prepared to support full project funding requests and become the first of the project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control. …
5. COST ESTIMATE CLASSIFICATION SYSTEM, CLASS 1 ESTIMATE – (Typical level of project definition required: 65% to 100% of full project definition.) Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's or vendor's bid estimate, or to evaluate/dispute claims or change orders (AACE 2021).

planned project's cost (Alternative 1.A) because the cost estimate is at a Class 3 and typically a lower contingency would be applied. However, this adjustment allows project cost to be evaluated consistent with other alternative options carried forward.

Operational costs are related to the ongoing annual cost incurred to operate the compressor station. A hybrid station requires more electric power; as such, SCE electricity is a greater portion of the operational cost. The County Line Alternative would require five compressors (either five natural gas [Alternative 5.A.] or two natural gas and three electric [Alternative 5.B.]), which is the reason for the greater cost differential compared to other sites with four compressors. Please refer to Appendix C for detailed cost estimate information and Table 37 below for summary costs.

Table 37. Ventura Compressor Station Alternatives – Cost Estimates

Alternative	Project Development Cost (Nonrecurring)	Operational Cost (Annual Recurring)
1.A: Planned Project	$421MM	$0.904MM
1.B: Current Site – Hybrid	$464MM	$1,778MM
2.A: Avocado Site – Natural Gas	$677MM	$0.949MM
2.B: Avocado Site – Hybrid	$707MM	$1,823MM
3.A: Ventura Steel – Natural Gas	$607MM	$0.909MM
3.B: Ventura Steel – Hybrid	$635MM	$1,783MM
4.A: Devil's Canyon Road – Natural Gas	$566MM	$0.919MM
4.B: Devil's Canyon Road – Hybrid	$594MM	$1,793MM
5.A: County Line – Natural Gas	$593MM	$1.124MM
5.B: County Line – Hybrid	$622MM	$2,522MM

Source: SCE 2019.
Notes: MM = million.
Costs are presented in 2022 dollars with escalation/inflation included.
Electric rates were based on SCE fixed tariff Schedule TOU-GS-2 (SCE 2019).

5.2 Schedule Analysis

SoCalGas, with technical support from BMCD and SPEC Services, developed schedule estimates for each alternative. Schedule estimates were also based on accepted industry standards using AACE RP 91R-16, "Schedule Development" (AACE 2020). Schedules are differentiated by the degree of detail available at the time of estimation, with the least detailed being a Level 1 schedule and the most detailed being a Level 5 schedule.[40] The schedule for the planned project

[40] In accordance with AACE RP 91R-16 (AACE 2020), schedules are classified as follows:
Level 1: A Level 1 schedule is a high-level schedule that reflects key milestones and summary activities by major phase, stage or project being executed. This schedule level may represent summary activities of an execution stage, specifically engineering, procurement, construction and start-up activities. Typically represented in Gantt format and depending upon when and how developed, a Level 1 schedule may or may not be the summary roll-up of a more detailed CPM schedule. Level 1 schedules provide high-level information that assist in the decision making process (go/no go prioritization and criticality of projects). …
Level 3: Level 3 schedules are generally prepared to communicate the execution of the deliverables for each of the contracting parties. The schedule should reflect the interfaces between key workgroups, disciplines,

(Alternative 1.A) is a Level 3 and all other alternatives are at a Level 1. Because schedule delays can have a variety of outcomes, including increased maintenance, obsolete replacement parts, lack of staffing and/or equipment resources, and increased cost, alternatives were evaluated based on three categories reflected in the scoring rubric related to schedule. Furthermore, as noted in the CPUC's Decision D.19-09-051 on SoCalGas' 2019 GRC application, "We do however encourage SoCalGas to place a high priority on critical projects under this category as most of its compressors are over 50 years old and because of key risks that need to be mitigated in this area" (D.19-09-051 at pp. 116-117). The consideration of schedule aligns with the CPUC's input.

Permitting assumptions are preliminary and are based on the level of detail available for each alternative at this time and could change depending on the ultimate selection of the site layout and equipment. Please refer to Appendix B for the scoring rubric and Appendix D for the schedule estimates.

5.2.1 Applicability of Local Agency Permits

An important consideration related to permitting and its impact on a particular alternative's schedule is the overarching authority of the CPUC to regulate natural gas utilities. Article XII, Section 8 of the California Constitution establishes the CPUC's preemptive authority over matters which the Legislature has granted the CPUC regulatory powers:

> A city, county, or other public body may not regulate matters over which the Legislature grants regulatory power to the Commission. This section does not affect power over public utilities relating to the making and enforcement of police, sanitary, and other regulations concerning municipal affairs pursuant to a city charter existing on October 10, 1911, unless that power has been revoked by the city's electors, or the right of any city to grant franchises for public utilities or other businesses on terms, conditions, and in the manner prescribed by law.

CPUC decisions,[41] as well as California courts, have confirmed the CPUC's preemptory powers. As such, no local discretionary (e.g., rezone, land use) permits would be required because the CPUC has preemptive jurisdiction over the siting, construction, maintenance, and operation of natural gas facilities in California. The CPUC's authority does not preempt special districts, such as air quality management districts, other state agencies, or the federal government. Additionally, SoCalGas would still have to obtain all ministerial permits from local jurisdictions. Local agency permits are discussed for each alternative to provide awareness to the reader.

5.2.2 Alternatives Evaluation of Schedule

This section evaluates the estimated schedule for each potential alternative. As noted above, permitting assumptions are preliminary and are based on the level of detail available for each

or crafts involved in the execution of the stage. Typically presented in Gantt or CPM network format and is generally the output of CPM scheduling software. Level 3 schedules provide enough detail to identify critical activities. Level 3 schedules assist the team in identifying activities that could potentially affect the outcome of a stage or phase of work, allowing for mitigation and course correction in short course. Audiences for this type of schedule include, but are not limited to program or project managers, CMs or owner's representatives, superintendents, and general foremen (AACE 2020).

41 In D.94-06-014 (CPUC 2019), "[t]he Commission has restated its exclusive jurisdiction over the location and construction of public utility facilities in numerous decisions."

alternative at this time and could change depending on the ultimate selection of the site layout and equipment (see Table 38).

Table 38. Alternatives Evaluation of Schedule

Scheduling Component	0	1-2-3	4-5-6	7-8-9
Project Permitting Complexity	Substantial permitting complexity	Moderate permitting complexity	Minimal permitting complexity	None or negligible permitting complexity
Property/Right-of-Way Acquisition Required	Greater than 10 properties/ROW acquisition	5 to 9 properties/ ROW acquisition	1 to 4 properties/ ROW acquisition	No permanent properties/ROW acquisition, only temporary construction access
Construction Duration	Longer than 4 years	3 to 4 years	2 to 3 years	Less than 2 years

Notes: ROW = right-of-way.
Permitting complexity relates to the number of agency permits anticipated for a particular alternative.
Construction duration is assumed to begin upon issuance of permits through commissioning of equipment.

Alternative 1.A: Planned Project

A permit to construct (PTC) was filed with the VCAPCD in March 2020. Coverage under the National Pollutant Discharge Elimination System (NDPES) would be required through filing a Notice of Intent with the Los Angeles Regional Water Quality Control Board as well as implementation of a Stormwater Pollution Prevention Plan during construction, since greater than one acre would be disturbed. Ministerial permits for site construction activities, such as building permits, will be required from the City of Ventura. These types of permits are typically granted within three to six months and applications would be filed upon completion of final engineering. Temporary construction and access easements will be required for two staging areas/laydown yards from private landowners adjacent to the facility, but no other offsite easements are anticipated. Construction would begin upon issuance of applicable permits and is anticipated to take 24 months due to site preparation, pipeline and utility modifications, and building construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 39.

Table 39. Evaluation of Schedule – Alternative 1.A: Planned Project

Scheduling Component	Points
Project Permitting	8
Property/Right-of-Way Acquisition	8
Construction Duration	8

Alternative 1.B: Ventura Compressor Station – Hybrid

As noted above, a PTC was filed with the VCAPCD in March 2020. However, the application addresses the planned project configuration of four new natural gas compressors, whereas Alternative 1B would include two natural gas and two electric compressors. As such, the PTC

application would need to be amended to modify the proposed equipment. The VCAPCD process typically takes 6 to 18 months from application filing to issuance of a permit. Coverage under the NDPES would be required through filing a Notice of Intent with the Los Angeles Regional Water Quality Control Board and the implementation of a Stormwater Pollution Prevention Plan during construction, since greater than one acre would be disturbed. Ministerial permits for site construction activities, such as building permits, would be required from the City of Ventura. Coordination with SCE would also be required to address any electrical upgrades, such as replacement of poles or conduit, which may require the filing of an advice letter with the CPUC in accordance with General Order 131-D.[42] Temporary construction and access easements will be required for staging areas/laydown yards and potentially for electrical lines if SCE does not already have easements/right-of-way in place. However, based on aerial imagery and publicly accessible SCE information, electrical infrastructure is located adjacent to the site. Construction would begin upon issuance of applicable permits and is anticipated to take 30 to 36 months due to site preparation, pipeline and utility modifications, minimal SCE electrical system modifications, and building construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 40.

Table 40. Evaluation of Schedule – Alternative 1.B: Ventura Compressor Station – Hybrid

Scheduling Component	Points
Project Permitting	7
Property/Right-of-Way Acquisition	8
Construction Duration	6

Alternative 2.A: Avocado Site – Natural Gas

Alternative 2.A would require a PTC from the VCAPCD for the four new natural gas compressors. The VCAPCD process typically takes 6 to 18 months from application filing to issuance of a permit. The site and potential pipeline and utility corridors may impact riparian habitat associated with tributaries that flow to the Ventura River, potentially requiring a U.S. Army

[42] General Order (GO) 131-D applies to the construction of electric power line and substation facilities designed to operate between 50 and 200 kV. Section III, Subsection B.1, exempts a utility from the CPUC's requirement to file an application requesting authority to construct if a project meets specific conditions, such as: replacing existing power line facilities or supporting structures with equivalent facilities or structures; minor relocation of existing power facilities up to 2,000 feet in length or intersetting of additional support structures between existing support structures. When electrical improvements are exempt from GO 131-D, a utility must file an informational advice letter with the Commission Advisory and Compliance Division (CACD) and the CPUC Public Advisor in accordance with GO 96-A.
GO131-D, Section III, A. requires a Certificate of Public Convenience and Necessity (CPCN) when "any new electric generating plant having in aggregate a net capacity available at the busbar in excess of 50 megawatts (MW), or of the modification, alteration, or addition to an existing electric generating plant that results in a 50 MW or more net increase in the electric generating capacity available at the busbar of the existing plant, or of major electric transmission line facilities which are designed for immediate or eventual operation at 200 kV or more… ."
GO131-D, Section III, B. requires a or Permit to Construct (PTC) when "any electric power line facilities or substations which are designed for immediate or eventual operation at any voltage between 50 kV or 200 kV or new or upgraded substations with high side voltage exceeding 50 kV."

Corps of Engineers Clean Water Act (CWA) Section 404 Nationwide Permit (404 NWP),[43] CWA Section 401 Water Quality Certification (401 Certification),[44] and California Department of Fish and Wildlife (CDFW) streambed alteration agreement (SAA).[45] The southerly portion of the proposed Taylor Ranch Road roadway improvements would extend into the State Coastal Zone, potentially requiring a coastal development permit issued by the County of Ventura.[46]

Local agency discretionary permits would not apply, as discussed in Section 5.2.1. However, local agency permits are discussed to provide awareness to the reader. The property is zoned by the County of Ventura as "AE-40 ac – Agricultural Exclusive, 40 acres minimum parcel size" (Ventura County 2021b). Section 8105-4 – Permitted Uses in Open Space, Agricultural, Residential and Special Purpose Zones states that pipelines require a conditional use permit (CUP) subject to approval by the Planning Director and that "Public Service/Utility Facilities" that include "Public Service/Utility Offices And Service Yards, When Located On Lots Containing The Majority Of The Agency's Facilities" are not allowed in the AE zone. Additionally, the site is within the SOAR initiative area, which in general requires countywide voter approval of (1) any substantive change to the General Plan's Agricultural, Open Space, or Rural land use goals or policies and (2) re-designation of land with these General Plan land use designations.

Ministerial permits for site construction activities, such as building permits, will be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, such as new poles or conduit, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D.

Substantial property and access rights across adjacent properties to the nearest public right-of-way would need to be acquired. The land is currently planted with an active avocado orchard, affecting the value of the property. Temporary construction and access easements would also be required for a staging area/laydown yard and potentially for electrical lines if SCE does not already have easements/right-of-way in place. Construction would begin upon issuance of

[43] CWA Section 404 establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. For most discharges that will have only minimal adverse effects, a general permit may be suitable. General permits are issued on a nationwide, regional, or state basis for particular categories of activities. An NWP is a general permit that authorizes activities across the country, unless revoked by a district or division commander. NWPs authorize a wide variety of activities such as mooring buoys, residential developments, utility lines, road crossings, mining activities, wetland and stream restoration activities, and commercial shellfish aquaculture activities (EPA 2022).

[44] CWA Section 401 establishes the State Water Resources Control Board and the Regional Water Quality Control Boards' authority to regulate discharges of dredged or fill material to waters of the state; it also establishes the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). CWA Section 401 water quality certifications are issued to applicants for a federal license or permit for activities that may result in a discharge into waters of the United States, including but not limited to the discharge or dredged or fill material. Waste discharge requirements under the Porter-Cologne Act are issued for discharges of dredged or fill material to waters of the state (California Water Boards 2022).

[45] California Fish and Game Code Section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW prior to beginning any activity that may do one or more of the following: divert or obstruct the natural flow of any river, stream, or lake; change the bed, channel, or bank of any river, stream, or lake; use material from any river, stream, or lake; or deposit or dispose of material into any river, stream, or lake (CDFW 2022).

[46] The California Coastal Act established the California Coastal Commission (Coastal Commission) and requires certification by the Coastal Commission of a Local Coastal Program (LCP) to govern decisions that determine the short- and long-term conservation and use of coastal resources within a local agency's jurisdiction. After an LCP has been approved, state coastal permitting authority over most new development is transferred from the Coastal Commission to the local government, which then applies the requirements of the LCP in reviewing proposed development. Ventura County's LCP was certified by the Coastal Commission on June 7, 2017 (Coastal Commission 2022; Ventura County 2017).

applicable permits and is anticipated to take 60 to 70 months due to roadway installation, utility installation, significant site preparation and grading due to the slope of the property (see Table 4: Alternative 2.A Construction Assumptions/Estimates), SCE electrical system improvements, and building construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 41.

Table 41. Evaluation of Schedule – Alternative 2.A: Avocado Site – Natural Gas

Scheduling Component	Points
Project Permitting	5
Property/Right-of-Way Acquisition	4
Construction Duration	0

Alternative 2.B: Avocado Site – Hybrid

As discussed in Alternative 2.A above, a PTC from the VCAPCD would be required, however only for two natural gas compressors. All other federal and state permits noted in Alternative 2.A would be anticipated for Alternative 2.B. Local agency discretionary permits would not apply, as discussed in Section 5.2.1; however, local agency permits related to this site are discussed above in Alternative 2.A to provide awareness to the reader. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D. The electrical interconnection would require at least 5 MW, necessitating additional infrastructure.

Substantial property and access rights across adjacent properties to the nearest public right-of-way would need to be acquired. The land is currently planted with an active avocado orchard, affecting the value of the property. Temporary construction and access easements would also be required for a staging area/laydown yard and potentially for electrical lines if SCE does not already have easements/right-of-way in place. Construction would begin upon issuance of applicable permits and is anticipated to take 60 to 70 months due to roadway installation, utility installation, significant site preparation and grading due to the slope of the property (see Table 5: Alternative 2.B Construction Assumptions/Estimates), SCE electrical system improvements, and building construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 42.

Table 42. Evaluation of Schedule – Alternative 2.B: Avocado Site – Hybrid

Scheduling Component	Points
Project Permitting	4
Property/Right-of-Way Acquisition	4
Construction Duration	0

Alternative 3.A: Ventura Steel – Natural Gas

Alternative 3.A would require a PTC from the VCAPCD for the four new natural gas compressors. The property is currently developed with industrial uses, including oil extraction infrastructure, and is zoned by the Ventura County zoning ordinance as "M3-10,000 sf – General Industrial, 10,000 sf minimum parcel size" (Ventura County 2020, 2021b). The site and potential pipeline and utility corridors may impact riparian habitat associated with tributaries that flow to the Ventura River, potentially requiring a 404 NWP, 401 Certification, and SAA.

Local agency discretionary permits would not apply, as discussed in Section 5.2.1. However, local agency permits are discussed to provide awareness to the reader. Section 8105-5, Permitted Uses in Commercial and Industrial Zones, states that pipelines require a CUP subject to approval by the Planning Director and a Public Utility Facility requires a Planning Director approval.

Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D.

The property would need to be acquired from the landowner although access to the site is immediately adjacent to a public right-of-way (Ventura Avenue). To install two new transmission pipelines, significant rights-of-way would be required (anticipated to be at least 12 properties). Land is currently developed with industrial land uses, including oil extraction. Construction would begin upon completion of oil extraction activity remediation, transfer of property and issuance of applicable permits and is anticipated to take 36 to 48 months due to roadway installation, utility installation, site preparation and grading, SCE electrical system modifications, and building construction and equipment installation (see Table 6: Alternative 3.A Construction Assumptions/Estimates). The points assessments of the three schedule components for this alternative are presented in Table 43.

Table 43. Evaluation of Schedule – Alternative 3.A: Ventura Steel – Natural Gas

Scheduling Component	Points
Project Permitting	6
Property/Right-of-Way Acquisition	0
Construction Duration	5

Alternative 3.B: Ventura Steel – Hybrid

As discussed in Alternative 3.A, a PTC from the VCAPCD would be required, however only for two new natural gas compressors. All other federal and state permits noted in Alternative 3.A would be anticipated for Alternative 3.B. Local agency discretionary permits would not apply, as discussed in Section 5.2.1; however, local agency permits related to this site are discussed in Alternative 3.A to provide awareness to the reader. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D. The electrical interconnection would require at least 5 MW, necessitating additional infrastructure.

Significant property would need to be acquired from the landowner although access to the site is immediately adjacent to a public right-of-way (Ventura Avenue). To install two new transmission pipelines, significant right-of-way would be required (anticipated to be at least 12 properties). The land is currently developed with industrial land uses, including oil extraction. Construction would begin upon completion of oil extraction activity remediation, transfer of property and issuance of applicable permits and is anticipated to take 36 to 48 months due to roadway installation, utility installation, site preparation and grading, SCE electrical system improvements, and building construction and equipment installation (see Table 7: Alternative 3.B Construction Assumptions/Estimates). The points assessments of the three schedule components for this alternative are presented in Table 44.

Table 44. Evaluation of Schedule – Alternative 3.B: Ventura Steel – Hybrid

Scheduling Component	Points
Project Permitting	5
Property/Right-of-Way Acquisition	0
Construction Duration	4

Alternative 4.A: Devil's Canyon Road – Natural Gas

Alternative 4.A would require a new application for a PTC from the VCAPCD for four new natural gas compressors. The property is currently used for oil extraction and is zoned by the Ventura County zoning ordinance as "OS-160 ac, Open Space, 160 acres minimum parcel size" with a Habitat Connectivity Corridor mapped along the Ventura River (Ventura County 2020, 2021b). The site and potential pipeline and utility corridors may impact riparian habitat associated with tributaries that flow to the Ventura River, potentially requiring a 404 NWP, 401 Certification, and SAA.

Local agency discretionary permits would not apply, as discussed in Section 5.2.1. However, local agency permits are discussed to provide awareness to the reader. Pursuant to Section 8105-4, Permitted Uses in Open Space, Agricultural, Residential and Special Purpose Zones, pipelines require a CUP subject to approval by the Planning Director and a Public Utility Facility requires a Planning Commission CUP approval. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D.

Significant property would need to be acquired from the landowner although access to the site is available from an existing driveway to a public right-of-way. To install new transmission pipelines, five properties are anticipated to require pipeline easements. The land is currently developed with industrial land uses, including oil extraction. Construction would begin upon completion of oil extraction activity remediation, transfer of property and issuance of applicable permits and is anticipated to take 24 to 30 months due to utility modifications, site preparation and grading, building construction, and equipment installation (see Table 8: Alternative 4.A Construction Assumptions/Estimates). The points assessments of the three schedule components for this alternative are presented in Table 45.

Table 45. Evaluation of Schedule – Alternative 4.A: Devil's Canyon Road – Natural Gas

Scheduling Component	Points
Project Permitting	6
Property/Right-of-Way Acquisition	2
Construction Duration	6

Alternative 4.B: Devil's Canyon Road – Hybrid

As discussed in Alternative 4.A, a new application for a PTC from the VCAPCD would be required, however only for two new natural gas compressors. All other federal and state permits noted in Alternative 4.A would be anticipated for Alternative 4.B. Local agency discretionary permits would not apply, as discussed in Section 5.2.1; however, local agency permits related to this site are discussed in Alternative 4.A to provide awareness to the reader. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D. The electrical interconnection would require at least 5 MW, necessitating additional infrastructure.

Significant property would need to be acquired from the landowner although access to the site is available from an existing driveway to a public right-of-way. To install new transmission pipelines, five properties are anticipated to require pipeline easements. The land is currently developed with industrial land uses. Construction would begin upon completion of oil extraction activity remediation, transfer of property and issuance of applicable permits and is anticipated to take 24 to 30 months due to utility modifications, site preparation and grading, SCE electrical system improvements, and building construction and equipment installation (see Table 9: Alternative 4.B Construction Assumptions/Estimates). The points assessments of the three schedule components for this alternative are presented in Table 46.

Table 46. Evaluation of Schedule – Alternative 4.B: Devil's Canyon Road – Hybrid

Scheduling Component	Points
Project Permitting	5
Property/Right-of-Way Acquisition	2
Construction Duration	5

Alternative 5.A: County Line – Natural Gas

Alternative 5.A would require a PTC from the VCAPCD for five new natural gas compressors. The site and potential pipeline and utility corridors may impact riparian habitat associated with Rincon Creek and/or tributaries that flow to Rincon Creek, potentially requiring a 404 NWP, 401 Certification, and SAA. The southerly portion of the project site and staging area may extend into the State Coastal Zone, potentially requiring a coastal development permit issued by the County of Ventura.

Local agency discretionary permits would not apply, as discussed in Section 5.2.1. However, local agency permits are discussed to provide awareness to the reader. The property is zoned by the Ventura County zoning ordinance as "AE-40 ac – Agricultural Exclusive, 40 acres minimum parcel size" and is within the area governed by SOAR initiative (Ventura County 2020, 2021a). Section 8105-4 – Permitted Uses in Open Space, Agricultural, Residential and Special Purpose Zones states that pipelines require a CUP subject to approval by the Planning Director and that "Public Service/Utility Facilities" that include "Public Service/Utility Offices And Service Yards, When Located On Lots Containing The Majority Of The Agency's Facilities" are not allowed in the AE zone. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, such as new poles or conduit, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D.

Moderate property and access rights across adjacent properties to the nearest public right-of-way would need to be acquired. To install new transmission pipelines, five properties are anticipated to require pipeline easements; the subject land is currently vacant. Construction would begin upon issuance of applicable permits and is anticipated to take 60 to 70 months due to roadway installation, utility installation, significant site preparation and grading due to the slope of the property (see Table 10: Alternative 5.A Construction Assumptions/Estimates), and building construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 47.

Table 47. Evaluation of Schedule – Alternative 5.A: County Line – Natural Gas

Scheduling Component	Points
Project Permitting	5
Property/Right-of-Way Acquisition	2
Construction Duration	0

Alternative 5.B: County Line – Hybrid

As discussed in Alternative 5.A, a new application for a PTC from the VCAPCD would be required, however only for two new natural gas compressors. Local agency discretionary permits would not apply, as discussed in Section 5.2.1; however, local agency permits related to this site are discussed in Alternative 5.A to provide awareness to the reader. All other federal and state permits noted in Alternative 5.A would be anticipated for Alternative 5.B. Ministerial permits for site construction activities, such as building permits, would be required from the County of Ventura. Coordination with SCE would also be required to address any electrical upgrades, which may require the filing of an advice letter with the CPUC or a PTC in accordance with General Order 131-D. The electrical interconnection would require at least 5 MW, necessitating additional infrastructure.

Moderate property would need to be acquired from the landowner. To install new transmission pipelines, five properties are anticipated to require pipeline easements; the subject land is currently vacant. Construction would begin upon issuance of applicable permits and is anticipated to take 60 to 70 months due to roadway installation, utility installation, significant site preparation and grading due to the slope of the property (see Table 11: Alternative 5.B Construction Assumptions/Estimates), SCE electrical system improvements, and building

construction and equipment installation. The points assessments of the three schedule components for this alternative are presented in Table 48.

