DOCKETED

Docket Number:	08-AFC-09C
Project Title:	Palmdale Energy Project (Formerly Palmdale Hybrid Power Plant) - Compliance
TN #:	206521-6
Document Title:	Palmdale Energy LLC's Response to City of Lancaster Data Request Set No.1 (1-13) DR-5 (Part 5)
Description:	N/A
Filer:	Marie Fleming
Organization:	DayZen LLC
Submitter Role:	Applicant Representative
Submission Date:	11/5/2015 4:21:44 PM
Docketed Date:	11/5/2015

APPENDIX C

Modeling Support Data

This appendix contains the following data and figures:

C-1	Facility Plot Plan
C-2a-2b-2c	Site Layout
C-3a-3b	Facility Elevation Views
C-4a-4e	Wind Rose Figures (5)
C-5	AVAQMD (MDAB) Air Monitoring Station Map

Modeling input/output files are included in the enclosed CD's.

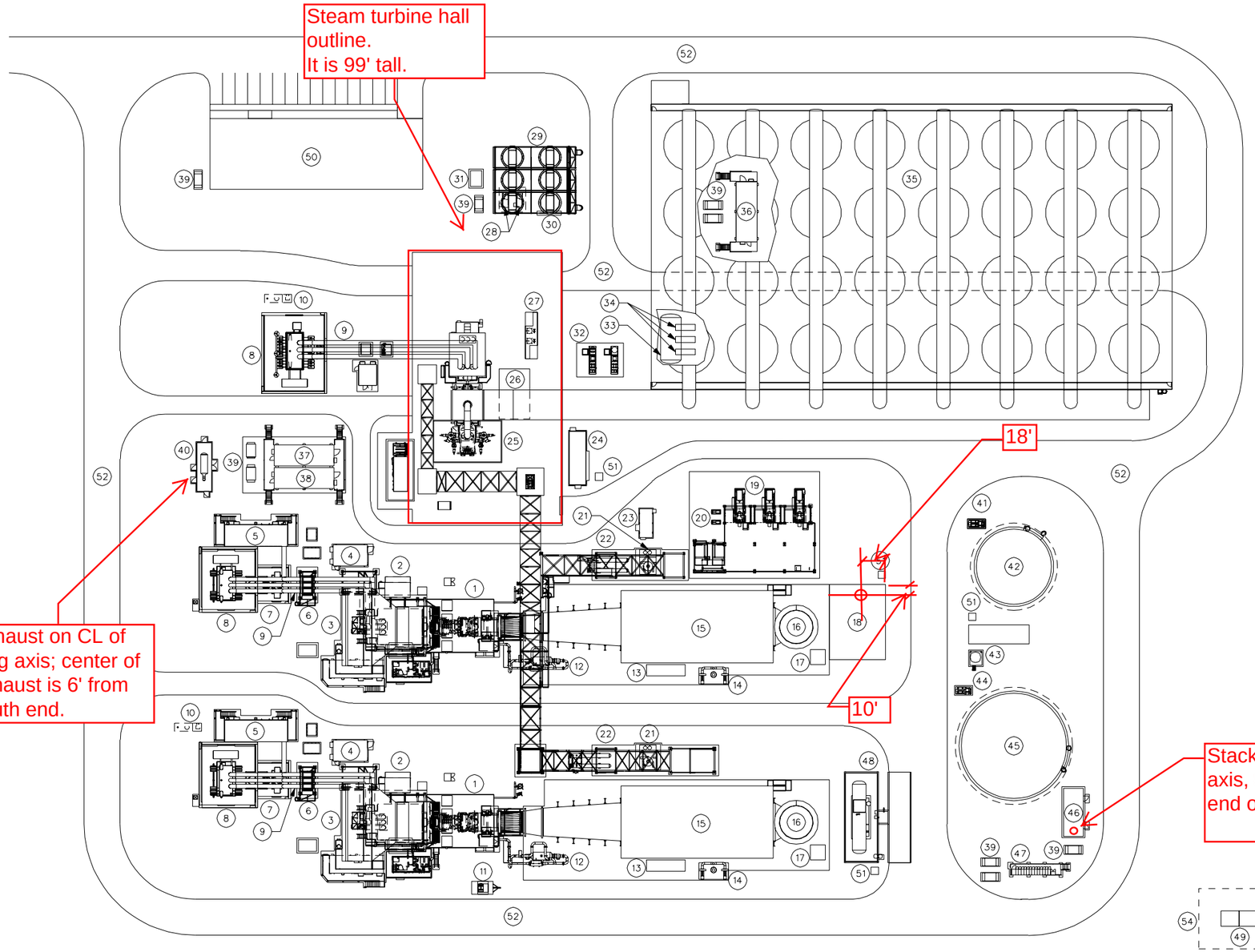


Figure C1 Plot Plan

PLANT N

NOTES

1. THE EQUIPMENT SHOWN IS REPRESENTATIVE INFORMATION. THIS DESIGN IS SUBJECT TO CHANGE AT THE DISCRETION OF SIEMENS ENERGY, INC.
2. ROTOR AIR COOLER (ITEM 12) CANNOT BE MOVED DUE TO PRE-ENGINEERED PIPING. MOVING THE UNIT WILL IMPACT COOLER PIPING STRESSES AND LOADS.
3. CLOSED COOLING WATER FIN FAN COOLER (ITEM 29) IS FOR COOLING BALANCE OF PLANT EQUIPMENT AND STEAM TURBINE GENERATOR ONLY.
4. REFERENCE DRAWING GH99050101 FOR POWER ISLAND EQUIPMENT IDENTIFICATION.