Table 48. Evaluation of Schedule – Alternative 5.B: County Line – Hybrid

Scheduling Component	Points
Project Permitting	4
Property/Right-of-Way Acquisition	2
Construction Duration	0

6 Results of Evaluation

SoCalGas appreciates the community's and CPUC's collaboration regarding the Ventura Compressor Station. As discussed in Section 1.2 Feasibility Study Methodology, there is no prescriptive format or template for a feasibility study. As such, SoCalGas developed this study based on the foundational purpose, need and objectives of the project, essential site criteria and five supplemental considerations. If an alternative site or technology did not meet the foundational purpose, need and most objectives or essential site criteria, it was dismissed from further consideration. Those alternatives that were carried forward were analyzed in accordance with a scoring rubric (Appendix B) in five areas including: operational considerations, environmental considerations, project cost, operational cost, and schedule. The top three alternative options were identified in each of the five areas that were evaluated. As noted below, however, there are additional factors (such as age of facility equipment, timing, and ability to acquire alternative sites considered in this study) which are not captured by this feasibility analysis and impact the results of this evaluation. The results of the evaluation are shown in Table 49. Results of Evaluation.

Table 49. Results of Evaluation

Ranking Order	Operational Considerations	Environmental Considerations	Project Cost	Operational Cost	Schedule
1	1A Planned Project	4B Devil's Canyon Road – Hybrid	1A Planned Project	1A Planned Project	1A Planned Project
2	3A Ventura Steel – Natural Gas	1B Current Site – Hybrid	1B Current Site – Hybrid	3A Ventura Steel – Natural Gas	1B Current Site – Hybrid
3	1B Current Site – Hybrid	3B Ventura Steel – Hybrid	4A Devil's Canyon Road – Natural Gas	4A Devil's Canyon Road – Natural Gas	4A Devil's Canyon Road – Natural Gas

Note: Environmental considerations were evaluated by Dudek and the results in Table 49 reflect their analysis.

Overall, Alternative 1.A Planned Project received the highest scores in four of the five categories (operational considerations, project cost, operational cost, and schedule). Alternative 1.B Current Site- Hybrid received the second highest score in the most categories. Alternative 4.B Devil's Canyon Road – Hybrid received the highest score in the environmental considerations.

The results indicate that the top three alternative options for environmental considerations are existing industrial sites with a hybrid compressor configuration. The top three alternative options for long-term operational costs are existing industrial sites with a natural gas compressor configuration. The remaining categories include both natural gas and hybrid options at existing industrial sites as the top three alternative options.

6.1 Preferred Alternative

Although Alternative 1.A Planned Project received the highest rankings in the most categories, SoCalGas has selected Alternative 1.B Current Site – Hybrid, which received the second highest rankings in the most categories, as the preferred alternative.

6.1.1 Greater Reliability Benefits

Based on the natural gas forecast of the 2020 California Gas Report (CGEU 2020), natural gas use is anticipated to slowly decline with greater emphasis on renewable sources such as solar and wind, placing a greater emphasis on operational flexibility and the ability of equipment to ramp up and down quickly. The Ventura Compressor Station is situated to support the Central Coast and meet reliability needs. It is the last compressor station on SoCalGas' Coastal System and the main feed to support storage injection at the La Goleta Storage Field as well as support customers on the Central Coast. Gas stored at the La Goleta Storage Field ultimately is used by customers on the Central Coast, including Ventura.

A recent study performed by the CPUC confirms the importance of maintaining gas storage to support overall gas demand.[47] This study includes modeling forecasts that are based on six scenarios developed by the CPUC that account for receipt point utilization, (the percent of the total capacity used at locations where gas enters the SoCalGas system), unplanned outages and storage withdrawal capacity (Abdelaziz et al. 2021). The results of the study reinforce the need to maintain available storage capacity, especially during winter peak demand, through at least 2030.

SoCalGas identified the need to proceed with a modernization of the 1980s facility equipment in 2013 (see SoCalGas DR– 4). Since 2016, SoCalGas has had a collective total of 73 maintenance events and cumulative total of 461 days when a compressor unit has been out of service (see SoCalGas DR-2). SoCalGas' trained maintenance staff are routinely performing inspections of the compressor equipment, but the risk of equipment failure increases the longer the aging equipment remains in use. Alternative site locations, such as those discussed in this study, would require site acquisition and pipeline easements over multiple properties, and in the event a landowner did not voluntarily sell land, SoCalGas could be forced to condemn land, which may take years and is not certain to be approved through an adjudicative process. Additionally, the condemnation process would consider whether other feasible locations not requiring condemnation are available, and given that SoCalGas currently operates a compressor station in the current location, the ability to condemn is not straight forward. Consequently, the analysis of alternative site acquisition is uncertain and beyond the scope of this feasibility study.

Given the age of the existing infrastructure, the uncertainty associated with acquiring alternative sites, and the time it would take to, permit, and construct a compressor station at a new location, constructing the modernization project at the current site would best support the fundamental purpose of the project, which is to (1) continue providing reliable compression to customers in Ventura and along the central coast, (2) enhance reliability by modernizing aging infrastructure; and (3) support gas deliveries to the La Goleta Storage Field.

[47] "Gas demand falls into three categories: (1) core (residential, commercial, industrial, municipal, and wholesale); (2) noncore, non-electric generation (commercial, industrial, refinery, and enhanced oil recovery); and (3) noncore, electric generation (EG). SoCalGas sells gas to core customers, whereas noncore customers buy their gas from other sources and SoCalGas delivers it" (Abdelaziz et al. 2021).

6.1.2 Greater Emission Reductions

SoCalGas is committed to taking measurable steps to reduce emissions and decarbonize its operations. Ventura County, where the compressor station is located, is in nonattainment with both the 2008 and 2015 federal 8-hour ozone standards. Both the all-natural gas options and the hybrid options significantly reduce permitted oxides of nitrogen (NO_x) emissions as compared to the existing facility's permitted emissions. Moreover, a hybrid option will reduce permitted emissions beyond those of a natural gas option. Specifically, a hybrid option would result in approximately 75% reduction in permitted NO_x emissions as compared to the existing facility's permitted NO_x emissions.

In addition, the hybrid option will decrease potential carbon dioxide equivalent (CO_2e) emissions by approximately 30% as compared to the all-gas option. As discussed in Section 1.1.4, reducing carbon intensity across all economic sectors is foundational to achieving California's net zero GHG emission goals.

6.1.3 Cost

As a prudent operator, SoCalGas must consider the short-term project costs and the long-term operational costs in relationship to the associated effects on ratepayers. No additional weighting was given to operational cost in comparison to project development cost despite the fact that operational costs are recurring for the life of the project.

As discussed in Section 5.1, SoCalGas' cost estimates for the 10 alternatives were based on the accepted AACE cost estimating practices. The top three alternatives for project development cost are shown in Table 50. Alternative 1.A Planned Project is the lowest total cost because no land acquisition for site development or ancillary infrastructure (pipelines, electric lines) is required. Furthermore, the existing pipeline infrastructure within the footprint of the existing compressor station is in place and only requires minor modification to connect to the proposed compressor building. As with 1.A, Alternative 1.B Current Site – Hybrid minimizes costs because no land acquisition for site development is required and pipeline infrastructure is already in place. The incremental $43 million (MM) is related to the additional onsite infrastructure required for a hybrid option (substation, electric drop). The third lowest project development cost, Alternative 4.A Devil's Canyon Road – Natural Gas, is approximately $100MM greater in cost than 1.B and $145MM greater in cost than 1.A.

Table 50. Ventura Compressor Station Alternatives – Project Development Cost Estimates – Top 3

Alternative	Project Development Cost (Nonrecurring)
1.A: Planned Project	$421MM
1.B: Current Site – Hybrid	$464MM
4.A: Devil's Canyon Road – Natural Gas	$566MM

Note: MM = million.

Overall, natural gas options have significantly less overall operational costs. The primary operational cost driver for all hybrid alternatives is the cost of SCE electricity. The top three alternatives for operational cost are provided in Table 51. For the hybrid alternatives, 1.B is the lowest annual operating cost and it is still $1.685MM above 1.A. Estimates were developed by

SPEC Services and calculated the fuel/power usage required to operate the engine/motor and multiplied it by the SCE anticipated rate (SCE 2019).

Table 51. Ventura Compressor Station Alternatives – Operational Cost Estimates – Top 3

Alternative	Operational Cost (Recurring)
1.A: Planned Project	$0.904MM
3.A: Ventura Steel – Natural Gas	$0.909MM
4.A: Devil's Canyon Road – Natural Gas	$0.919MM

Note: MM = million.

Although the long-term operational costs of any hybrid option will be greater than a natural gas option, the emission reductions and overall progression towards a net zero future achieved with 1.B outweighs the lower cost of 1.A.

For the reasons noted above, SoCalGas believes that 1.B Current Site – Hybrid best achieves the project's purpose of continuing to provide reliable service, while supporting decarbonization and reducing emissions at the lowest cost to ratepayers.

6.2 Next Steps

This feasibility study will be shared on SoCalGas' Ventura project website accessible here: www.socalgas.com/ventura, no later than March 25, 2022. The feasibility study will be presented to the community and CPUC in March/April 2022 during Public Forum meetings. It is SoCalGas' intention to move forward with Alternative 1.B Current Site – Hybrid and continue to place a high priority on this critical project to address the fundamental needs of SoCalGas' transmission system and replace the aging equipment consistent with Commission Decision D.19-09-051.

7 References

AACE (American Association of Cost Engineers). 2020. AACE International Recommended Practice No. 91R-16. Schedule Development. TCM Framework:7-2 – Schedule Planning and Development. Rev. August 3, 2020.

AACE. 2021. AACE International Recommended Practice No. 10S-90. Cost Estimating Terminology. TCM Framework: General Reference (All Sections). Rev. September 30, 2021. Accessed online January 19, 2022: https://web.aacei.org/docs/default-source/rps/10s-90.pdf?sfvrsn=64.

AACE. 2022. "Recommended Practices." Accessed online January 19, 2022: https://web.aacei.org/resources/recommended-practices.

Abdelaziz, K., L. Cosby, C. Ly, and D. Brooks. 2021. Aliso Canyon I.17-02-002 Phase 2: Modeling Report by the Staff of the California Public Utilities Commission. January 26, 2021.

AGA (American Gas Association). 2020. *Blowdown Emission Reduction White Paper*. Authored by the Joint Blowdown Emission Reduction Taskforce of the AGA Environmental Matters Committee and the AGA Engineering Committee. Accessed online December 20, 2021: https://www.aga.org/contentassets/fdb295e9799449d78d3b07b4a0eac453/aga-blowdown-emissions-reduction-white-paper-final-8.5.20.pdf.

Blunt, K. "America's Power Grid is Increasingly Unreliable." *Wall Street Journal*. February 18, 2022. Accessed online February 18, 2022: https://www.wsj.com/articles/americas-power-grid-is-increasingly-unreliable-11645196772.

CALFIRE/VCFPD (California Department of Forestry and Fire Protection and Ventura County Fire Department). 2019. Investigation Report 17CAVNC103156. March 13, 2019. Accessed online February 17, 2022: https://vcfd.org/wp-content/uploads/2020/02/Thomas-Fire-Investigation-Report_Redacted_3-14-19.pdf.

CalGEM (California Geologic Energy Management Division). 2022. Geologic Energy Management Laws and Rulemaking. Accessed online January 21, 2022: https://www.conservation.ca.gov/calgem/Pages/Oil,-Gas,-and-Geothermal-Rulemaking-and-Laws.aspx.

California Water Boards (California State Water Resources Control Board). 2022. 401 Water Quality Certification and Wetlands Program. Accessed online January 21, 2022: waterboards.ca.gov/water_issues/programs/cwa401/.

CDFW (California Department of Fish and Wildlife). 2022. Lake and Streambed Alteration Agreement Program. Accessed online January 21, 2022: https://wildlife.ca.gov/Conservation/Environmental-Review/LSA.

CGEU (California Gas and Electric Utilities). 2020. *2020 California Gas Report*. Accessed online December 7, 2021: https://www.socalgas.com/sites/default/files/2020-10/2020_California_Gas_Report_Joint_Utility_Biennial_Comprehensive_Filing.pdf.

City of Ventura. 2017. City Grading Ordinance No 2017-009(Grading). May 22, 2017. Accessed online December 11, 2021: https://www.cityofventura.ca.gov/DocumentCenter/View/1445/City-Grading-Ordinance-Number-2017-009.

City of Ventura. 2019. Current General Plan Designations. June 28, 2019. Accessed online December 11, 2021: https://map.cityofventura.net/zoom/genplan/docs/ventura_genplan.pdf.

City of Ventura. 2020. Zoning District Map. February. Accessed online December 11, 2021: https://map.cityofventura.net/zoom/zoning/docs/ventura_zoning.pdf

City of Ventura. 2021. Ventura Non-Coastal Zoning Ordinance (4-13-2021 edition). Accessed online December 13, 2021: https://vcrma.org/docs/images/pdf/planning/ordinances/VCNCZO_Current.pdfhttps://vcrma.org/docs/images/pdf/planning/ordinances/VCNCZO_Current.pdfhttps://www.cityofventura.ca.gov/DocumentCenter/View/1445/City-Grading-Ordinance-Number-2017-009.

Coastal Commission (California Coastal Commission). 2022. Local Coastal Programs. Accessed online January 21, 2022: https://www.coastal.ca.gov/lcps.html.

County of Santa Barbara. 2022. Santa Barbara County Land Use and Zoning Map. Accessed online January 6, 2022: https://www.arcgis.com/home/webmap/viewer.html?webmap=fa3545a29dac49aeacc81669b956e3e5&extent=-120.9142,34.093,-118.9408,35.4355.

CPUC (California Public Utilities Commission). 2019. General Rate Case Commission Decision D.19-09-051.

CPUC. 2021a. "Letter from Executive Director Rachel Peterson to Scott Drury. SUBJECT: Ventura Compressor Station." August 5, 2021.

CPUC. 2021b. "Letter from Executive Director Rachel Peterson to Scott Drury. SUBJECT: Ventura Compressor Station." August 20, 2021.

CPUC. 2022. Decision 22-02-025 February 24, 2022. Decision Implementing Senate Bill 1440 Biomethane Procurement Program Rulemaking 13-02-008. February 25, 2022.

Dubarry, M., M. Tun, G. Baure, M. Matsuura, and R.E. Rocheleau. "Battery Durability and Reliability under Electric Utility Grid Operations: Analysis of On-Site Reference Tests." *Electronics* 2021, 10, 1593. https://doi.org/10.3390/ electronics10131593.

DTSC (California Department of Toxic Substances Control). 2022. "DTSC Regulations." Web page. Accessed online January 21, 2022: dtsc.ca.gov/regs/.

Dvorak, P. "California's Green-Energy Subsidies Spur a Gold Rush in Cow Manure." *Wall Street Journal*. February 19, 2022. Accessed online February 19, 2022: https://www.wsj.com/articles/californias-green-energy-subsidies-spur-a-gold-rush-in-cow-manure-11645279200?reflink=share_mobilewebshare.

Engineering News-Record. 2021. "2021 Top 200 Environmental Firms." https://www.enr.com/toplists/2021-Top-200-Environmental-Firms-Preview.

EPA (U.S. Environmental Protection Agency). 2011. PRO Fact Sheet No. 908. Redesign Blowdown Systems and Alter ESD Practices. Accessed online December 20, 2021: https://www.epa.gov/sites/default/files/2016-06/documents/redesignblowdownsystems.pdf.

EPA. 2022. "Nationwide Permits Chronology and Related Material under CWA Section 404." Accessed online January 21, 2022: https://www.epa.gov/cwa-404/nationwide-permits-chronology-and-related-materials-under-cwa-section-404.

FEMA (Federal Emergency Management Agency). 2019. "Guidance for Flood Risk Analysis and Mapping. Floodway Analysis and Mapping." November 2019.

FEMA. 2020. "Floodway." Accessed online December 14, 2021: https://www.fema.gov/glossary/floodway.

FEMA. 2021a. FEMA Flood Map Service Center. Panel 06111C0741F eff.1/29/2021. Accessible online: https://msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/mscprintb_gpserver/j4b6ed73b9bee4645bb4172922843b5ca/scratch/FIRMETTE_0171066e-58ba-4133-bf77-24bf8743b816.pdf.

FEMA. 2021b. FEMA Flood Map Service Center. Panel 06111C0733F eff.1/29/2021. Accessible online: msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/mscprintb_gpserver/ja3c7cd26eaca43a6b4a97d44a8365ff9/scratch/FIRMETTE_84095437-ca8c-443e-ba26-50b29476e7ad.pdf.

FEMA. 2021c. FEMA Flood Map Service Center. Panel 06111C0539F eff.1/29/2021. Accessible online: https://msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/mscprintb_gpserver/j95765adf351c4c419d1887352c1db22a/scratch/FIRMETTE_67e92b6d-8a0c-4425-a2bd-832241545d0e.pdf.

FEMA. 2021d. FEMA Flood Map Service Center. Panel 06111C0733F eff.1/29/2021. Accessible online: https://msc.fema.gov/arcgis/rest/directories/arcgisjobs/fhl_print/mscprintb_gpserver/j50d15d591d9041d1a1ad0efe8b2db5b5/scratch/FIRMETTE_0c326df2-d947-407e-bad7-2c7f54e5c14c.pdf.

FEMA. 2022. National Flood Hazard Layer (NFHL) Viewer. hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd.

Kovaleski, D. "California's Green-Energy Subsidies Spur a Gold Rush in Cow Manure." *Daily Energy Insider*. 2019. Accessed online February 20, 2022: https://dailyenergyinsider.com/news/20866-calgren-completes-renewable-natural-gas-facility-in-california/?amp.

MJB&A (MJ Bradley & Associates). 2016. *Analysis of Pipeline and Hazardous Materials Safety Administration Proposed New Safety Rules: Pipeline Blowdown Emissions and Mitigation Options*. June 2016. Accessed online January 5, 2022: http://blogs.edf.org/energyexchange/files/2016/07/PHMSA-Blowdown-Analysis-FINAL.pdf.

NREL (National Renewable Energy Laboratory). 2019. Grid-Scale Battery Storage Frequently Asked Questions. September. Accessed online February 17, 2022: https://www.nrel.gov/docs/fy19osti/74426.pdf.

NREL. 2021. "Black Start." Accessed online December 19, 2021: https://www.nrel.gov/grid/black-start.html.

PHMSA (Pipeline & Hazardous Materials Safety Administration, U.S. Department of Transportation). 2018. "Fact Sheet: Distribution Pipelines." January 11, 2018. Accessed online December 12, 2021: https://primis.phmsa.dot.gov/comm/FactSheets/FSDistributionPipelines.htm.

SEIA (Solar Energy Industries Association). 2021. "Siting, Permitting & Land Use for Utility-Scale Solar." Accessed online December 8, 2021: https://www.seia.org/initiatives/siting-permitting-land-use-utility-scale-solar.

SCE (Southern California Edison). 2019. "Schedule TOU-GS-2." Time-of Use -General Service-Demand Metered. Effective date March 1, 2019. Accessed online March 2022: https://www.sce.com/regulatory/tariff-books/rates-pricing-choices.

SCE. 2022. Southern California Edison Power Site Search Tool. Accessed online January 2022: https://www.arcgis.com/apps/webappviewer/index.html?id=05a84ec9d19f43ac93b451939c330888.

SoCalGas. 2021a. "CPUC-Energy Division Data Request 1 RE: Ventura Compressor Station. Date Requested: May 12, 2021. Date Responded: May 14, 2021."

SoCalGas. 2021b. "CPUC-Energy Division Data Request 2 RE: Ventura Compressor Station. Date Requested: May 17, 2021. Date Responded: May 24, 2021."

SoCalGas. 2021c. "CPUC-Energy Division Data Request 3 RE: Ventura Compressor Station. Date Requested: June 1, 2021. Date Responded: June 4, 2021."

SoCalGas. 2021d. "CPUC-Energy Division Data Request 4 RE: Ventura Compressor Station. Date Requested: June 23, 2021. Date Responded: July 7, 2021."

SoCalGas. 2021e. "CPUC-Energy Division Data Request 4 RE: Ventura Compressor Station. Date Requested: July 23, 2021. Date Responded: August 6, 2021."

SoCalGas. 2021f. "CPUC-Safety and Enforcement Division Data Request 1 RE: Ventura Compressor Station. Date Requested: August 19, 2021. Date Responded: August 19, 2021."

USDOEEERE (U.S. Department of Energy, Energy Efficiency & Renewable Energy). 2015. "Fuel Cells." November 2015. Accessed online February 17, 2022: https://www.energy.gov/sites/prod/files/2015/11/f27/fcto_fuel_cells_fact_sheet.pdf.

USEIA (U.S. Energy Information Administration). 2007. "Natural Gas Compressor Station on the Interstate Pipeline Network: Developments since 1996." November 7, 2007. Accessed online December 29, 2021: https://www.eia.gov/naturalgas/articles/compressor96index.php.

USGS (U.S. Geological Survey). 2019. "Land Subsidence." March 2, 2019. Accessed online December 20, 2021: https://www.usgs.gov/mission-areas/water-resources/science/land-subsidence.

USGS. 2021. "What is Liquefaction?" Accessed online December 20, 2021: usgs.gov/faqs/what-liquefaction.

VCALUC (Ventura County Airport Land Use Commission). 2000. *Airport Comprehensive Land Use Plan for Ventura County: Final Report*. Prepared by Coffman Associates Inc. July 7, 2000.

VCFPD (Ventura County Fire Protection District). 2019. "501 – Fire Apparatus Access Standard." September 30, 2019. Accessed online December 22, 2021: https://vcfd.org/wp-content/uploads/2020/02/501-Fire-Apparatus-Access-Standard.pdf.

Ventura County. 2016. Grading Ordinance – Appendix J of Ventura County Building Code. Accessed online December 11, 2021: https://www.vcpublicworks.org/es/permittingprocess/.

Ventura County. 2017. "Coastal Area Plan." *Ventura County General Plan*. July 1, 2017. Accessed online January 21, 2022: https://docs.vcrma.org/images/pdf/planning/plans/Coastal_Area_Plan_07-01-2017_ver.pdf.

Ventura County. 2020. "Land Use Element." *Ventura County 2040 General Plan*. September 15, 2020. Accessed online December 10, 2021: https://docs.vcrma.org/images/pdf/planning/plans/Final_2040_General_Plan_docs/VCGPU_02_Land_Use_Element_2020_09_15_web.pdf.

Ventura County. 2021a. Ventura County Non-Coastal Zoning Ordinance (4-13-2021 edition). Accessed online December 14, 2021: https://docs.vcrma.org/images/pdf/planning/ordinances/VCNCZO_Current.pdf.

Ventura County. 2021b. County View: Ventura County, California. Accessed online December 10, 20, 2021: maps.ventura.org/countyview/.

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BURNS McDONNELL

Ventura Electric Motor Driver Analysis

SoCalGas
A Sempra Energy utility

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

[redacted]

Ventura Electric Motor Driver Analysis

prepared for

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

Project No. 132609
Report #: E15043-000-55-RP-003

Contract 5660060833

Revision C
10/7/2021

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 WPII 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 of 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)

BURNS McDONNELL — EQUIPMENT LOAD SUMMARY (OPTION 1) — SoCalGas, A Sempra Energy utility

SOURCE DESCRIPTION					CONNECTED				RUNNING				RUNNING + 20% SPARE			EQUIPMENT SIZING		
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)	Notes
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)

BURNS McDONNELL — EQUIPMENT LOAD SUMMARY (OPTION 2) — SoCalGas, A Sempra Energy utility

SOURCE DESCRIPTION					CONNECTED				RUNNING				RUNNING + 20% SPARE			EQUIPMENT SIZING		
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)	Notes
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.

[redacted]

APPENDIX A - TECHNOLOGY COMPARISON

[redacted]

EMD OPTION BID EVALUATION

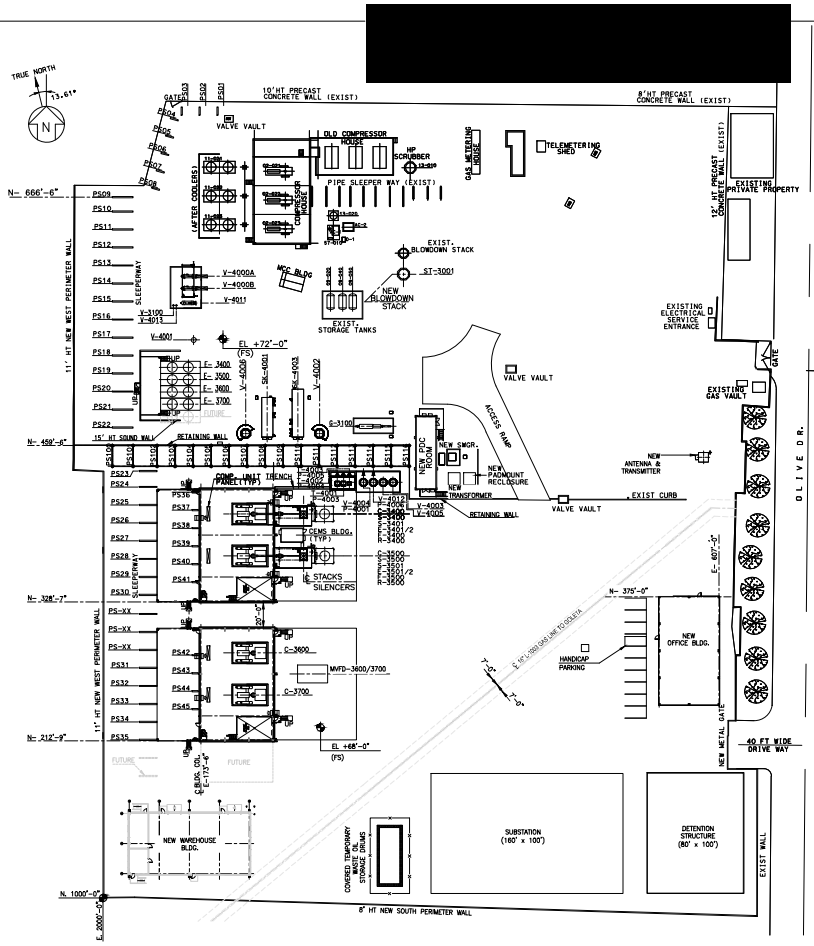
Owner: SoCalGas | Revision: A
Project Number: 132609 | Clarification is required | By: BEB
Project Description: Ventura Compressor Modernization | Tech Not Acceptable | Appvd: CDS
Bid Description: EMD Option Bid Tab | Vendor Selected | Date: 8/31/2021

Specification No.		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	
SKID 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	
SKID 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		[redacted]	**1900 HP Engine Package**	[redacted]	**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**	

[redacted]

APPENDIX B – PLOT PLAN

[redacted]



NOTES:
1. SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE EMD 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
33900-3002-D-PIP	OVERALL PLOT PLAN
33900-3006-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN – H2 FEED

EQUIPMENT LIST (NEW)

PACKAGE EQUIPMENT

C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKID
SK-4003	STARTING AIR COMPRESSOR SKID
G-3100	EMERGENCY GENERATOR SKID
ST-3001	BLOWDOWN STACK

EXCHANGERS

E-3400	DISCHARGE COOLER
E-3401/2	AUXILIARY/JACKET WATER COOLERS
E-3501/2	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3600	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700	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 SCRUBBER
V-4002	STARTING AIR RECEIVER
V-4003	OILY WASTE STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRIP DRUM
V-4012	COOLANT STORAGE DRUM
V-4013	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OILY WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP

PUMPS

P-4001	ENGINE OIL CHARGE PUMP
P-4003	COMPRESSOR AREA OILY WASTE TANK PUMP
P-4004	WASTE OIL TANK PUMP
P-4005	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-4006	COOLANT CHARGE PUMP

MISC

F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MVFD-3600/3700	VFD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3401	INLET SILENCER #1
S-3500	EXHAUST SILENCER #2
S-3501	INLET SILENCER #2

REV	DATE	DRAWN	CHECKED	PROJ. MGR.	QUALITY MGR.	ENG. FILE NO.	DESCRIPTION	MOA	BY / DATE
									DESIGNED C. SLAVIN 09/15/21
									DRAWN V. PATIL 09/15/21
									CHECKED C. SLAVIN 09/15/21
									PROJ. MGR. B. BOUDD 09/15/21
B	10-01-21	VDP	CDS	BB		E15043	RE-ISSUED FOR INFORMATION	91651	QUALITY MGR.
A	09-22-21	VDP	CDS	BB		E15043	ISSUED FOR INFORMATION	91651	ENG. FILE NO. E15043

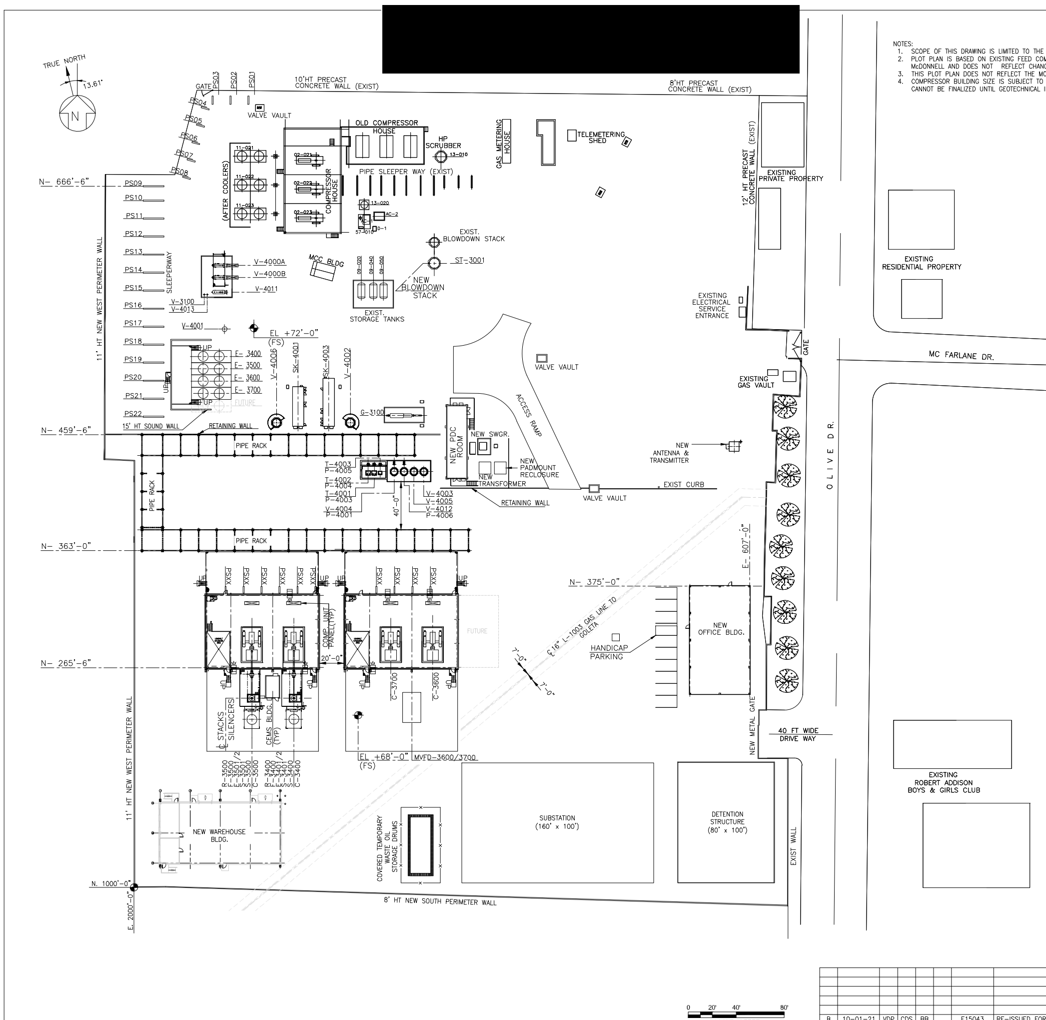
ORIG. CLASS: GLOBE DRG. DATA: 11.4 | MOA: 91651

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

DRAWING NUMBER: 33900-3901-D-PIP REV: B

SCALE: 1"=40'-0"

C:\USR\Do Cell – Ventura\133659 SCE VCM EPC\CAD FILES\33900-3901-D-PIP_1A.dwg, 10/1/2021 11:26 AM, Russell, Brent A



NOTES:
1. SCOPE OF THIS DRAWING IS LIMITED TO THE ANALYSIS COMPLETED ON THE EMD 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
33900-3002-D-PIP	OVERALL PLOT PLAN
33900-3006-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN – H2 FEED

EQUIPMENT LIST (NEW)

PACKAGE EQUIPMENT

C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKID
SK-4003	STARTING AIR COMPRESSOR SKID
G-3100	EMERGENCY GENERATOR SKID
ST-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	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700	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 SCRUBBER
V-4002	STARTING AIR RECEIVER
V-4003	OILY WASTE STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRIP DRUM
V-4012	COOLANT STORAGE DRUM
V-4013	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OILY WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP

PUMPS

P-4001	ENGINE OIL CHARGE PUMP
P-4003	COMPRESSOR AREA OILY WASTE TANK PUMP
P-4004	WASTE OIL TANK PUMP
P-4005	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-4006	COOLANT CHARGE PUMP

MISC

F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MVFD-3600/3700	VFD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3401	INLET SILENCER #1
S-3500	EXHAUST SILENCER #2
S-3501	INLET SILENCER #2

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
B	10-01-21	VDP	CDS	BB		E15043	RE-ISSUED FOR INFORMATION	91651
A	09-22-21	VDP	CDS	BB		E15043	ISSUED FOR INFORMATION	91651

	BY	DATE
DESIGNED:	C. SLAVIN	09/15/21
DRAWN:	V. PATIL	09/15/21
CHECKED:	C. SLAVIN	09/15/21
PROJ APV:	B. BOUDID	09/15/21
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

DWG CLASS: 09,39 DWG DIST: 114
SCALE: 1"=40'-0"

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

DRAWING NUMBER 33900-3901-D-PIP REV B

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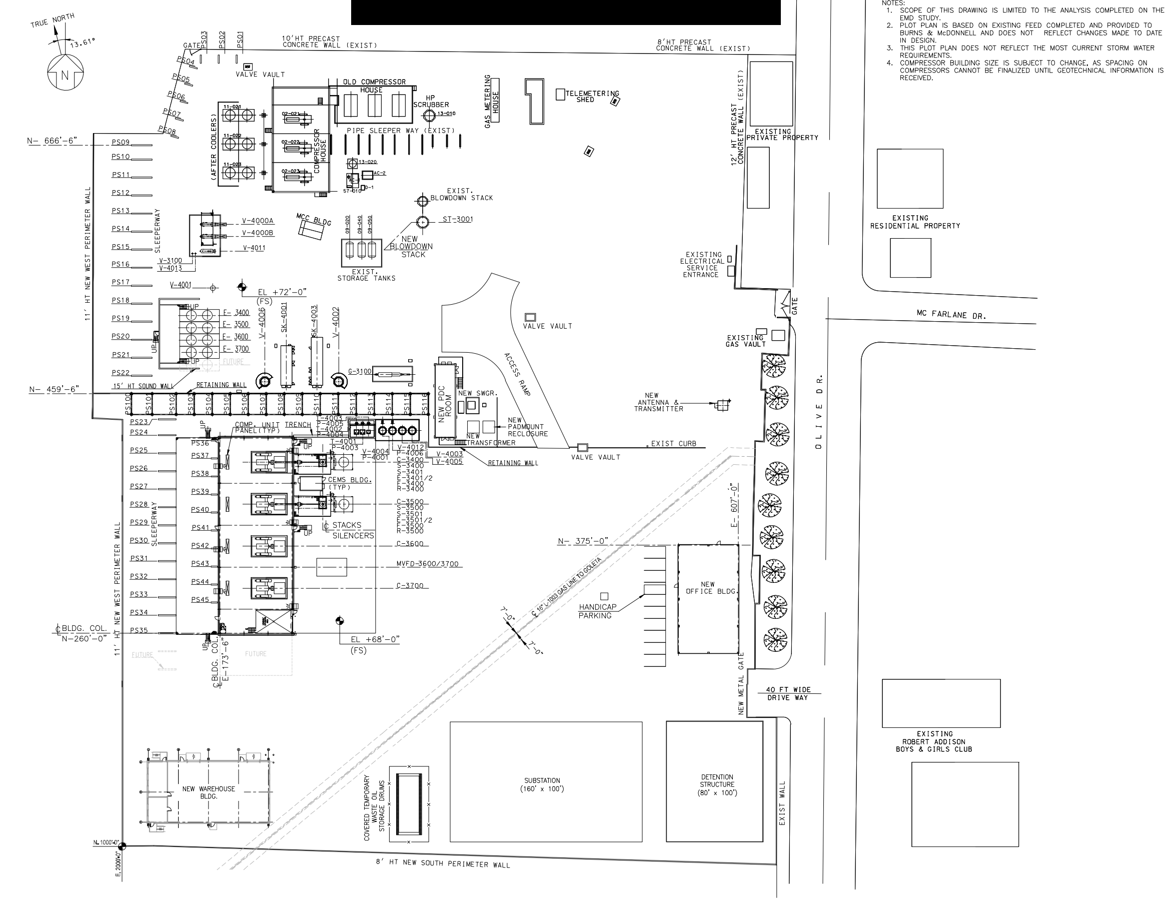
[redacted]



NOTES:
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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
33900-3002-D-PIP	OVERALL PLOT PLAN
33900-3006-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN - H2 FEED

EQUIPMENT LIST (NEW)

PACKAGE EQUIPMENT

C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKID
SK-4003	STARTING AIR COMPRESSOR SKID
G-3100	EMERGENCY GENERATOR SKID
ST-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	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700	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 SCRUBBER
V-4002	STARTING AIR RECEIVER
V-4003	OILY WASTE STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRIP DRUM
V-4012	COOLANT STORAGE DRUM
V-4013	COMPRESSOR FUEL GAS REGULATOR FILTER
T-4001	COMP AREA OILY WASTE TANK
T-4002	COMP AREA OIL WASTE TANK
T-4003	COMPRESSOR AREA COOLANT DRAIN SUMP

PUMPS

P-4001	ENGINE OIL CHARGE PUMP
P-4003	COMPRESSOR AREA OILY WASTE TANK PUMP
P-4004	WASTE OIL TANK PUMP
P-4005	COMPRESSOR ENGINE WASTE COOLANT PUMP
P-4006	COOLANT CHARGE PUMP

MISC

F-3400	INLET AIR FILTER #1
F-3500	INLET AIR FILTER #2
MVFD-3600/3700	VFD BUILDING
R-3400	CATALYTIC CONVERTER #1
R-3500	CATALYTIC CONVERTER #2
S-3400	EXHAUST SILENCER #1
S-3401	INLET SILENCER #1
S-3500	EXHAUST SILENCER #2
S-3501	INLET SILENCER #2

0 10' 40' 80' 120'

SCALE: 1"=40'-0"

REV	DATE	DRAWN	CHECKED	PRJ APV	SCG APV	ENG FILE NO	DESCRIPTION	WOA
A	10-06-2021	VDP	CDS	BB		E15043	ISSUED FOR INFORMATION	91651

	BY	DATE
DESIGNED:	C. SLAVIN	10/06/21
DRAWN:	V. PATIL	10/06/21
CHECKED:	C. SLAVIN	10/06/21
PROJ APV:	B. BOUDID	10/06/21
SCG ENG APV:		
ENG FILE NO:	E15043	
WOA:	91651	

SoCalGas

A Sempra Energy utility

DWG CLASS: 09,39 DWG DIST: 114

SCALE: 1"=40'-0"

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

DRAWING NUMBER 33900-3901-D-PIP_1C

REV A

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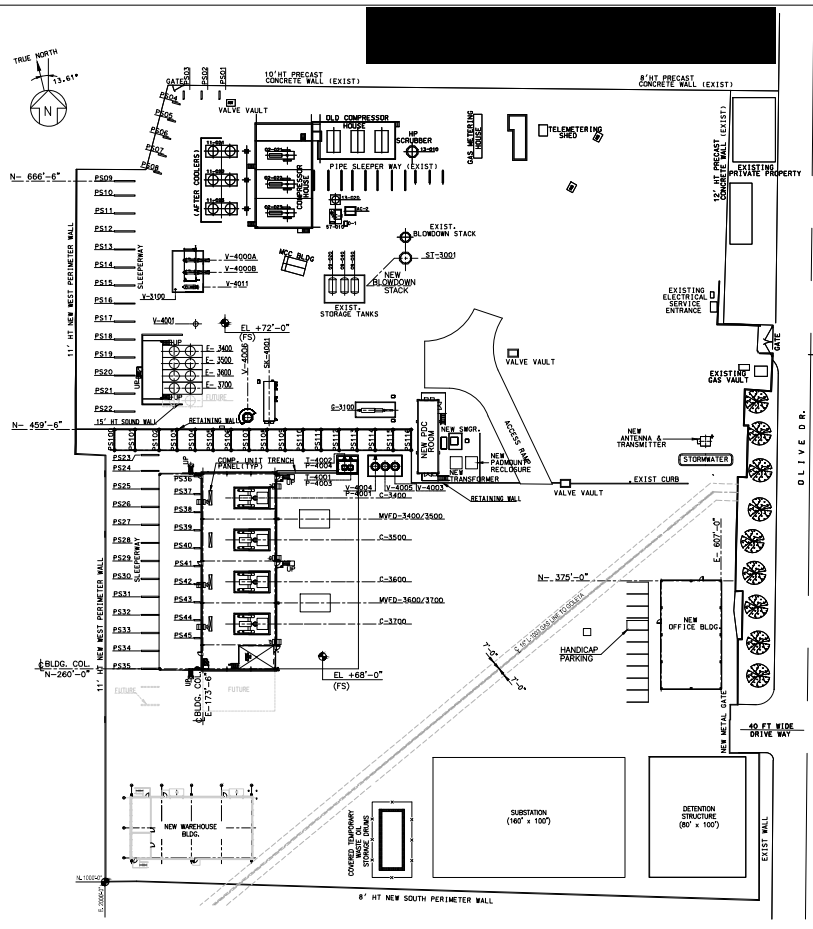

NOTES:
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4. COMPRESSOR BUILDING SIZE IS SUBJECT TO CHANGE, AS SPACING ON COMPRESSORS CANNOT BE FINALIZED UNTIL GEOTECHNICAL INFORMATION IS RECEIVED.

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
33900-3002-D-PIP	OVERALL PLOT PLAN
33900-3006-D-PIP	EQUIPMENT LAYOUT
33900-3720-D-PIP	EQUIPMENT LOCATION PLAN – H2 FEED

EQUIPMENT LIST (NEW)

PACKAGE EQUIPMENT

C-3400	GAS COMPRESSOR
C-3500	GAS COMPRESSOR
C-3600	GAS COMPRESSOR
C-3700	GAS COMPRESSOR
SK-4001	INSTRUMENT AIR COMPRESSOR SKID
G-3100	EMERGENCY GENERATOR SKID
ST-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-3601	DISCHARGE COOLER
E-3601/2	AUXILIARY/JACKET WATER COOLERS
E-3700	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 SCRUBBER
V-4003	OILY WASTE STORAGE DRUM
V-4004	ENGINE OIL STORAGE DRUM
V-4005	WASTE OIL STORAGE DRUM
V-4006	INSTRUMENT AIR RECEIVER
V-4011	CONDENSATE DRIP DRUM
T-4001	COMP AREA OILY WASTE TANK
T-4002	COMP AREA OIL WASTE TANK

PUMPS

P-4001	ENGINE OIL CHARGE PUMP
P-4003	COMPRESSOR AREA OILY WASTE TANK PUMP
P-4004	WASTE OIL TANK PUMP

MISC

MVFD-3400/3500	VFD BUILDING
MVFD-3600/3700	VFD BUILDING

0 10' 40' 80' 120'
SCALE: 1"=40'-0"

REV	DATE	DRAWN	CHECKED	ENG APV	DES APV	EMD FILE NO.	DESCRIPTION	BY
A	09-22-21	VDP	CDS	BB		E15043	ISSUED FOR INFORMATION	91651

	DATE
DESIGNED C. SLAVIN	09/15/21
DRAWN V. PATIL	09/15/21
CHECKED C. SLAVIN	09/15/21
PROJ MGR B. BOUDD	09/15/21
EGD ENG APV.	
ENG FILE NO. E15043	
BOM 91651	

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

ORIG. CLASS: GLOBE DRG. DEPT. 114
SCALE 1"=40'-0"
DRAWING NUMBER 33900-3902-D-PIP
REV A

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[redacted]

APPENDIX C – COST ESTIMATE

[redacted]

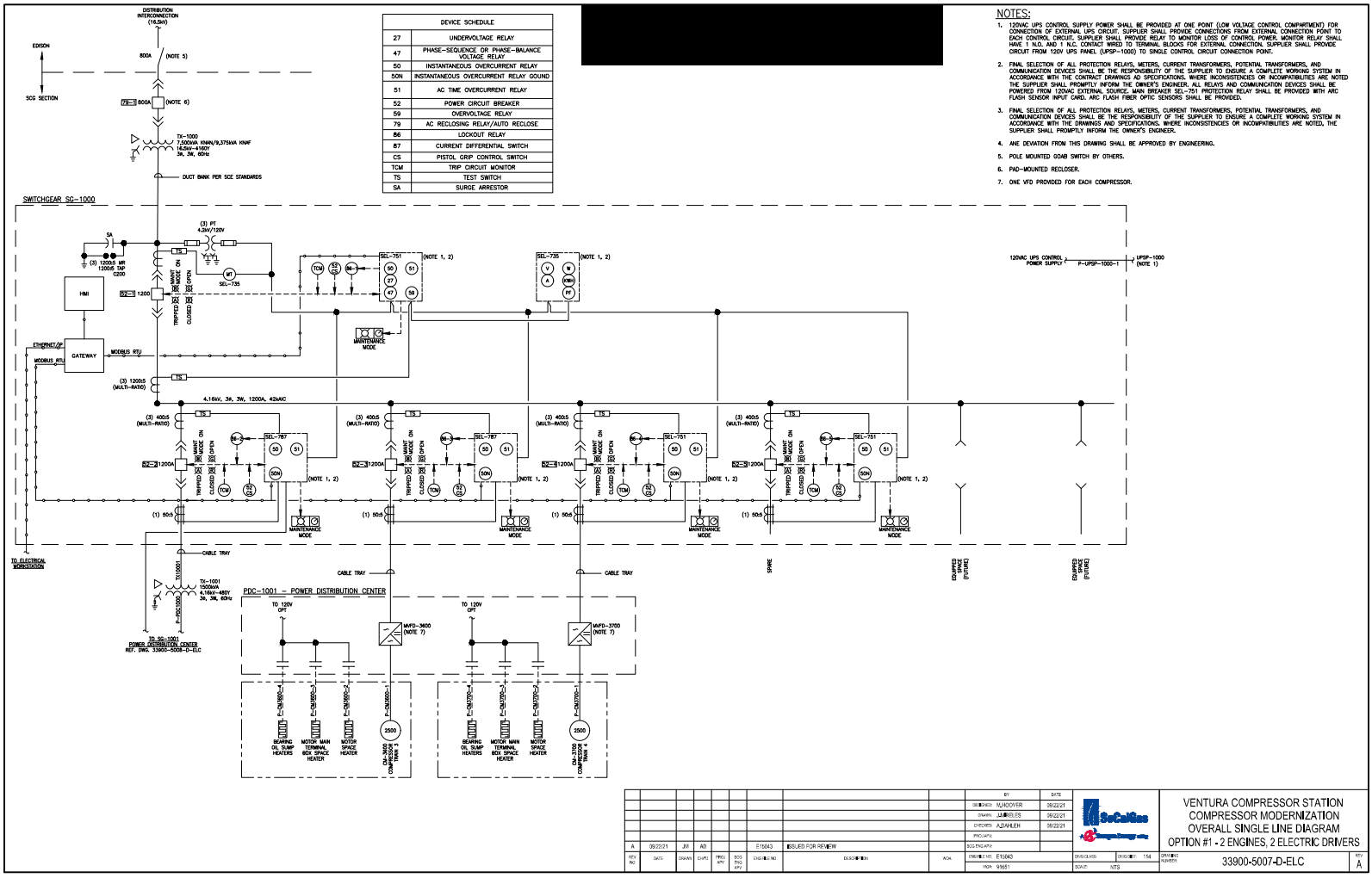
		Base Scope		Option 1		Option 2	
Scope		**(4) Natural Gas Engines**		**(2) Engines, (2) EMDs**		**(4) EMDs**	
Equipment & Material	**Unit Cost**	**QTY**	**Total**	**QTY**	**Total**	**QTY**	**Total**
Engine Compressor Package[1]	$ [redacted]	4	$ [redacted]	2	$ [redacted]	0	$ [redacted]
EMD Compressor Package[2]	$	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)			$ [redacted]		$ [redacted]		$ [redacted]
Misc. Cost	**Unit Cost**	**QTY**	**Total**	**QTY**	**Total**	**QTY**	**Total**
Additional Engineering (ROM)	$ [redacted]	0	$ -	1	$ [redacted]	1	$ [redacted]
SCE T-Line Improvements[3]	$	0	$ -	1	$	1	$
			$ -		$ -		$
Cost Comparision (ROUNDED)		**$** [redacted]		**$**		**$**	
Delta from Base Scope(ROUNDED):		**Baseline**		**$**		**$**	
Total Install Cost (ROM) (ROUNDED) (Base Scope + Delta)		**$** [redacted]		**$**		**$**	

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 BMcD'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 comparision 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.

[redacted]

APPENDIX D – ONE LINE



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

[redacted]

NOTES:

1. 120VAC UPS CONTROL SUPPLY POWER SHALL BE PROVIDED AT ONE POINT (LOW VOLTAGE CONTROL COMPARTMENT) FOR CONNECTION OF EXTERNAL UPS CIRCUIT. SUPPLIER SHALL PROVIDE CONNECTIONS FROM EXTERNAL CONNECTION POINT TO EACH CONTROL CIRCUIT. SUPPLIER SHALL PROVIDE RELAY TO MONITOR LOSS OF CONTROL POWER. MONITOR RELAY SHALL HAVE 1 N.O. AND 1 N.C. CONTACT WIRED TO TERMINAL BLOCKS FOR EXTERNAL CONNECTION. SUPPLIER SHALL PROVIDE CIRCUIT FROM 120V UPS PANEL (UPSP-1000) TO SINGLE CONTROL CIRCUIT CONNECTION POINT.
2. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE CONTRACT DRAWINGS AD SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER. ALL RELAYS AND COMMUNICATION DEVICES SHALL BE POWERED FROM 120VAC EXTERNAL SOURCE. MAIN BREAKER SEL-751 PROTECTION RELAY SHALL BE PROVIDED WITH ARC FLASH SENSOR INPUT CARD. ARC FLASH FIBER OPTIC SENSORS SHALL BE PROVIDED.
3. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED, THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER.
4. ANE DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.
5. POLE MOUNTED GOAB SWITCH BY OTHERS.
6. PAD-MOUNTED RECLOSER.
7. ONE VFD PROVIDED FOR EACH COMPRESSOR.

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCE ENG APV	ENGINEERING NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJAMBELES	09/22/21
CHECKED	AJDAHLEM	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEERING NO.	E15043	
WOA	99651	

SoCalGas

DRAWING CLASS	
DRAWING SHEET	154
SCALE	NTS

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
OVERALL SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING NUMBER: 33900-5007-D-ELC

REV: A

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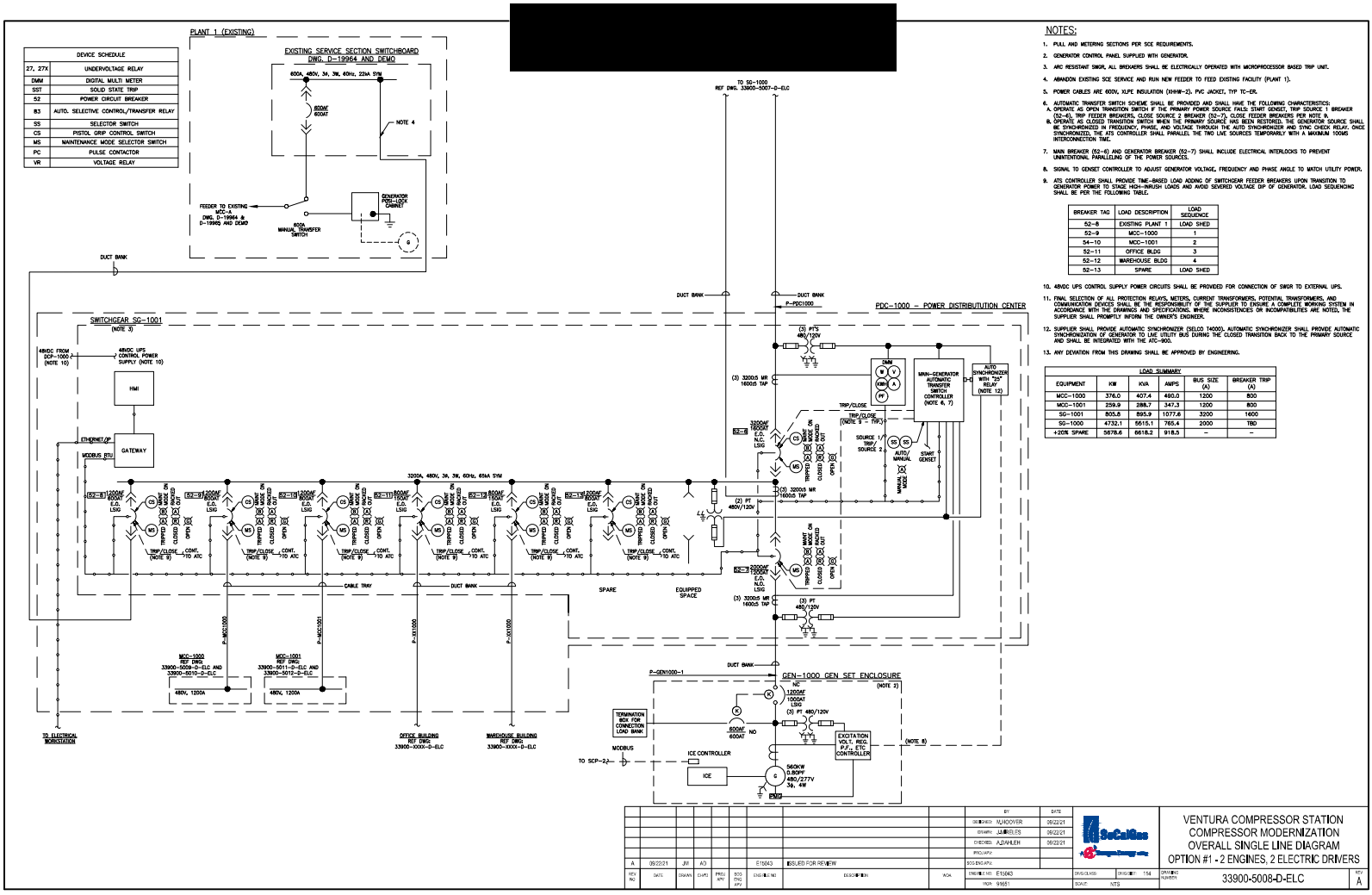


DEVICE SCHEDULE	
27, 27X	UNDERVOLTAGE RELAY
DMM	DIGITAL MULTI METER
SST	SOLID STATE TRIP
52	POWER CIRCUIT BREAKER
83	AUTO. SELECTIVE CONTROL/TRANSFER RELAY
SS	SELECTOR SWITCH
CS	PISTOL GRIP CONTROL SWITCH
MS	MAINTENANCE MODE SELECTOR SWITCH
PC	PULSE CONTACTOR
VR	VOLTAGE RELAY

NOTES:

1. PULL AND METERING SECTIONS PER SCE REQUIREMENTS.
2. GENERATOR CONTROL PANEL SUPPLIED WITH GENERATOR.
3. ARC RESISTANT SWGR, ALL BREAKERS SHALL BE ELECTRICALLY OPERATED WITH MICROPROCESSOR BASED TRIP UNIT.
4. ABANDON EXISTING SCE SERVICE AND RUN NEW FEEDER TO FEED EXISTING FACILITY (PLANT 1).
5. POWER CABLES ARE 600V, XLPE INSULATION (XHHW-2), PVC JACKET, TYP TC-ER.
6. AUTOMATIC TRANSFER SWITCH SCHEME SHALL BE PROVIDED AND SHALL HAVE THE FOLLOWING CHARACTERISTICS:
   A. OPERATE AS OPEN TRANSITION SWITCH IF THE PRIMARY POWER SOURCE FAILS: START GENSET, TRIP SOURCE 1 BREAKER (52-6), TRIP FEEDER BREAKERS, CLOSE SOURCE 2 BREAKER (52-7), CLOSE FEEDER BREAKERS PER NOTE 9.
   B. OPERATE AS CLOSED TRANSITION SWITCH WHEN THE PRIMARY SOURCE HAS BEEN RESTORED, THE GENERATOR SOURCE SHALL BE SYNCHRONIZED IN FREQUENCY, PHASE, AND VOLTAGE THROUGH THE AUTO SYNCHRONIZER AND SYNC CHECK RELAY. ONCE SYNCHRONIZED, THE ATS CONTROLLER SHALL PARALLEL THE TWO LIVE SOURCES TEMPORARILY WITH A MAXIMUM 100MS INTERCONNECTION TIME.
7. MAIN BREAKER (52-6) AND GENERATOR BREAKER (52-7) SHALL INCLUDE ELECTRICAL INTERLOCKS TO PREVENT UNINTENTIONAL PARALLELING OF THE POWER SOURCES.
8. SIGNAL TO GENSET CONTROLLER TO ADJUST GENERATOR VOLTAGE, FREQUENCY AND PHASE ANGLE TO MATCH UTILITY POWER.
9. ATS CONTROLLER SHALL PROVIDE TIME-BASED LOAD ADDING OF SWITCHGEAR FEEDER BREAKERS UPON TRANSITION TO GENERATOR POWER TO STAGE HIGH-INRUSH LOADS AND AVOID SEVERED VOLTAGE DIP OF GENERATOR. LOAD SEQUENCING SHALL BE PER THE FOLLOWING TABLE.

BREAKER TAG	LOAD DESCRIPTION	LOAD SEQUENCE
52-8	EXISTING PLANT 1	LOAD SHED
52-9	MCC-1000	1
54-10	MCC-1001	2
52-11	OFFICE BLDG	3
52-12	WAREHOUSE BLDG	4
52-13	SPARE	LOAD SHED

10. 48VDC UPS CONTROL SUPPLY POWER CIRCUITS SHALL BE PROVIDED FOR CONNECTION OF SWGR TO EXTERNAL UPS.
11. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED, THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER.
12. SUPPLIER SHALL PROVIDE AUTOMATIC SYNCHRONIZER (SELCO T4000). AUTOMATIC SYNCHRONIZER SHALL PROVIDE AUTOMATIC SYNCHRONIZATION OF GENERATOR TO LIVE UTILITY BUS DURING THE CLOSED TRANSITION BACK TO THE PRIMARY SOURCE AND SHALL BE INTEGRATED WITH THE ATC-900.
13. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

LOAD SUMMARY

EQUIPMENT	KW	KVA	AMPS	BUS SIZE (A)	BREAKER TRIP (A)
MCC-1000	376.0	407.4	480.0	1200	800
MCC-1001	259.9	288.7	347.3	1200	800
SG-1001	805.8	895.9	1077.6	3200	1600
SG-1000	4732.1	5515.1	765.4	2000	TBD
+20% SPARE	5678.6	6618.2	918.5	–	–

REV NO	DATE	DRAWN	CHKD	PROJ APV	SCE ENG APV	ENGINEERING	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJUBELES	09/22/21
CHECKED	AJAHLEH	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEERING NO.	E15043	
WOA	99651	

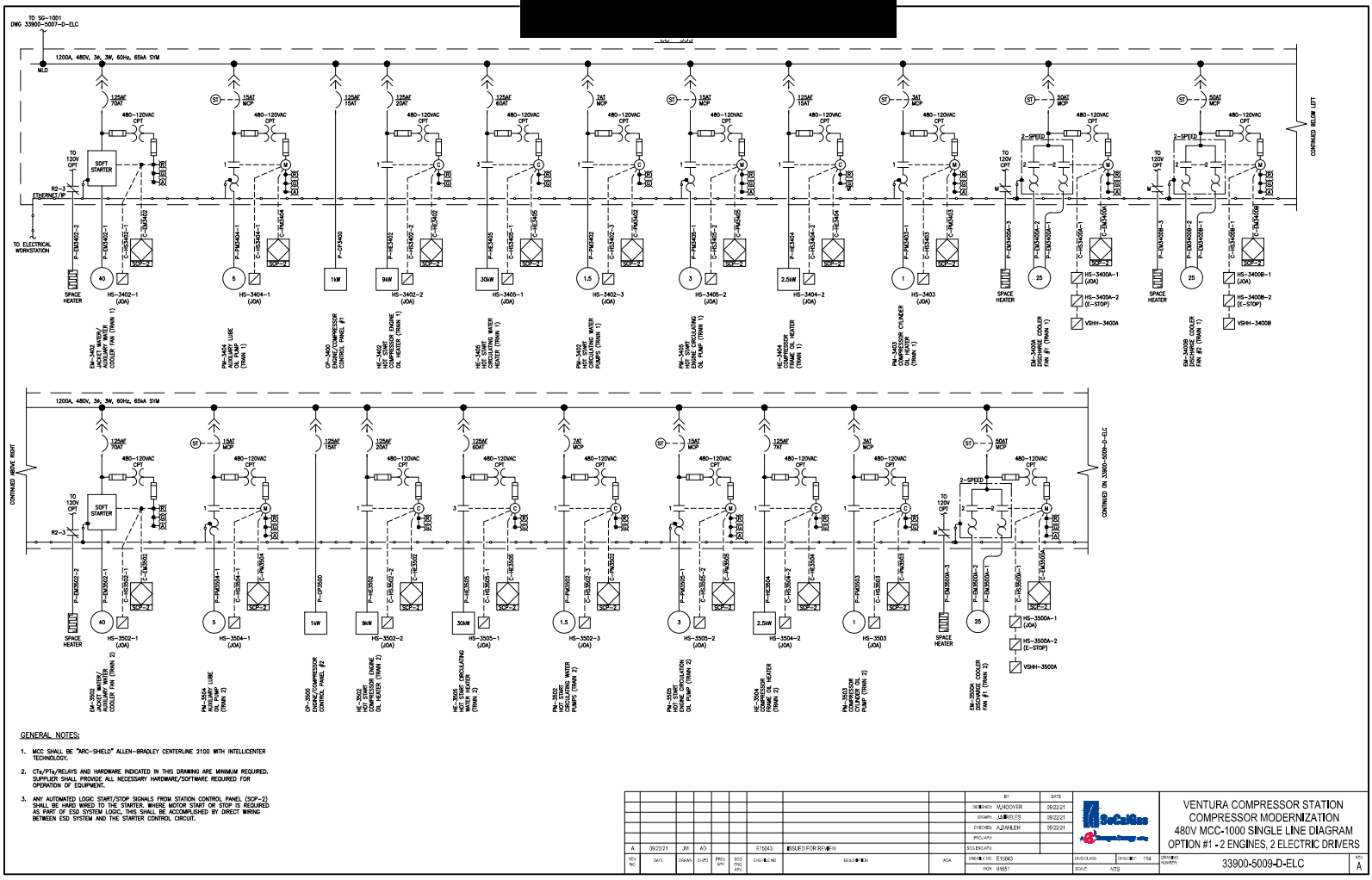
SoCalGas

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
OVERALL SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRG CLASS: | DRG SHT: 154 | SCALE: NTS

DRAWING NUMBER: 33900-5008-D-ELC

REV: A



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCO ENG APV	ENGINEER NO.	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJAMELES	09/22/21
CHECKED	AJAHLEH	09/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	19951	

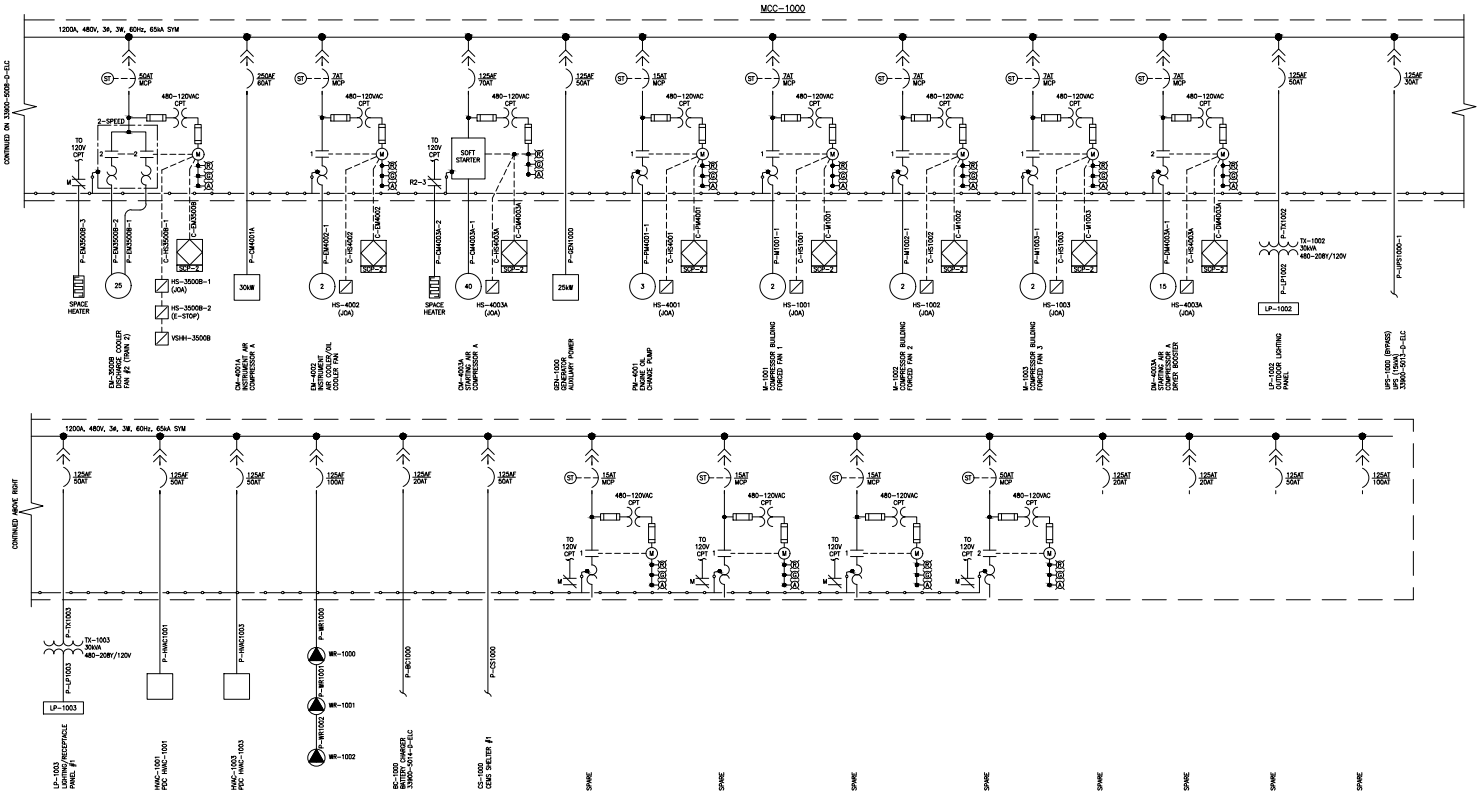
SoCalGas
A Sempra Energy utility

DRAWING CLASS: | DRAWING SHEET: 154
SCALE: NTS

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
480V MCC-1000 SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING NUMBER: 33900-5009-D-ELC
REV: A

[redacted]



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCO ENG APV	ENGINEER	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

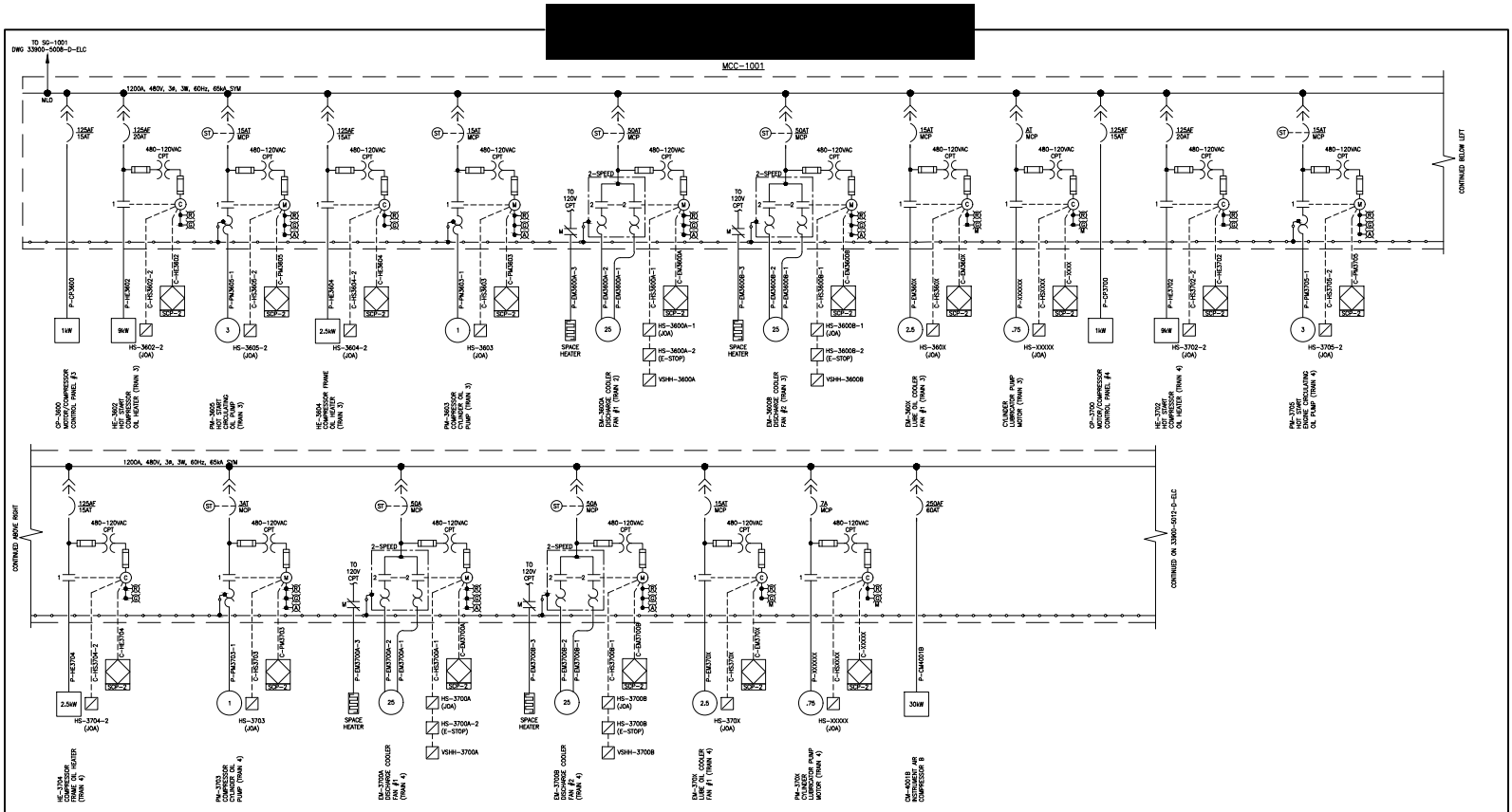
	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJAMELES	09/22/21
CHECKED	AJAHLEH	09/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	19651	

DRG CLASS: | DRG SHT: 154 | SCALE: NTS

SoCalGas

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
480V MCC-1000 SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING NUMBER: 33900-5010-D-ELC | REV: A



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCO ENG APV	ENGINEER	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJUBELES	09/22/21
CHECKED	AZAHLEH	09/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	19951	

SoCalGas

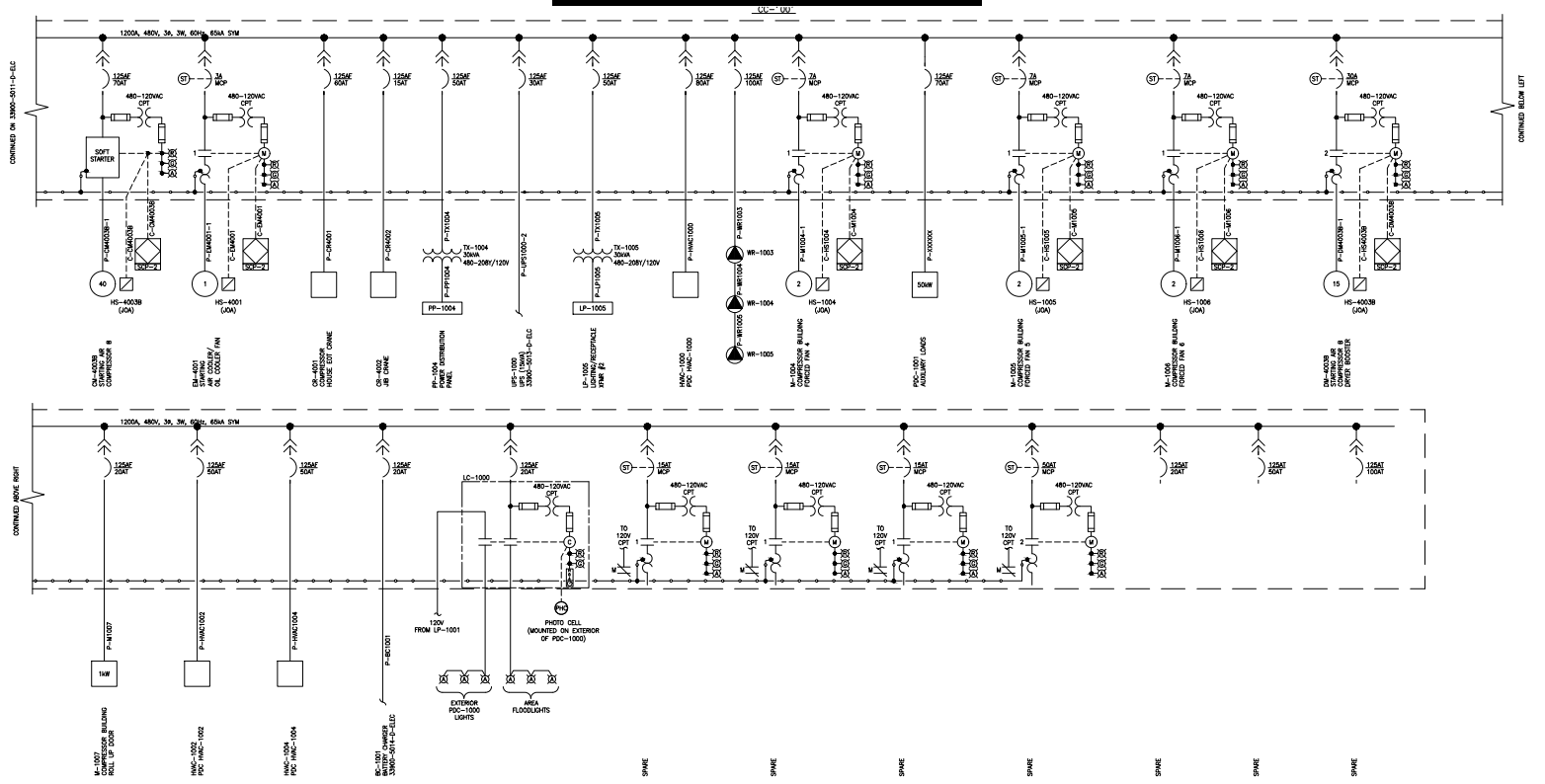
VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
480V MCC-1001 SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING CLASS: | DRAWING SHEET: 154 | SCALE: NTS

DRAWING NUMBER: 33900-5011-D-ELC

REV: A

[redacted]



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHK'D	PROJ MGR APV	SCO ENG APV	ENGINEER NO	DESCRIPTION
A	06/22/21	JM	AD			E15043	ISSUED FOR REVIEW

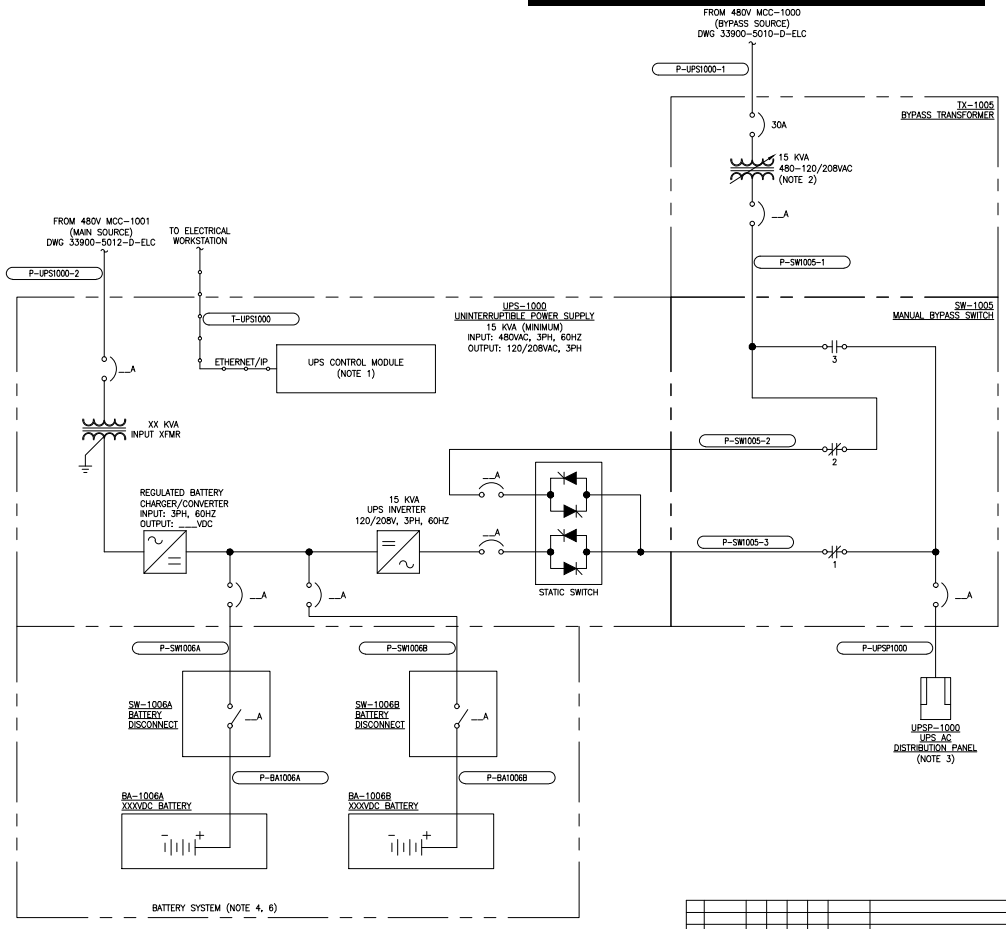
	BY	DATE
DESIGNED	KJHOOVER	06/22/21
DRAWN	JJAMELES	06/22/21
CHECKED	AZAHLEH	06/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	19651	

SoCalGas

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

DRG CLASS	DRG SHT	DRAWING NUMBER	REV
	154	33900-5012-D-ELC	A

SCALE: NTS



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 77°F 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	O
BYPASS	O	O	X

LEGEND:

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

REV NO	DATE	DRAWN	CHKD	PROJ APV	SCE PROJ APV	ENGR NO	DESCRIPTION
A	09/22/21	JM	AB			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	LARIELES	09/22/21
CHECKED	AJAHLEH	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEER NO.	E15043	
WO#	99851	

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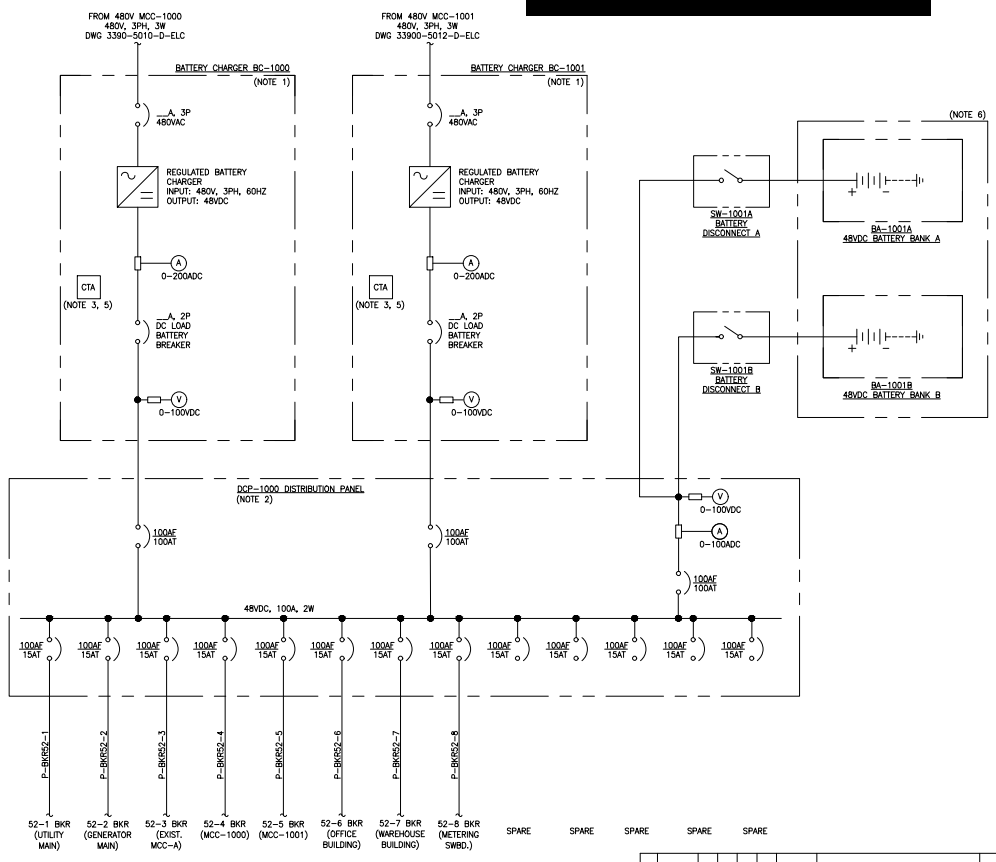
DWG CLASS: | DWG CERT: 1.5d | SCALE: NTS

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

DRAWING NUMBER: 33900-5013-D-ELC

REV: A



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 PLC.
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:

- CIRCUIT BREAKER
- RECTIFIER/CONVERTER
- BATTERY
- DISCONNECT SWITCH

REV NO	DATE	DRAWN	CHK'D	PROJ APV	ENG APV	ENGINEERING NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

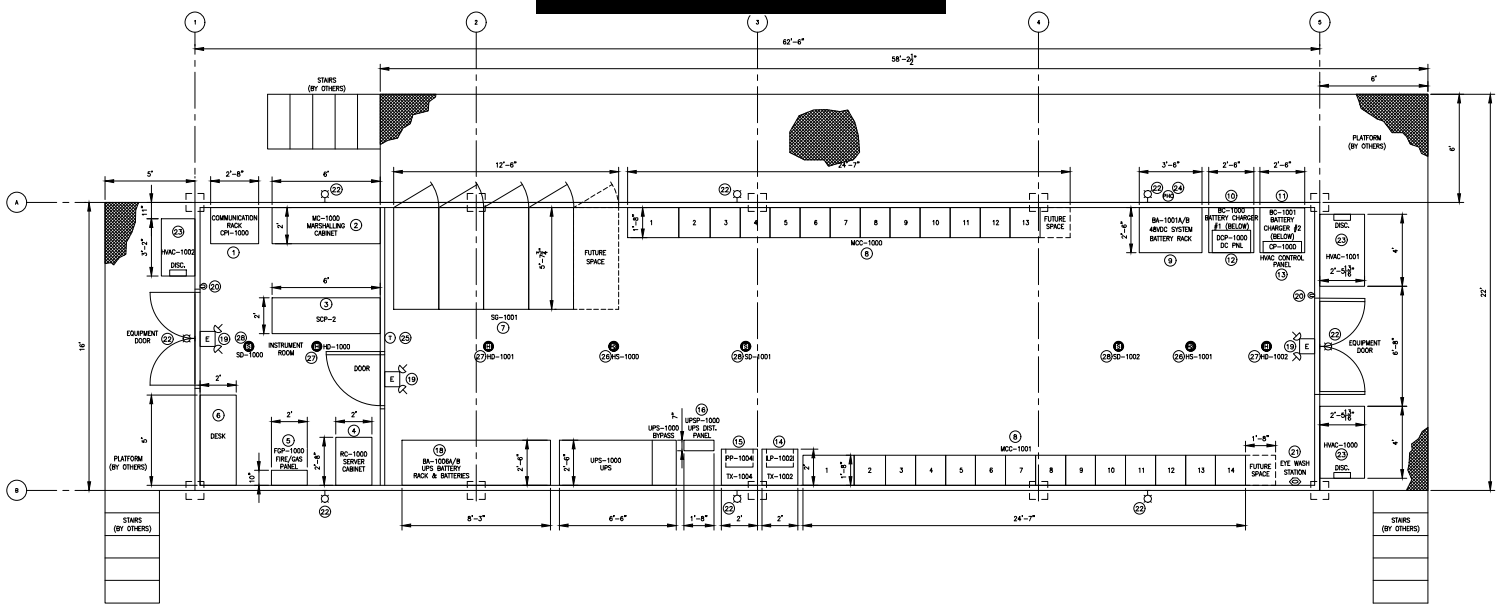
	BY	DATE
DESIGNED	ALHOOVER	09/22/21
DRAWN	JMARBELES	09/22/21
CHECKED	AZAMLEH	09/22/21
PROJ APV		
ENG APV		

WO/A
ENGINEERING NO E15043
WO/A 91851
DWG CLASS
DWG SHT 1 OF 1
SCALE: NTS

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
48 VDC - SINGLE LINE DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING NUMBER: 33900-5014-D-ELC
REV: A

[redacted]



NOTES :

1. PRE-FABRICATED BUILDING COMPLETE WITH LIGHTING, RECEPTACLES AND HVAC. TO BE PROVIDED AS PART OF CONTRACT ELE-401.
2. BUILDING AND EQUIPMENT DIMENSIONS ARE PRELIMINARY. VENDOR TO PREPARE FINAL EQUIPMENT LAYOUT WITH ALL ACTUAL VENDOR DATA AND SUBMIT FOR APPROVAL, DURING DETAIL ENGINEERING.
3. INTERIOR CEILING HEIGHT SHALL BE A MINIMUM OF 10'-0".
4. BUILDING SHALL BE INSTALLED ON PIERS APPROXIMATELY 4' ABOVE GRADE (BY OTHERS).
5. REFER TO SPECIFICATION E15043-V1CM-65-SP-004.
6. INCOMING AND OUTGOING FIELD POWER CABLES FROM THE MCC'S AND SWGR SHALL BE BOTTOM AND/OR TOP ENTRY.
7. SUPPLIER SHALL PROVIDE CABLE TRAY AROUND TOP INTERIOR OF PDC-1000 FOR DISTRIBUTION OF STATUS, CONTROL, AND POWER WIRING. SUPPLIER SHALL PROVIDE SEPARATE CABLE TRAY FOR POWER (480/120V) AND INSTRUMENTATION & CONTROL WIRING. CABLE TRAY SHALL BE ALUMINUM LADDER TYPE WITH 9" RUNG SPACING AND 6" LOAD DEPTH. COOPER B-LINE OR APPROVED EQUAL.
8. ALL INTERIOR CONDUITS SHALL BE PROVIDED WITH METALLIC NAMEPLATE. ALL RECEPTACLES SHALL BE PROVIDED WITH LAMICOID NAMEPLATES.
9. REFER TO PDC-1000 ELECTRICAL EQUIPMENT LIST (VICM-65-EN-002) FOR FURNISH, INSTALL, WIRE RESPONSIBILITIES. SUPPLIER SHALL BE RESPONSIBLE FOR PROVIDING MISCELLANEOUS ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM.
10. SUPPLIER SHALL REFER TO PDC-1000 CIRCUIT SCHEDULE. SUPPLIER SHALL PROVIDE POWER FOR ALL SUPPLIER PROVIDED EQUIPMENT INCLUDING, BUT NOT LIMITED TO, THOSE INDICATED IN THE CABLE SCHEDULE. SUPPLIER SHALL PROVIDE CONTROL AND COMMUNICATION CIRCUITS AS INDICATED IN THE CABLE SCHEDULE. SUPPLIER SHALL PROVIDE POWER FOR OWNER SUPPLIED EQUIPMENT AS INDICATED IN THE CABLE SCHEDULE.
11. STATION CONTROL PANEL SCP-2 AND MARSHALLING CABINET MC-1000 SHALL HAVE TOP ENTRY WIREWAYS.
12. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR THE STATION CONTROL PANEL AND MARSHALLING CABINET. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR FUTURE MCC. FUTURE MCC CUTOUTS SHALL BE BASED ON SAME DIMENSIONS OF TYPICAL MCC SECTION DIMENSIONS.

LEGEND:

- E — EMERGENCY EXIT UNIT WITH BATTERY PACK
- FIRE EXTINGUISHER
- EYE WASH
- H — HEAT DETECTOR – RATE OF RISE TYPE, OPENS WHEN REACHES TEMPERATURE SET POINT OF 60°F.
- S — SMOKE DETECTOR – PHOTO ELECTRIC TYPE WITH ALARM AND FAULT RELAYS WITH FORM C CONTACTS THE OPEN ON ALARM OR LOSS OF POWER, 24VDC.
- HZ — HYDROGEN SENSOR
- PHO — PHOTOCELL
- T — THERMOSTAT

REV NO	DATE	DRAWN	CHK'D	PROJ MGR	SOCO ENG MGR	ENGR'G NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	JMWELES	09/22/21
CHECKED	AZAMLEH	09/22/21
PROJ MGR		
SOCO ENG MGR		
ENGR'G NO	E15043	
WO#	91551	

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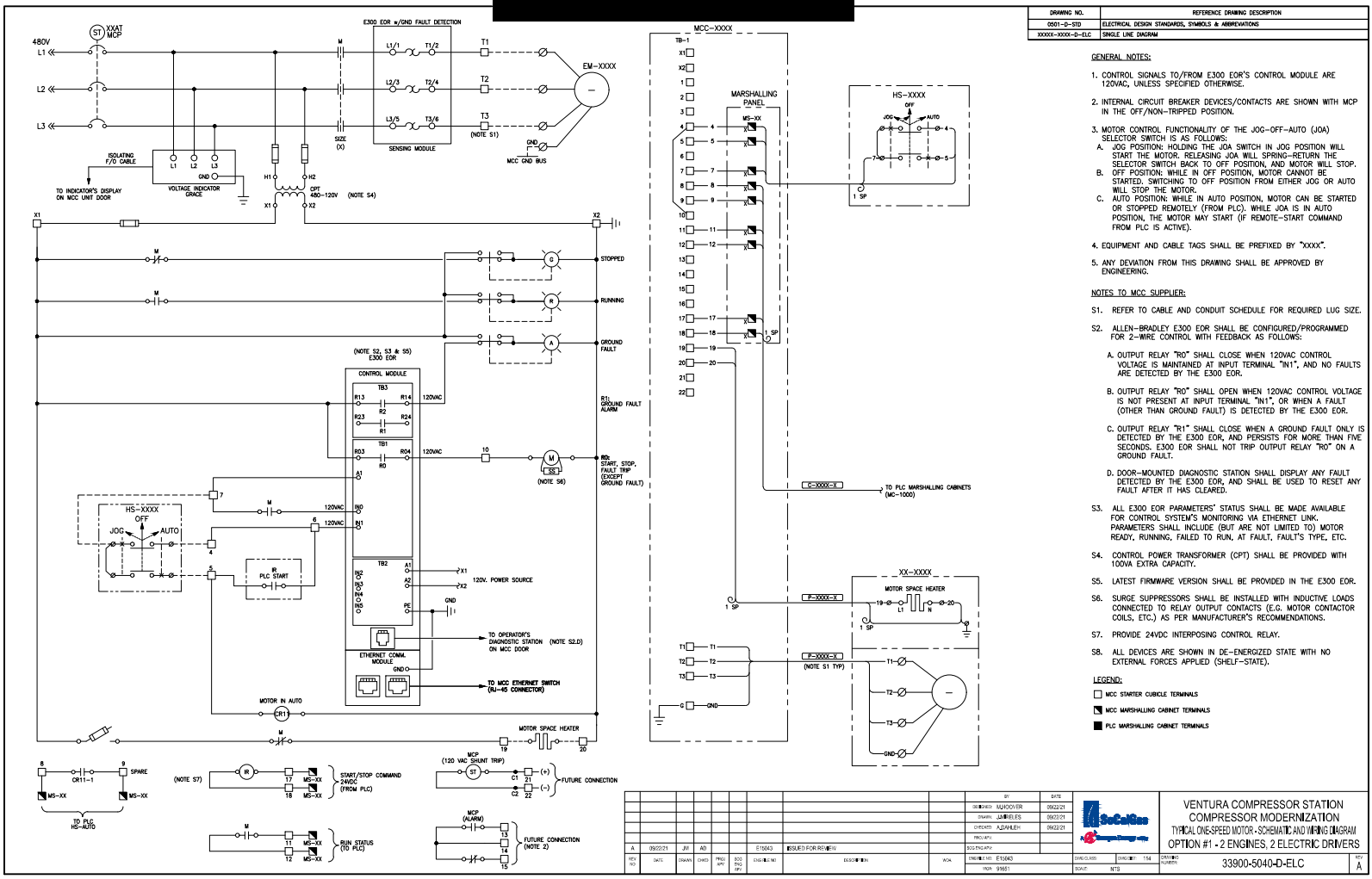
VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
PDC BUILDING - EQUIPMENT ARRANGEMENT
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRG CLASS	DRG SHEET	DRAWING NUMBER	REV
	114	33900-5030-D-ELC	A

SCALE 3/8" = 1'-0"

[redacted]



DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0001-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM

GENERAL NOTES:

1. CONTROL SIGNALS TO/FROM E300 EOR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
2. INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MCP IN THE OFF/NON-TRIPPED POSITION.
3. MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
   A. JOG 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.
   B. OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
   C. 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).
4. EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXX".
5. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-WIRE CONTROL WITH FEEDBACK AS FOLLOWS:

   A. OUTPUT RELAY "R0" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINAL "IN1", AND NO FAULTS ARE DETECTED BY THE E300 EOR.

   B. OUTPUT RELAY "R0" 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.

   C. OUTPUT RELAY "R1" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN FIVE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAY "R0" ON A GROUND FAULT.

   D. 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.

S3. ALL E300 EOR 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.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.

S6. SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.

S7. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S8. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF-STATE).

LEGEND:

- MCC STARTER CUBICLE TERMINALS
- MCC MARSHALLING CABINET TERMINALS
- PLC MARSHALLING CABINET TERMINALS

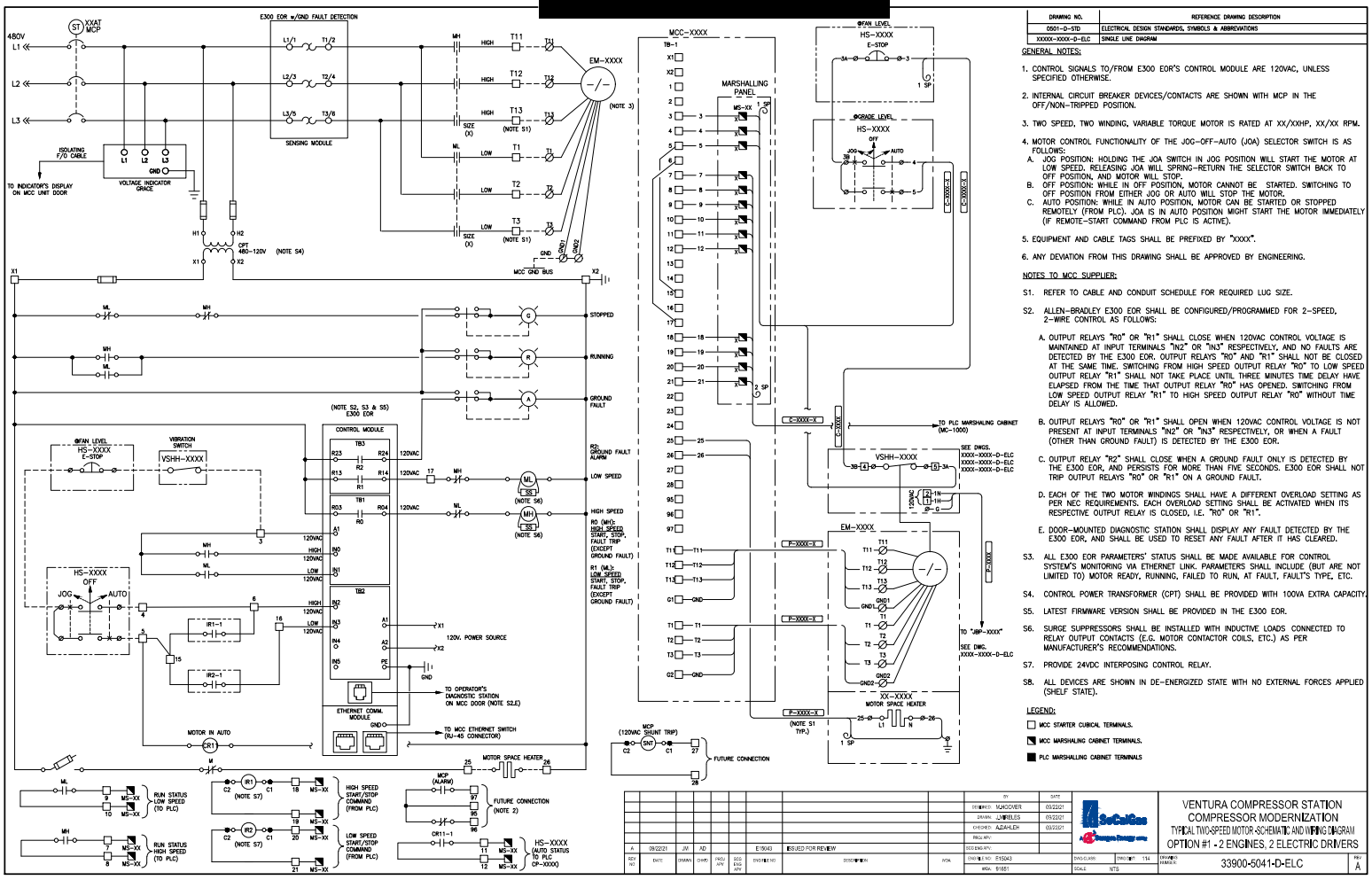
REV NO	DATE	DRAWN	CHKD	PROJ APV	SCE ENG APV	ENGINEER NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	LMIRELES	09/22/21
CHECKED	AZAHLEH	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEER NO.	E15043	
WO#.	99651	
DWG CLASS		
DWG SHT	1	54
SCALE	NTS	

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

DRAWING NUMBER: 33900-5040-D-ELC
REV: A

[redacted]



DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0501-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM

GENERAL NOTES:

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

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-SPEED, 2-WIRE CONTROL AS FOLLOWS:

   A. 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 EOR. 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.

   B. 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 EOR.

   C. OUTPUT RELAY "R2" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN FIVE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAYS "R0" OR "R1" ON A GROUND FAULT.

   D. 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".

   E. 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.

S3. ALL E300 EOR 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.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.

S6. SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.

S7. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S8. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF STATE).

LEGEND:

- MCC STARTER CUBICAL TERMINALS.
- MCC MARSHALING CABINET TERMINALS.
- PLC MARSHALING CABINET TERMINALS

REV NO	DATE	DRAWN	CHKD	PROJ MGR	ECO ENGR APP	ECO/ISSUE NO	DESCRIPTION
A	09/22/21	JM	AD			E19043	ISSUED FOR REVIEW

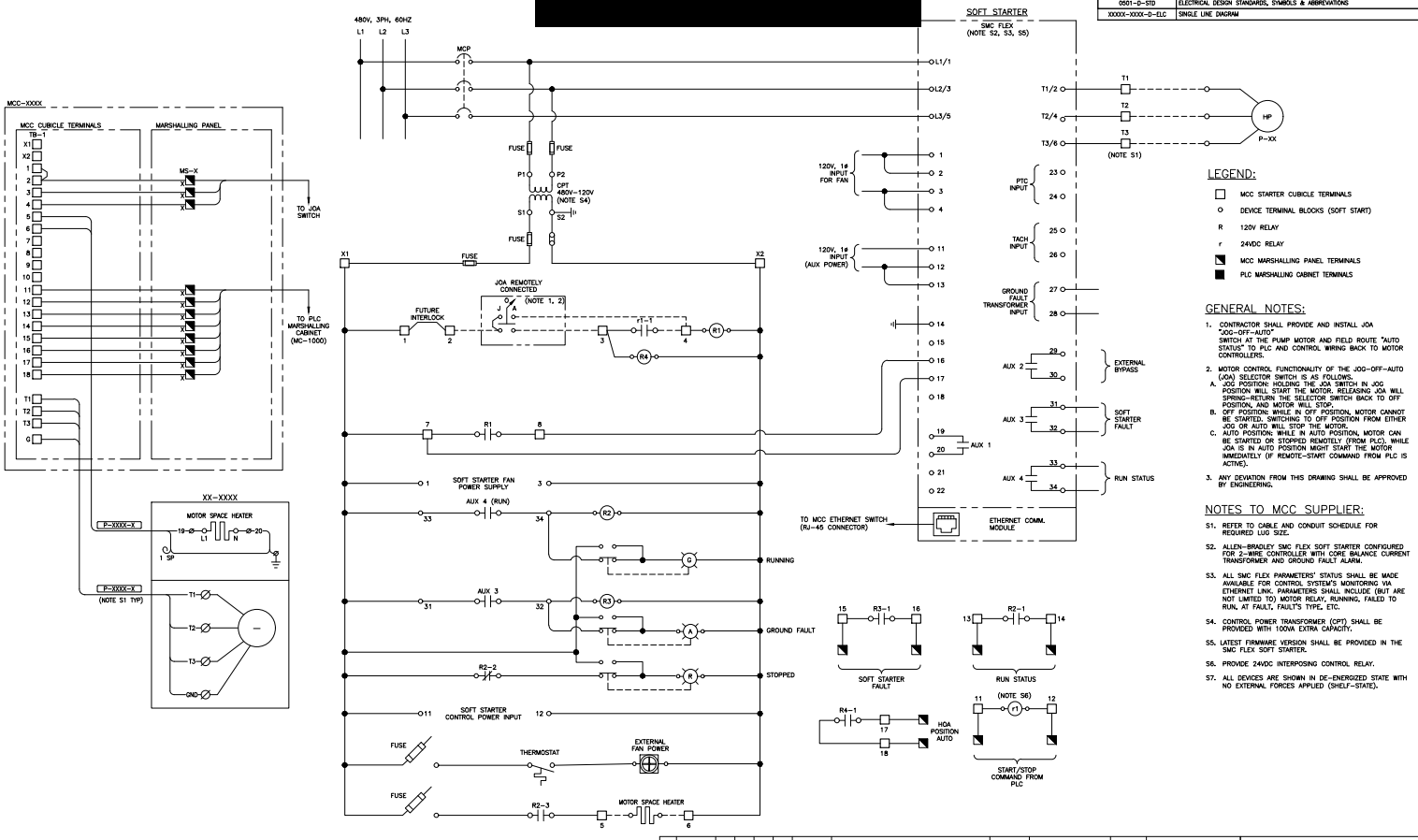
DESIGNED	MANOOVER	09/22/21
DRAWN	JLWELLES	09/22/21
CHECKED	AZAHLEH	09/22/21
PROJ MGR		
ECO ENGINEER		
ENG'G NO	E19043	DWG CLASS
MSA	91681	DWG DEPT 154
SCALE	NTS	DRAWING NUMBER 33900-5041-D-ELC

SoCalGas — The Gas Company

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

REV A

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0001-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM



LEGEND:

- MCC STARTER CUBICLE TERMINALS
- DEVICE TERMINAL BLOCKS (SOFT START)
- R 120V RELAY
- r 24VDC RELAY
- MCC MARSHALLING PANEL TERMINALS
- PLC MARSHALLING CABINET TERMINALS

GENERAL NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL JOA "JOG-OFF-AUTO" SWITCH AT THE PUMP MOTOR AND FIELD ROUTE "AUTO STATUS" TO PLC AND CONTROL WIRING BACK TO MOTOR CONTROLLERS.
2. MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
   A. JOG 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.
   B. OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
   C. AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). WHILE JOA IS IN AUTO POSITION MIGHT START THE MOTOR IMMEDIATELY (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
3. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY SMC FLEX SOFT STARTER CONFIGURED FOR 2-WIRE CONTROLLER WITH CORE BALANCE CURRENT TRANSFORMER AND GROUND FAULT ALARM.

S3. ALL SMC FLEX PARAMETERS' STATUS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE (BUT ARE NOT LIMITED TO) MOTOR RELAY, RUNNING, FAILED TO RUN, AT FAULT, FAULT'S TYPE, ETC.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE SMC FLEX SOFT STARTER.

S6. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S7. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF-STATE).

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCE ENG APV	ENGINEER	DESCRIPTION
A	09/22/21	JM	AD		E10043	ISSUED FOR REVIEW	

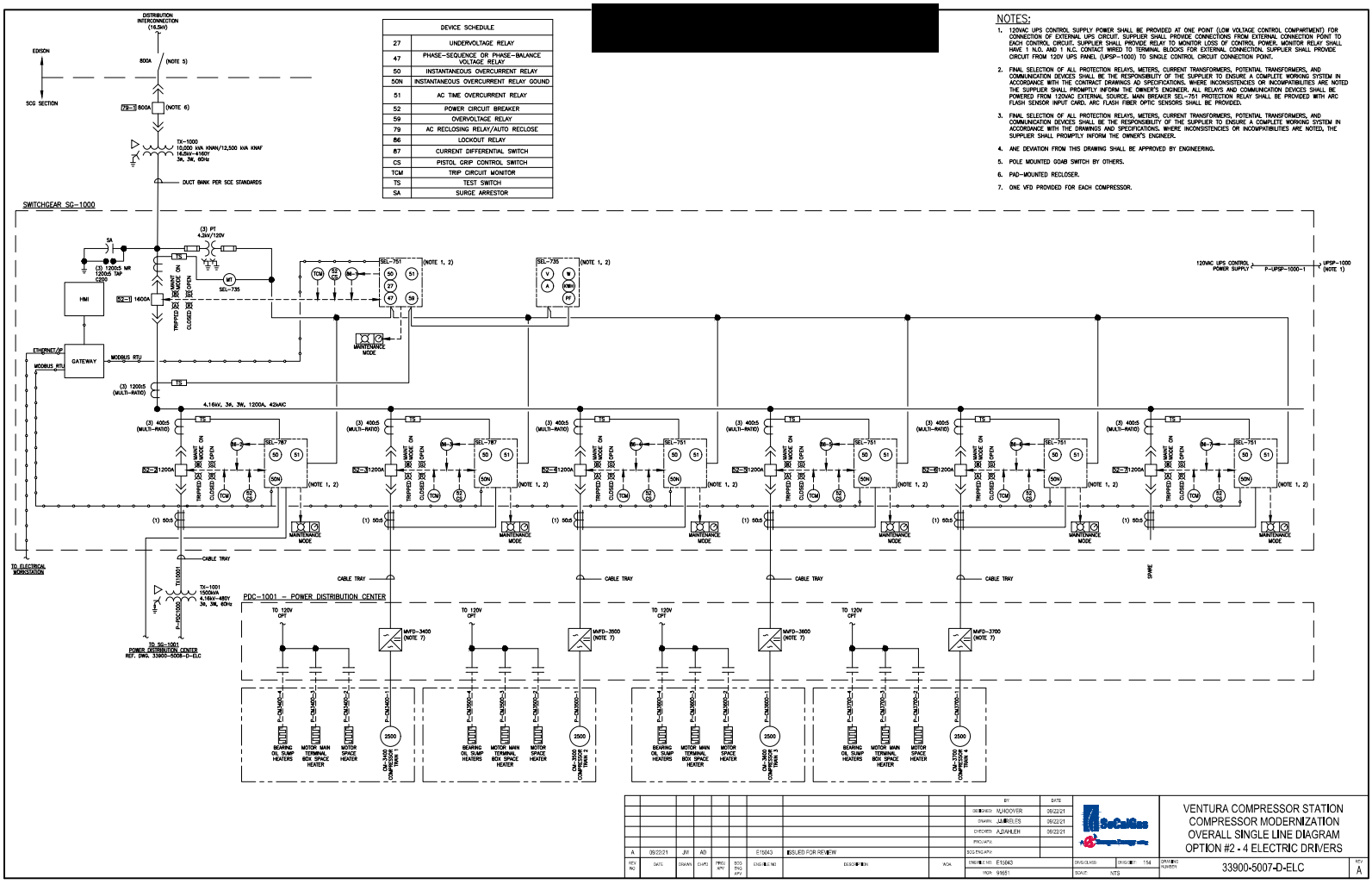
	BY	DATE
DESIGNED	BLROOTER	09/22/21
DRAWN	LMERELES	09/22/21
CHECKED	ADAHLER	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEER NO.	E10043	
WOA	916011	

SoCalGas

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
TYPICAL SOFT-START - SCHEMATIC AND WIRING DIAGRAM
OPTION #1 - 2 ENGINES, 2 ELECTRIC DRIVERS

DRAWING CLASS: 11E | DRAWING NUMBER: 33900-5042-D-ELC | REV: A

SCALE: N.T.S.



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

[redacted]

NOTES:

1. 120VAC UPS CONTROL SUPPLY POWER SHALL BE PROVIDED AT ONE POINT (LOW VOLTAGE CONTROL COMPARTMENT) FOR CONNECTION OF EXTERNAL UPS CIRCUIT. SUPPLIER SHALL PROVIDE CONNECTIONS FROM EXTERNAL CONNECTION POINT TO EACH CONTROL CIRCUIT. SUPPLIER SHALL PROVIDE RELAY TO MONITOR LOSS OF CONTROL POWER. MONITOR RELAY SHALL HAVE 1 N.O. AND 1 N.C. CONTACT WIRED TO TERMINAL BLOCKS FOR EXTERNAL CONNECTION. SUPPLIER SHALL PROVIDE CIRCUIT FROM 120V UPS PANEL (UPSP-1000) TO SINGLE CONTROL CIRCUIT CONNECTION POINT.
2. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE CONTRACT DRAWINGS AD SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER. ALL RELAYS AND COMMUNICATION DEVICES SHALL BE POWERED FROM 120VAC EXTERNAL SOURCE. MAIN BREAKER SEL-751 PROTECTION RELAY SHALL BE PROVIDED WITH ARC FLASH SENSOR INPUT CARD. ARC FLASH FIBER OPTIC SENSORS SHALL BE PROVIDED.
3. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED, THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER.
4. ANE DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.
5. POLE MOUNTED GOAB SWITCH BY OTHERS.
6. PAD-MOUNTED RECLOSER.
7. ONE VFD PROVIDED FOR EACH COMPRESSOR.

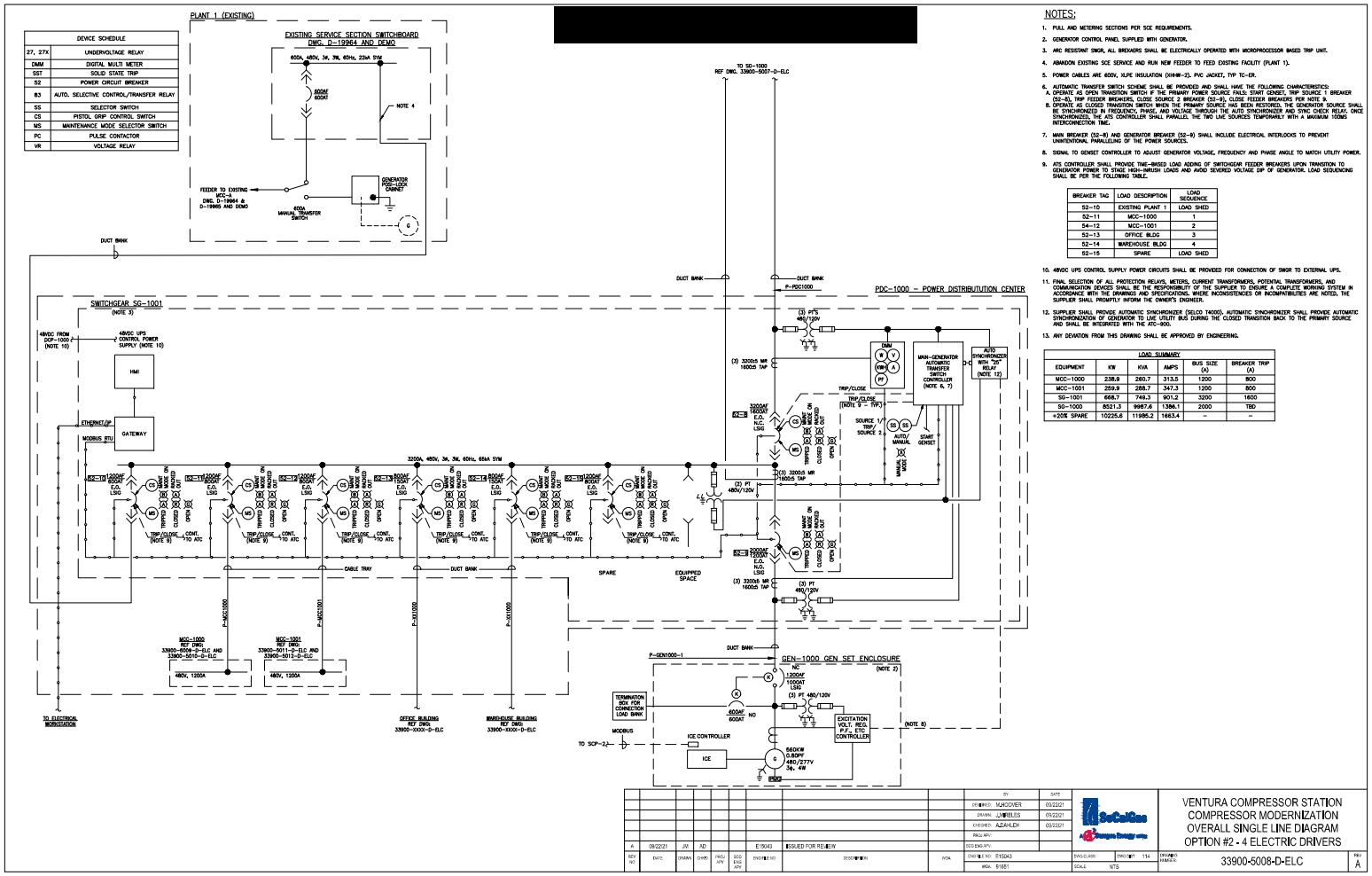
REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCE ENG APV	ENGINEERING	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJAMBELES	09/22/21
CHECKED	AJAHLEM	09/22/21
PROJ APV'L		
SCE ENG APV'L		

WOA 99651 | ENGINEERING NO. E15043 | DRAWING CLASS: | DRAWING SHEET: 154 | SCALE: NTS

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

DRAWING NUMBER: 33900-5007-D-ELC | REV: A



DEVICE SCHEDULE	
27, 27X	UNDERVOLTAGE RELAY
DMM	DIGITAL MULTI METER
SST	SOLID STATE TRIP
52	POWER CIRCUIT BREAKER
83	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:

1. PULL AND METERING SECTIONS PER SCE REQUIREMENTS.
2. GENERATOR CONTROL PANEL SUPPLIED WITH GENERATOR.
3. ARC RESISTANT SWGR, ALL BREAKERS SHALL BE ELECTRICALLY OPERATED WITH MICROPROCESSOR BASED TRIP UNIT.
4. ABANDON EXISTING SCE SERVICE AND RUN NEW FEEDER TO FEED EXISTING FACILITY (PLANT 1).
5. POWER CABLES ARE 600V, XLPE INSULATION (XHHW-2), PVC JACKET, TYP TC-ER.
6. AUTOMATIC TRANSFER SWITCH SCHEME SHALL BE PROVIDED AND SHALL HAVE THE FOLLOWING CHARACTERISTICS:
   A. OPERATE AS OPEN TRANSITION SWITCH IF THE PRIMARY POWER SOURCE FAILS, START GENSET, TRIP SOURCE 1 BREAKER (52-G), TRIP FEEDER BREAKERS, CLOSE SOURCE 2 BREAKER (52-9), CLOSE FEEDER BREAKERS PER NOTE 9.
   B. OPERATE AS CLOSED TRANSITION SWITCH WHEN THE PRIMARY SOURCE HAS BEEN RESTORED, THE GENERATOR SOURCE SHALL BE SYNCHRONIZED IN FREQUENCY, PHASE, AND VOLTAGE THROUGH THE AUTO SYNCHRONIZER AND SYNC CHECK RELAY. ONCE SYNCHRONIZED, THE ATS CONTROLLER SHALL PARALLEL THE TWO LIVE SOURCES TEMPORARILY WITH A MAXIMUM 100MS INTERCONNECTION TIME.
7. MAIN BREAKER (52-9) AND GENERATOR BREAKER (52-9) SHALL INCLUDE ELECTRICAL INTERLOCKS TO PREVENT UNINTENTIONAL PARALLELING OF THE POWER SOURCES.
8. SIGNAL TO GENSET CONTROLLER TO ADJUST GENERATOR VOLTAGE, FREQUENCY AND PHASE ANGLE TO MATCH UTILITY POWER.
9. ATS CONTROLLER SHALL PROVIDE TIME-BASED LOAD ADDING OF SWITCHGEAR FEEDER BREAKERS UPON TRANSITION TO GENERATOR POWER TO STAGE HIGH-INRUSH LOADS AND AVOID SEVERED VOLTAGE DIP OF GENERATOR. LOAD SEQUENCING SHALL BE PER THE FOLLOWING TABLE.

BREAKER TAG	LOAD DESCRIPTION	LOAD SEQUENCE
52-10	EXISTING PLANT 1	LOAD SHED
52-11	MCC-1000	1
54-12	MCC-1001	2
52-13	OFFICE BLDG	3
52-14	WAREHOUSE BLDG	4
52-15	SPARE	LOAD SHED

10. 48VDC UPS CONTROL SUPPLY POWER CIRCUITS SHALL BE PROVIDED FOR CONNECTION OF SWGR TO EXTERNAL UPS.
11. FINAL SELECTION OF ALL PROTECTION RELAYS, METERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, AND COMMUNICATION DEVICES SHALL BE THE RESPONSIBILITY OF THE SUPPLIER TO ENSURE A COMPLETE WORKING SYSTEM IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. WHERE INCONSISTENCIES OR INCOMPATIBILITIES ARE NOTED, THE SUPPLIER SHALL PROMPTLY INFORM THE OWNER'S ENGINEER.
12. SUPPLIER SHALL PROVIDE AUTOMATIC SYNCHRONIZER (SELCO T4000). AUTOMATIC SYNCHRONIZER SHALL PROVIDE AUTOMATIC SYNCHRONIZATION OF GENERATOR TO LIVE UTILITY BUS DURING THE CLOSED TRANSITION BACK TO THE PRIMARY SOURCE AND SHALL BE INTEGRATED WITH THE ATC-900.
13. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

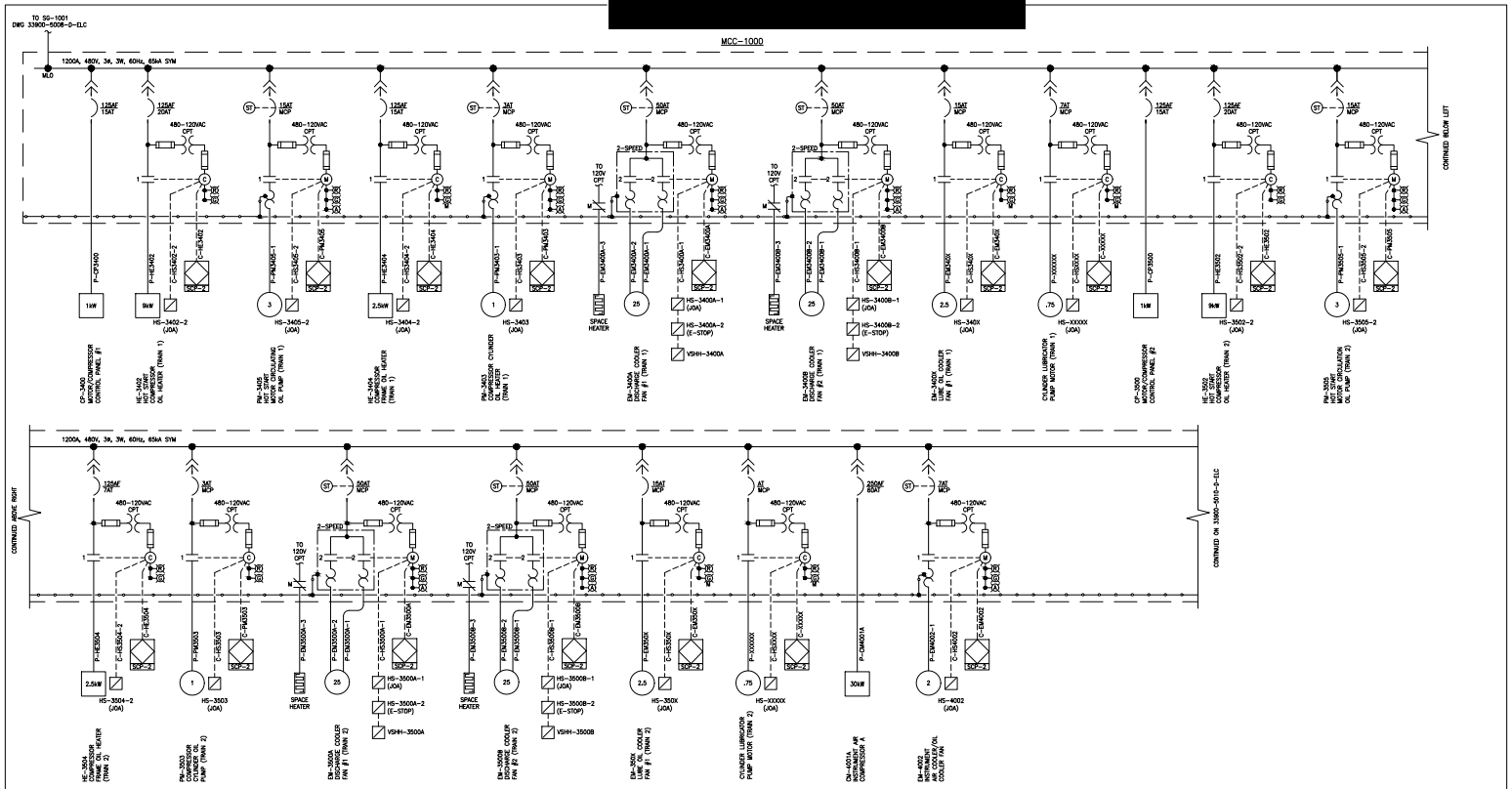
LOAD SUMMARY

EQUIPMENT	KW	KVA	AMPS	BUS SIZE (A)	BREAKER TRIP (A)
MCC-1000	238.9	260.7	313.5	1200	800
MCC-1001	259.9	288.7	347.3	1200	800
SG-1001	668.7	749.3	901.2	3200	1600
SG-1000	8521.3	9987.6	1386.1	2000	TBD
+20% SPARE	10225.6	11985.2	1663.4	–	–

REV NO	DATE	DRAWN	CHKD	PROJ MGR	ECG ENG MGR	DISTRIB NO	DESCRIPTION
A	09/22/21	JM	AD			E19043	ISSUED FOR REVIEW

		NO	DATE
DESIGNED	MANOOVER		09/22/21
DRAWN	JJWELLES		09/22/21
CHECKED	AZAHLEH		09/22/21
PROJ MGR			
ECG ENG MGR			
ENGINEER NO	E19043	DWG CLASS	
MSA	91681	DWG DEPT	114
SCALE	NTS	DRAWING NUMBER	33900-5008-D-ELC
		REV	A

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



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

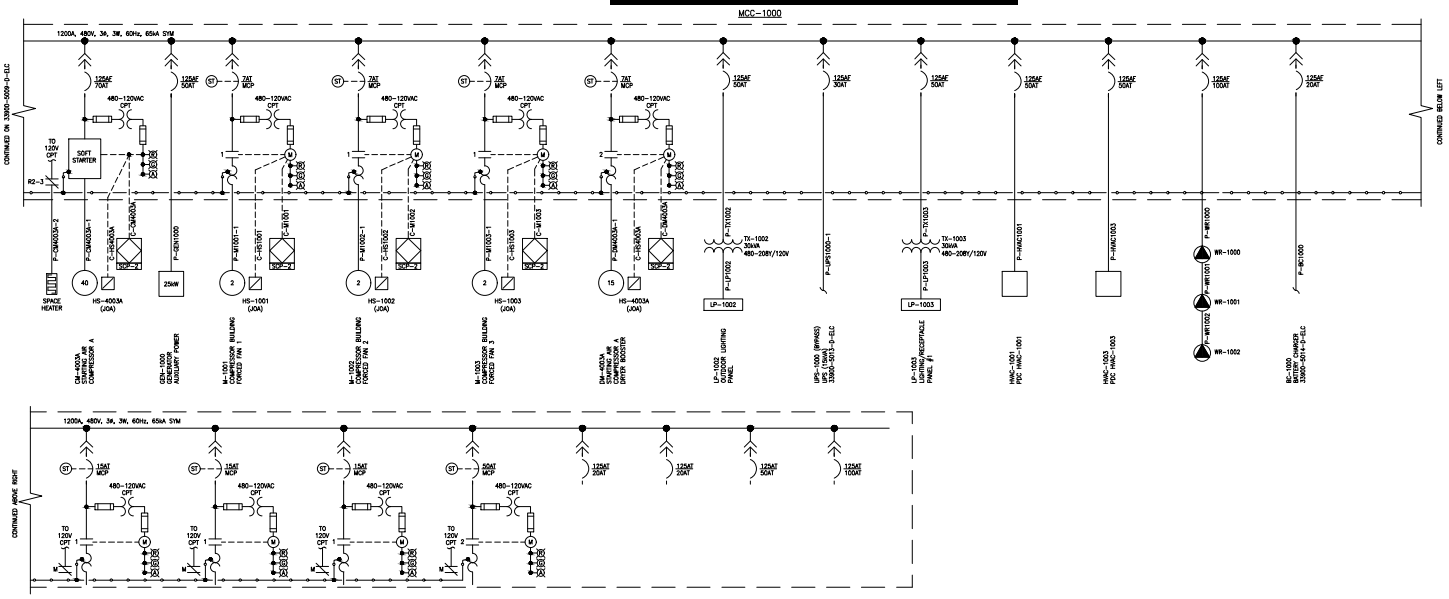
REV NO	DATE	DRAWN	CHKD	PROJ MGR	ECG ESD APP	ENGINEER NO	DESCRIPTION
A	09/22/21	JM	AD			E19043	ISSUED FOR REVIEW

BY	DATE
DESIGNED: MJACOVER	09/22/21
DRAWN: JJWELLES	09/22/21
CHECKED: AZAHLEH	09/22/21
PROJ MGR:	
ECG ENG MGR:	
ENG FILE NO: E19043	DWG CLASS:
WO#: 91681	SCALE: NTS
DWG DEPT: 114	DRAWING NUMBER: 33900-5009-D-ELC
	REV: A

SoCalGas — The Gas Company

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

[redacted]



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHKD	PROJ MGR	ECG ESD MGR	ENTITLE NO	DESCRIPTION
A	09/22/21	JM	AD			E19043	ISSUED FOR REVIEW

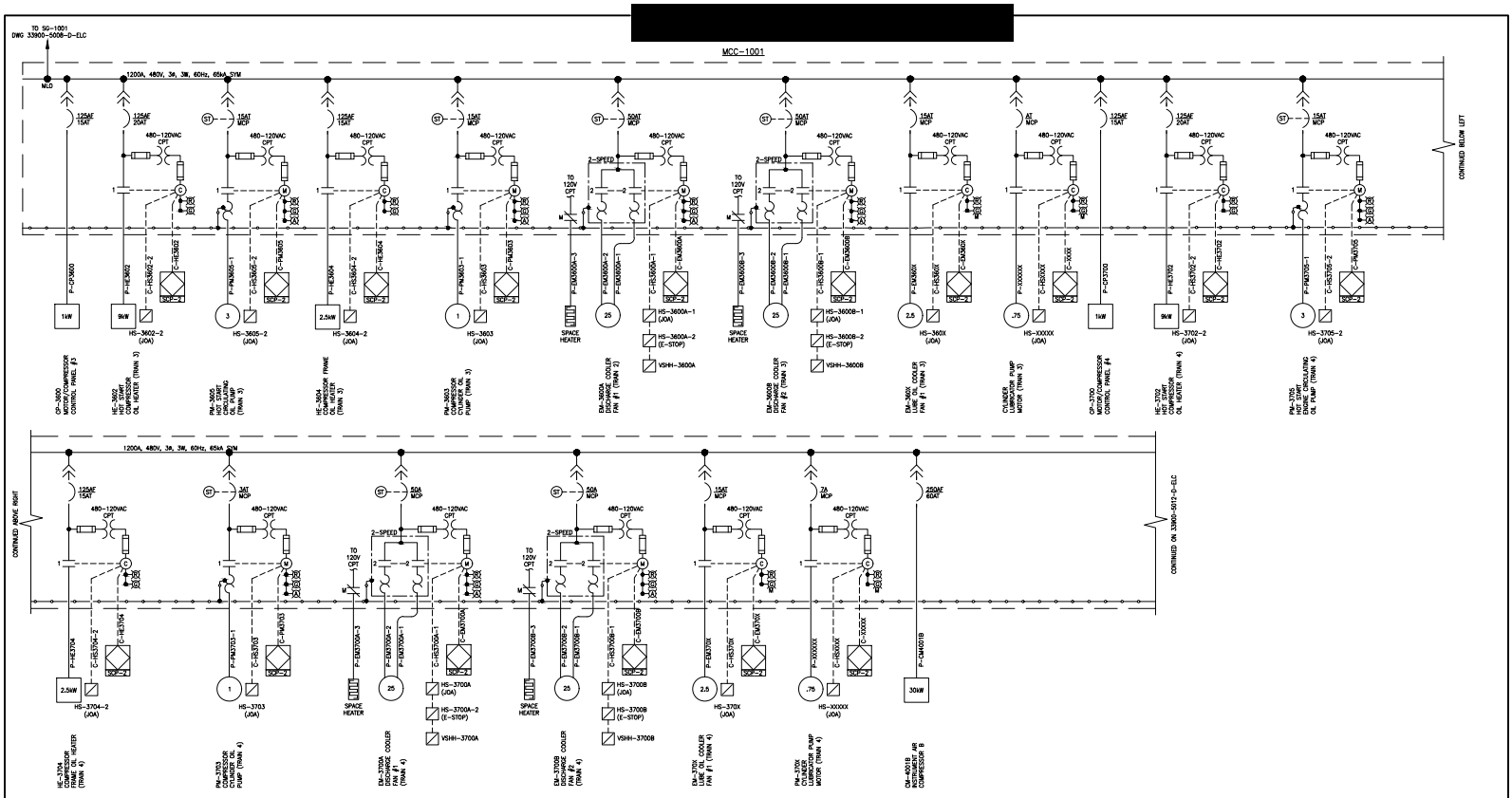
	BY	DATE
DESIGNED	M.HOOVER	09/22/21
DRAWN	J.MEULES	09/22/21
CHECKED	A.ZAHLEH	09/22/21
PROJ MGR		
ECG ENG MGR		
ENG REC NO	E19043	
MGA	91681	
DWG CLASS		
DWG DEPT	154	
SCALE	NTS	

SoCalGas — Sempra Energy utility

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

DRAWING NUMBER: 33900-5010-D-ELC

REV: A



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CT_S/PT_S/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SCO ENG APV	ENGINEER	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

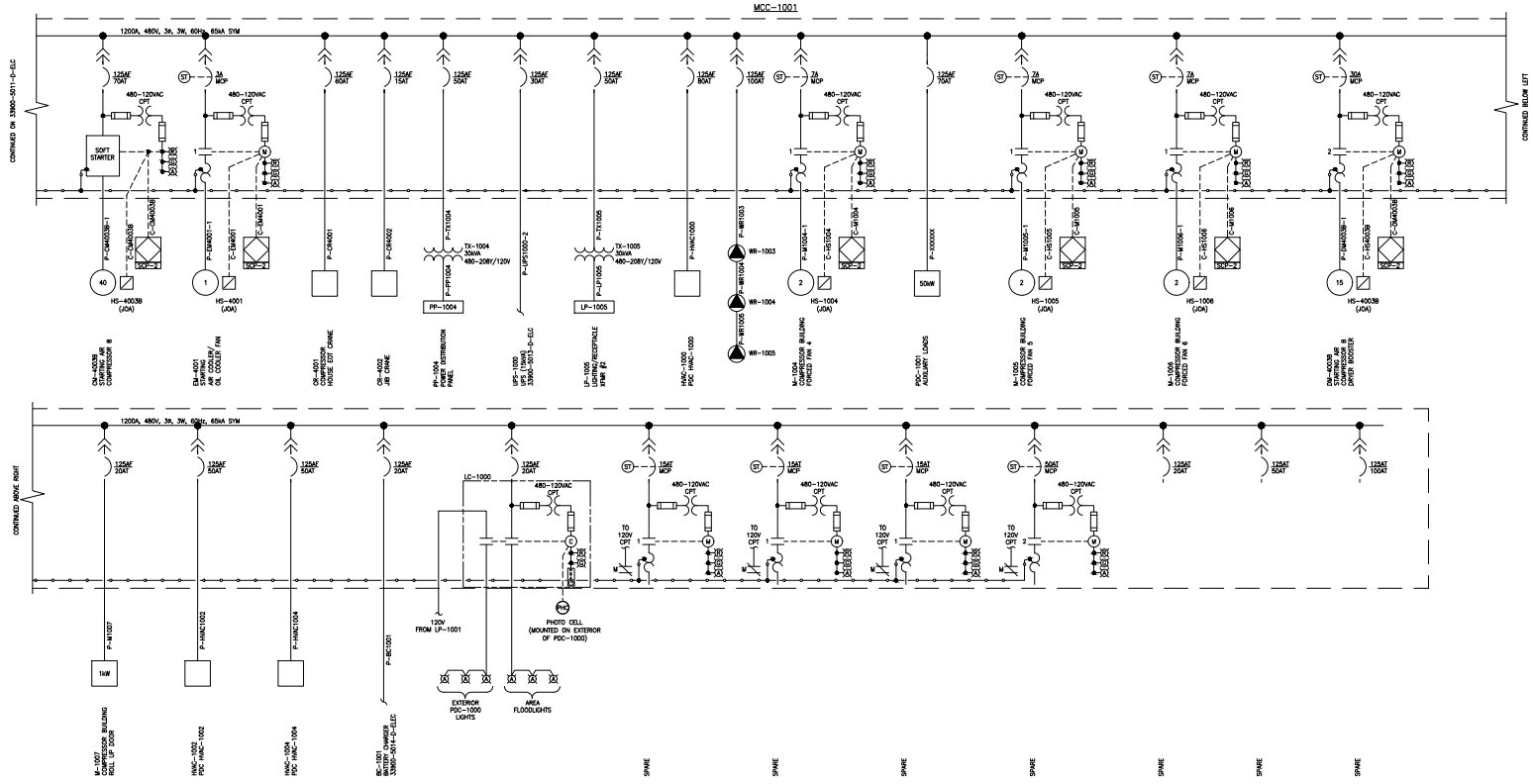
	BY	DATE
DESIGNED	KJHOOVER	09/22/21
DRAWN	JJAMELES	09/22/21
CHECKED	AJAHLEH	09/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	99651	

DRG CLASS: | DRG SHT: 154 | SCALE: NTS

SoCalGas

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

DRAWING NUMBER: 33900-5011-D-ELC | REV: A



GENERAL NOTES:

1. MCC SHALL BE "ARC-SHIELD" ALLEN-BRADLEY CENTERLINE 2100 WITH INTELLICENTER TECHNOLOGY.
2. CTs/PTs/RELAYS AND HARDWARE INDICATED IN THIS DRAWING ARE MINIMUM REQUIRED. SUPPLIER SHALL PROVIDE ALL NECESSARY HARDWARE/SOFTWARE REQUIRED FOR OPERATION OF EQUIPMENT.
3. 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.

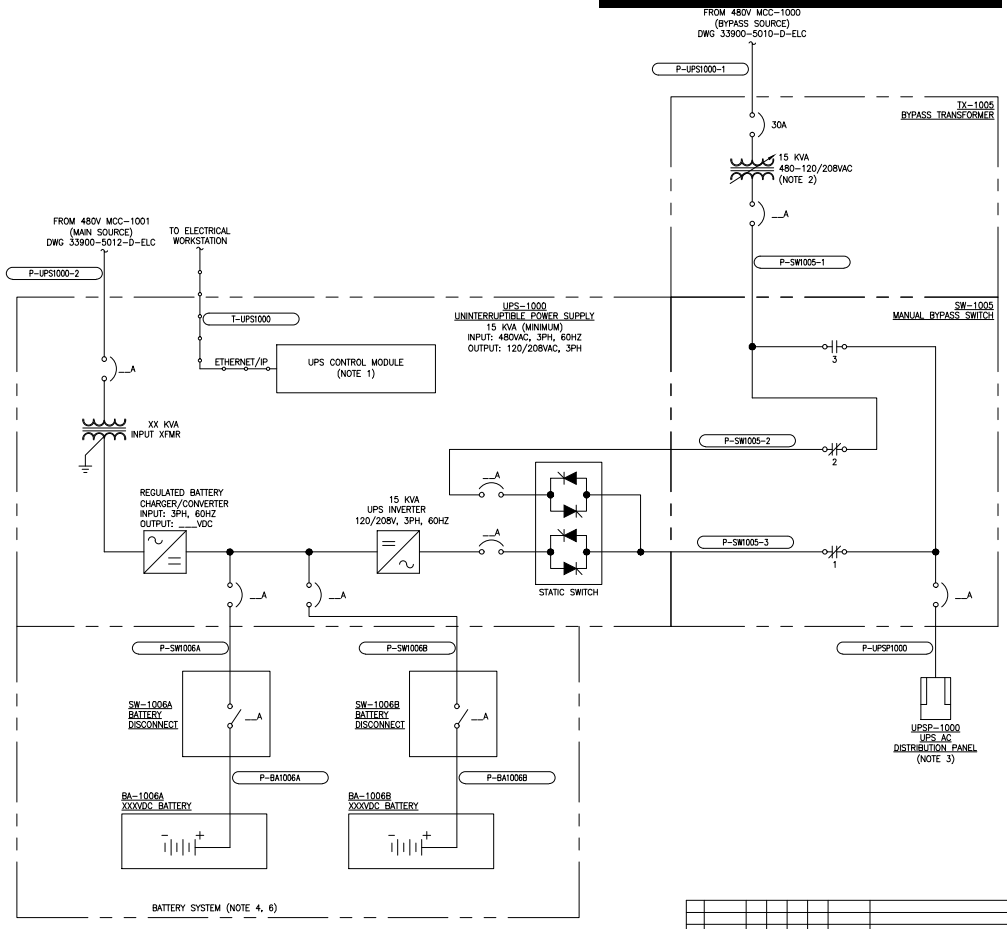
REV NO	DATE	DRAWN	CHK'D	PROJ MGR APV	SCO ENG APV	ENGINEER NO.	DESCRIPTION
A	06/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	KJHOOVER	06/22/21
DRAWN	JJAMELES	06/22/21
CHECKED	AJAHLEM	06/22/21
PROJ APV.		
SCO ENG APV.		
ENGINEER NO.	E15043	
WOA	19651	

DRG CLASS: | DRG SHT: 154 | SCALE: NTS

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

DRAWING NUMBER: 33900-5012-D-ELC | REV: A



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 77°F 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	O
BYPASS	O	O	X

LEGEND:

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

REV NO	DATE	DRAWN	CHKD	PROJ APV	DOC ENG APV	ENGR'G NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

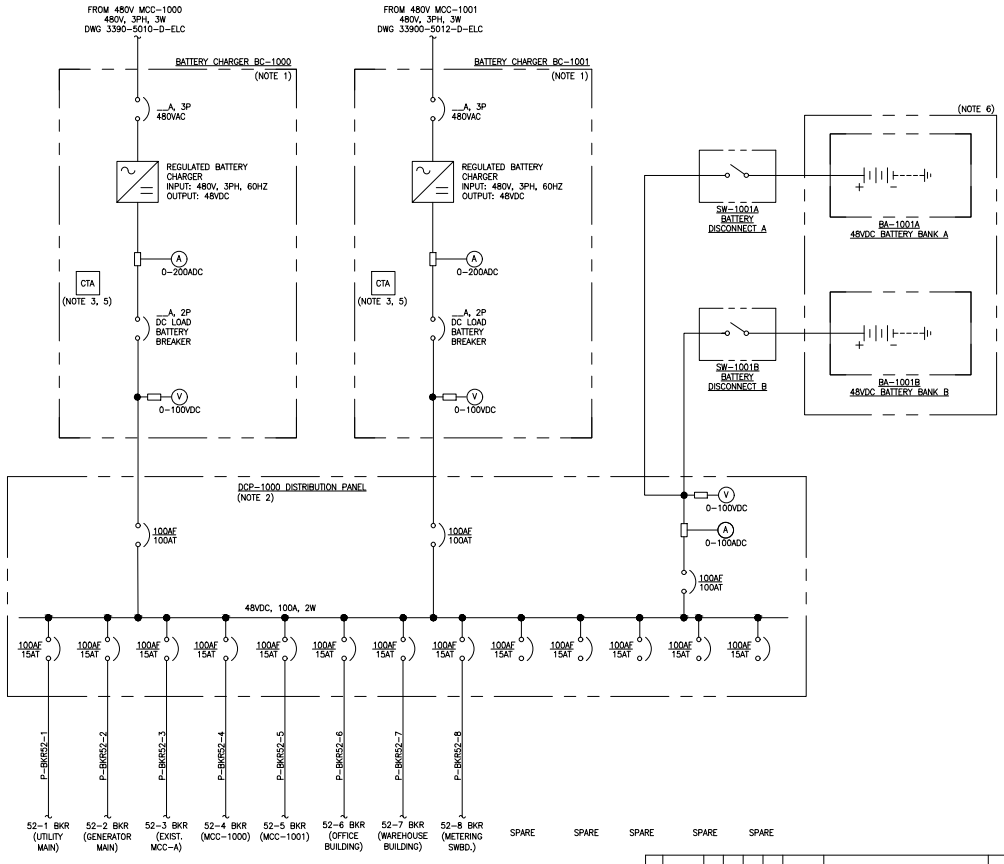
BY DATE
DESIGNED MJHOOVER 09/22/21
DRAWN JJARVELES 09/22/21
CHECKED AJAHLEH 09/22/21
PROJ APV.
DOC ENG APV.
ENGINEER NO. E15043
WO# 99851
DWG CLASS
DWG CERT
SCALE NTS

SoCalGas
A Sempra Energy utility

VENTURA COMPRESSOR STATION
COMPRESSOR MODERNIZATION
UNINTERRUPTIBLE POWER SUPPLY
SINGLE LINE DIAGRAM - OPTION #2 - 4 ELECTRIC DRIVERS

DRAWING NUMBER: 33900-5013-D-ELC
REV: A

[redacted]



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 PLC.
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:

- CIRCUIT BREAKER
- RECTIFIER/CONVERTER
- BATTERY
- DISCONNECT SWITCH

REV NO	DATE	DRAWN	CHKD	PROJ APV	ENGR APV	DESCRIPTION
A	09/22/21	JM	AD		E15043	ISSUED FOR REVIEW

DESIGNED	M.HOOVER 09/22/21
DRAWN	J.M°MULLEN 09/22/21
CHECKED	A.ZAHLEH 09/22/21
PROJ APV	
ENGR APV	
ENGINEER NO	E15043
DWG CLASS	
DWG DEPT	114
SCALE	NTS

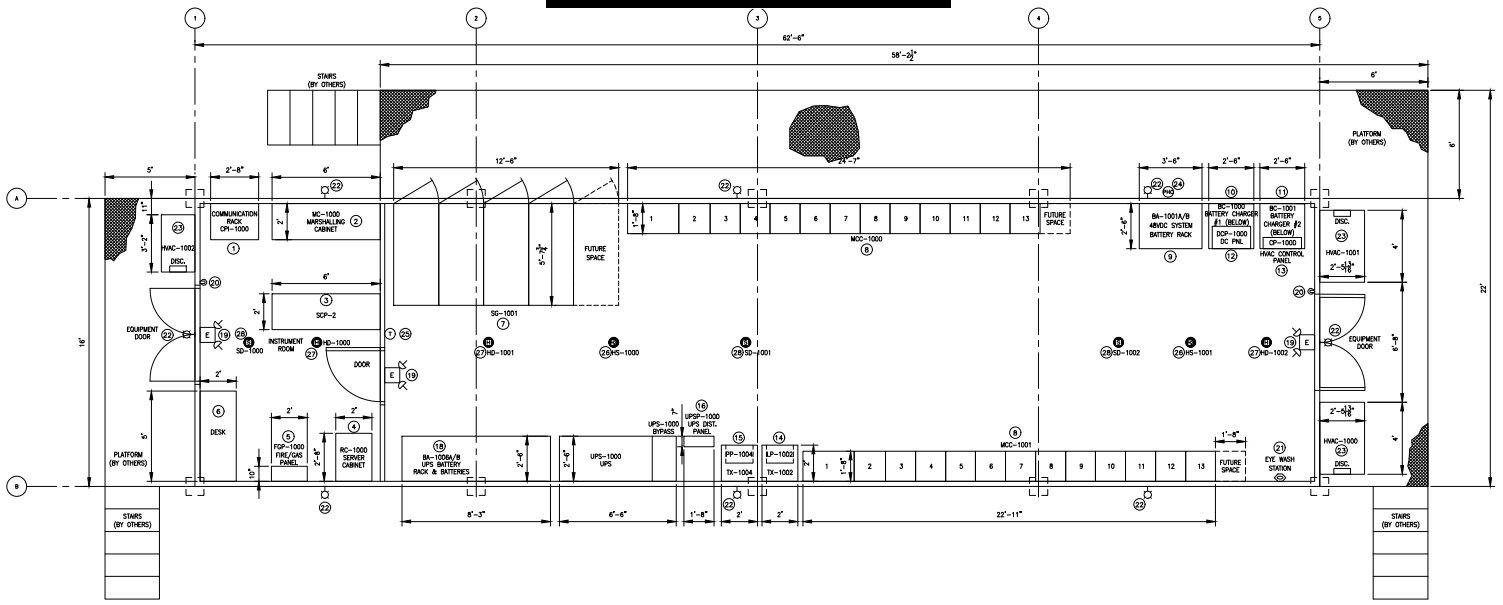
SoCalGas — The Gas Company

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

DRAWING NUMBER: 33900-5014-D-ELC

REV: A

[redacted]



NOTES :

1. PRE-FABRICATED BUILDING COMPLETE WITH LIGHTING, RECEPTACLES AND HVAC. TO BE PROVIDED AS PART OF CONTRACT ELE-401.
2. BUILDING AND EQUIPMENT DIMENSIONS ARE PRELIMINARY. VENDOR TO PREPARE FINAL EQUIPMENT LAYOUT WITH ALL ACTUAL VENDOR DATA AND SUBMIT FOR APPROVAL, DURING DETAIL ENGINEERING.
3. INTERIOR CEILING HEIGHT SHALL BE A MINIMUM OF 10'-0".
4. BUILDING SHALL BE INSTALLED ON PIERS APPROXIMATELY 4' ABOVE GRADE (BY OTHERS).
5. REFER TO SPECIFICATION E15043-V1CM-65-SP-004.
6. INCOMING AND OUTGOING FIELD POWER CABLES FROM THE MCC'S AND SWGR SHALL BE BOTTOM AND/OR TOP ENTRY.
7. SUPPLIER SHALL PROVIDE CABLE TRAY AROUND TOP INTERIOR OF PDC-1000 FOR DISTRIBUTION OF STATUS, CONTROL, AND POWER WIRING. SUPPLIER SHALL PROVIDE SEPARATE CABLE TRAY FOR POWER (480/120V) AND INSTRUMENTATION & CONTROL WIRING. CABLE TRAY SHALL BE ALUMINUM LADDER TYPE WITH 9" RUNG SPACING AND 6" LOAD DEPTH. COOPER B-LINE OR APPROVED EQUAL.
8. ALL INTERIOR CONDUITS SHALL BE PROVIDED WITH METALLIC NAMEPLATE. ALL RECEPTACLES SHALL BE PROVIDED WITH LAMACOID NAMEPLATES.
9. REFER TO PDC-1000 ELECTRICAL EQUIPMENT LIST (VICM-65-EN-002) FOR FURNISH, INSTALL, WIRE RESPONSIBILITIES. SUPPLIER SHALL BE RESPONSIBLE FOR PROVIDING MISCELLANEOUS ACCESSORIES REQUIRED FOR A COMPLETE SYSTEM.
10. SUPPLIER SHALL REFER TO PDC-1000 CIRCUIT SCHEDULE. SUPPLIER SHALL PROVIDE POWER FOR ALL SUPPLIER PROVIDED EQUIPMENT INCLUDING, BUT NOT LIMITED TO, THOSE INDICATED IN THE CABLE SCHEDULE. SUPPLIER SHALL PROVIDE CONTROL AND COMMUNICATION CIRCUITS AS INDICATED IN THE CABLE SCHEDULE. SUPPLIER SHALL PROVIDE POWER FOR OWNER SUPPLIED EQUIPMENT AS INDICATED IN THE CABLE SCHEDULE.
11. STATION CONTROL PANEL SCP-2 AND MARSHALLING CABINET MC-1000 SHALL HAVE TOP ENTRY WIREWAYS.
12. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR ALL EQUIPMENT AS RECOMMENDED BY THE MANUFACTURER. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR THE STATION CONTROL PANEL AND MARSHALLING CABINET. SUPPLIER SHALL PROVIDE FLOOR CUTOUTS FOR FUTURE MCC. FUTURE MCC CUTOUTS SHALL BE BASED ON SAME DIMENSIONS OF TYPICAL MCC SECTION DIMENSIONS.

LEGEND:

- E — EMERGENCY EXIT UNIT WITH BATTERY PACK
- FIRE EXTINGUISHER
- EYE WASH
- H — HEAT DETECTOR – RATE OF RISE TYPE, OPENS WHEN REACHES TEMPERATURE SET POINT OF 60°F.
- S — SMOKE DETECTOR – PHOTO ELECTRIC TYPE WITH ALARM AND FAULT RELAYS WITH FORM C CONTACTS THE OPEN ON ALARM OR LOSS OF POWER, 24VDC.
- HZ — HYDROGEN SENSOR
- PHC — PHOTOCELL
- T — THERMOSTAT

REV NO	DATE	DRAWN	CHK'D	PROJ APV	SOC ENG APV	ENGINEERING NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

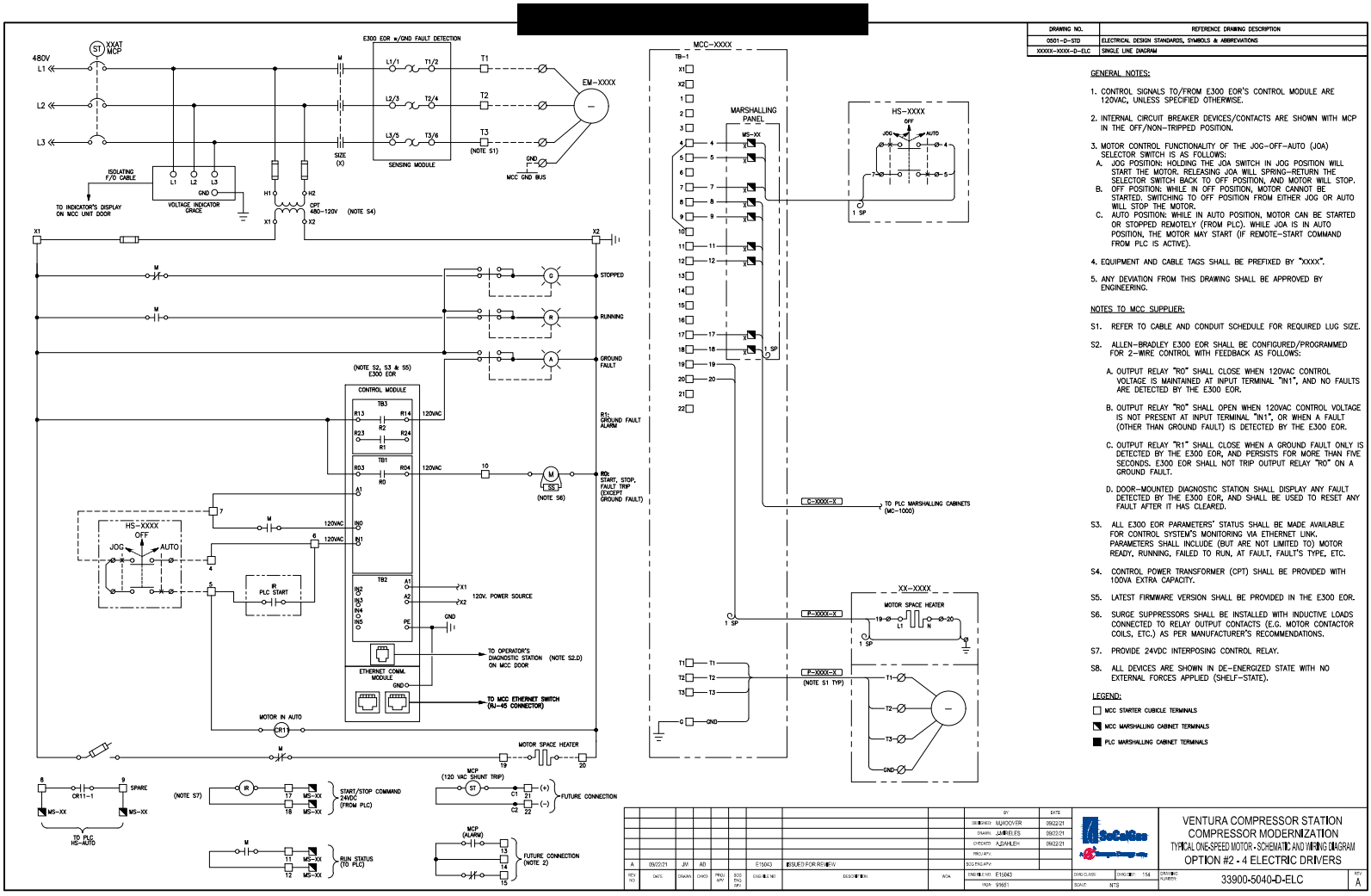
	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	JMWEELES	09/22/21
CHECKED	AZAMLEH	09/22/21
PROJ APV.		
SOC ENG APV.		

WOA ENGINEERING NO E15043 | DRG CLASS | DRG SHEET 114
WBS 9150.1 | SCALE 3/8" = 1'-0"

SoCalGas

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

DRAWING NUMBER 33900-5030-D-ELC | REV A



DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0001-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM

GENERAL NOTES:

1. CONTROL SIGNALS TO/FROM E300 EOR'S CONTROL MODULE ARE 120VAC, UNLESS SPECIFIED OTHERWISE.
2. INTERNAL CIRCUIT BREAKER DEVICES/CONTACTS ARE SHOWN WITH MCP IN THE OFF/NON-TRIPPED POSITION.
3. MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
   A. JOG 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.
   B. OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
   C. 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).
4. EQUIPMENT AND CABLE TAGS SHALL BE PREFIXED BY "XXXX".
5. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-WIRE CONTROL WITH FEEDBACK AS FOLLOWS:

   A. OUTPUT RELAY "R0" SHALL CLOSE WHEN 120VAC CONTROL VOLTAGE IS MAINTAINED AT INPUT TERMINAL "IN1", AND NO FAULTS ARE DETECTED BY THE E300 EOR.

   B. OUTPUT RELAY "R0" 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.

   C. OUTPUT RELAY "R1" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN FIVE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAY "R0" ON A GROUND FAULT.

   D. 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.

S3. ALL E300 EOR 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.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.

S6. SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.

S7. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S8. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF-STATE).

LEGEND:

- MCC STARTER CUBICLE TERMINALS
- MCC MARSHALLING CABINET TERMINALS
- PLC MARSHALLING CABINET TERMINALS

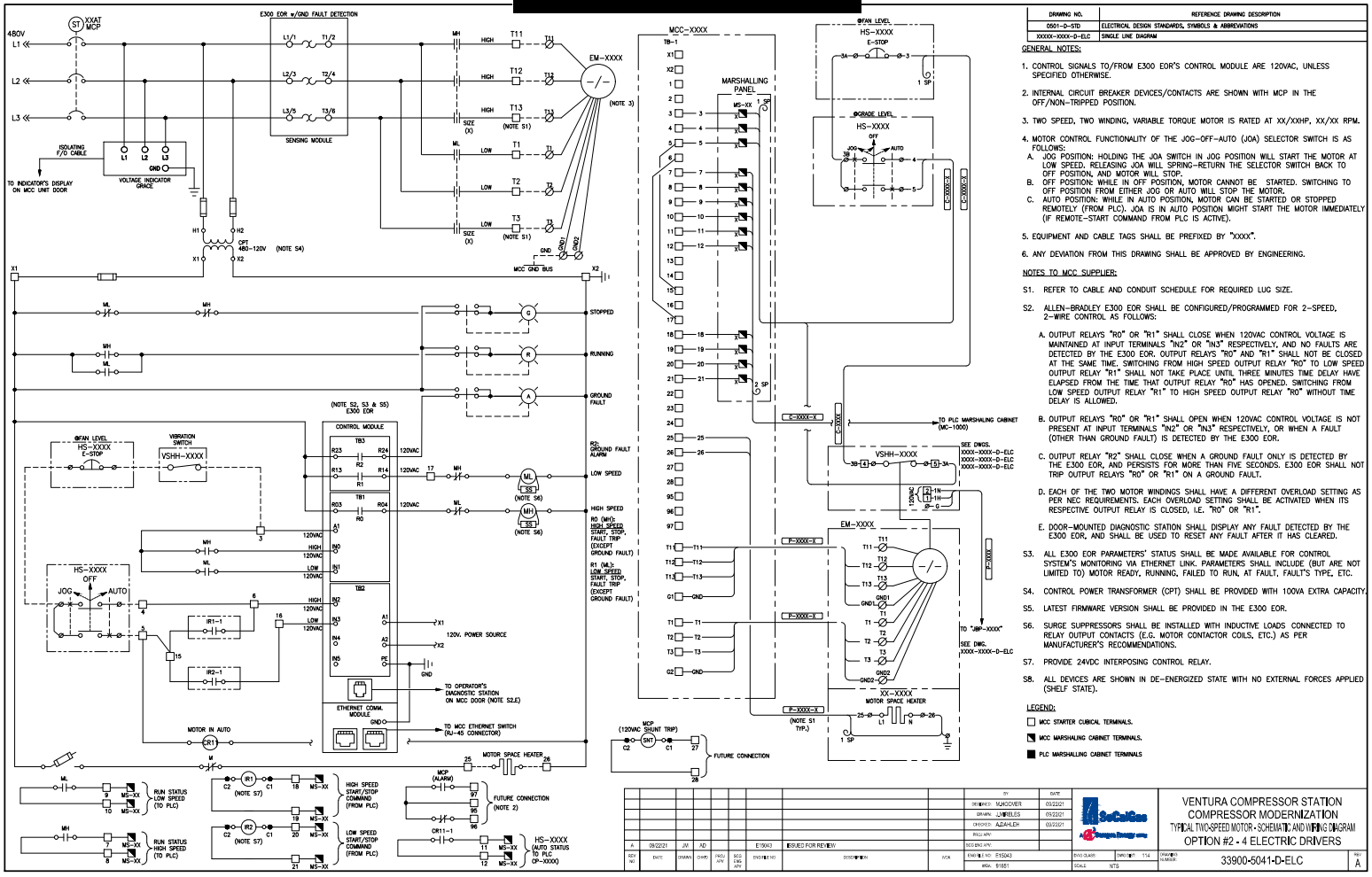
REV NO	DATE	DRAWN	CHKD	PROJ APV	SOC ENG APV	ENGINEER NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	LMIRELES	09/22/21
CHECKED	AZAHLEH	09/22/21
PROJ APV.		
SOC ENG APV.		
ENGINEER NO.	E15043	
WO#.	99651	

SoCalGas
A Sempra Energy utility

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

DWG CLASS: ---
DWG SHT: 1 of 1
SCALE: NTS
DRAWING NUMBER: 33900-5040-D-ELC
REV: A



DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0501-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM

GENERAL NOTES:

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

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY E300 EOR SHALL BE CONFIGURED/PROGRAMMED FOR 2-SPEED, 2-WIRE CONTROL AS FOLLOWS:

   A. 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 EOR. 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.

   B. 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 EOR.

   C. OUTPUT RELAY "R2" SHALL CLOSE WHEN A GROUND FAULT ONLY IS DETECTED BY THE E300 EOR, AND PERSISTS FOR MORE THAN FIVE SECONDS. E300 EOR SHALL NOT TRIP OUTPUT RELAYS "R0" OR "R1" ON A GROUND FAULT.

   D. 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".

   E. 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.

S3. ALL E300 EOR 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.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE E300 EOR.

S6. SURGE SUPPRESSORS SHALL BE INSTALLED WITH INDUCTIVE LOADS CONNECTED TO RELAY OUTPUT CONTACTS (E.G. MOTOR CONTACTOR COILS, ETC.) AS PER MANUFACTURER'S RECOMMENDATIONS.

S7. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S8. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF STATE).

LEGEND:

- MCC STARTER CUBICAL TERMINALS.
- MCC MARSHALING CABINET TERMINALS.
- PLC MARSHALING CABINET TERMINALS

REV NO	DATE	DRAWN	CHKD	PROJ MGR	ENGR LDG MGR	DISTRIB NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

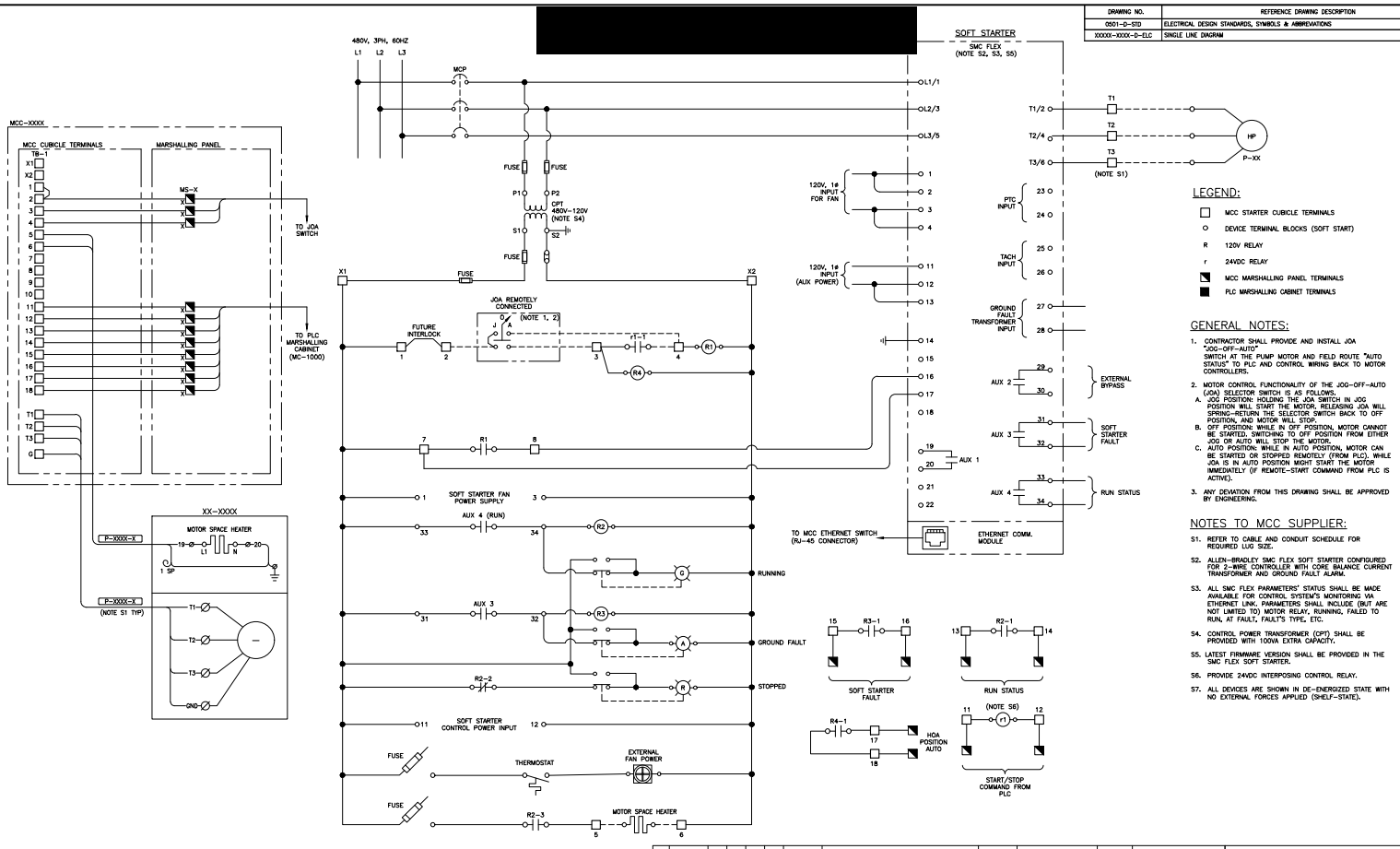
DESIGNED	MANOOVER 09/22/21
DRAWN	J.WELLES 09/22/21
CHECKED	AZAHLEH 09/22/21
PROJ MGR	
SCG ENG MGR	
ENG REC NO	E15043
MFG.	91681
DWG CLASS	
DWG DEPT	114
SCALE	NTS

SoCalGas — The Gas Company

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

DRAWING NUMBER: 33900-5041-D-ELC
REV: A

DRAWING NO.	REFERENCE DRAWING DESCRIPTION
0501-D-STD	ELECTRICAL DESIGN STANDARDS, SYMBOLS & ABBREVIATIONS
XXXXX-XXXX-D-ELC	SINGLE LINE DIAGRAM



LEGEND:

- MCC STARTER CUBICLE TERMINALS
- DEVICE TERMINAL BLOCKS (SOFT START)
- R 120V RELAY
- r 24VDC RELAY
- MCC MARSHALLING PANEL TERMINALS
- PLC MARSHALLING CABINET TERMINALS

GENERAL NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL JOA "JOG-OFF-AUTO" SWITCH AT THE PUMP MOTOR AND FIELD ROUTE "AUTO STATUS" TO PLC AND CONTROL WIRING BACK TO MOTOR CONTROLLERS.
2. MOTOR CONTROL FUNCTIONALITY OF THE JOG-OFF-AUTO (JOA) SELECTOR SWITCH IS AS FOLLOWS:
   A. JOG 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.
   B. OFF POSITION: WHILE IN OFF POSITION, MOTOR CANNOT BE STARTED. SWITCHING TO OFF POSITION FROM EITHER JOG OR AUTO WILL STOP THE MOTOR.
   C. AUTO POSITION: WHILE IN AUTO POSITION, MOTOR CAN BE STARTED OR STOPPED REMOTELY (FROM PLC). WHILE JOA IS IN AUTO POSITION MIGHT START THE MOTOR IMMEDIATELY (IF REMOTE-START COMMAND FROM PLC IS ACTIVE).
3. ANY DEVIATION FROM THIS DRAWING SHALL BE APPROVED BY ENGINEERING.

NOTES TO MCC SUPPLIER:

S1. REFER TO CABLE AND CONDUIT SCHEDULE FOR REQUIRED LUG SIZE.

S2. ALLEN-BRADLEY SMC FLEX SOFT STARTER CONFIGURED FOR 2-WIRE CONTROLLER WITH CORE BALANCE CURRENT TRANSFORMER AND GROUND FAULT ALARM.

S3. ALL SMC FLEX PARAMETERS' STATUS SHALL BE MADE AVAILABLE FOR CONTROL SYSTEM'S MONITORING VIA ETHERNET LINK. PARAMETERS SHALL INCLUDE (BUT ARE NOT LIMITED TO) MOTOR RELAY, RUNNING, FAILED TO RUN, AT FAULT, FAULT'S TYPE, ETC.

S4. CONTROL POWER TRANSFORMER (CPT) SHALL BE PROVIDED WITH 100VA EXTRA CAPACITY.

S5. LATEST FIRMWARE VERSION SHALL BE PROVIDED IN THE SMC FLEX SOFT STARTER.

S6. PROVIDE 24VDC INTERPOSING CONTROL RELAY.

S7. ALL DEVICES ARE SHOWN IN DE-ENERGIZED STATE WITH NO EXTERNAL FORCES APPLIED (SHELF-STATE).

REV NO	DATE	DRAWN	CHKD	PROJ APV	SCE ENG APV	ENGINEER NO	DESCRIPTION
A	09/22/21	JM	AD			E15043	ISSUED FOR REVIEW

	BY	DATE
DESIGNED	MJHOOVER	09/22/21
DRAWN	JJARBELES	09/22/21
CHECKED	AJDAHLEH	09/22/21
PROJ APV.		
SCE ENG APV.		
ENGINEER NO.	E15043	
WOA	99551	
DWG CLASS		
DWG SHT	1	54
SCALE	NTS	

SoCalGas

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

DRAWING NUMBER: 33900-5042-D-ELC

REV: A

[redacted]

APPENDIX E – SCE CORRESPONDENCE

[redacted]

From: [redacted]@sce.com>
Sent: Wednesday, August 25, 2021 10:53 AM
To: [redacted]
Cc:
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
[redacted]

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

Hi [redacted]-

[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?
-[redacted]

[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]

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

[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: [redacted] **E-mail:** [redacted]

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/Prjoect Information Sheet		1	Assessor Parcel map
X	1	Site/Plot (scaled)	X	1	Copy of Grant Deed/ Title Report
X	1	Street Improvement (if appicable)		2	Recorded Tract Maps
X	1	Grading and Elevation (if appicable)	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 Locaitons		1	Address Sequence list
X	1	Street Light Plan (if appicable)	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,

[redacted]
Service Planner
10060 Telegraph Road
Ventura, CA 93004

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

[redacted]

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.

10060 Telegraph Rd.
Ventura, CA 93004

[redacted]

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Customer/Project Information Sheet

Date Received by SCE: _____

Individual or Business Name: (Customer / Developer – Tract DBA or LLC)		
Address:	Email Address:	
City:	State:	Zip Code:
Attn:	Phone No:	
Legal Contact: (Individual responsible for signing contract, paying fees and receiving potential refunds)	Phone No:	
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: ☐	**Commercial:** ☐	**Industrial:** ☐	**Agricultural:** ☐
Service Requested:	Overhead: ☐	Underground: ☐	Indoor Cultivation ☐
Tract:	Lot(s)		Mixed-Light Cultivation ☐
Is this project subject to Buy America Compliance? Yes ☐ No ☐		Temporary Service Required: Yes ☐ No ☐	
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): *Homes over 5000 sq. ft. larger lots require a Load Schedule. Please contact your electrician for assistance.*			
Solar or Generation Equipment to be installed (If yes, please attach additional descriptions/specifications): Yes ☐ No ☐			
Electric Vehicle: ☐ Charge Station ☐ 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?	

[redacted]

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

SOUTHERN CALIFORNIA EDISON
An *EDISON INTERNATIONAL* Company

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:_____

_____

_____

10060 Telegraph Rd
Ventura, CA 93004

[redacted]

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.

[redacted]

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 enties 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]*

[redacted]

- 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)

[redacted]

- 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

[redacted]

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
TEXT RELATED		
TEXT - STREET NAMES	TEXT-STREET	7
TEXT - Lot Numbers	TEXT-LOTS	7
Text - Misc.	TEXT	7
DIMENSIONING - AutoCAD related with DIM	DIMENSION	7

[redacted]

BURNS McDONNELL

CREATE AMAZING.

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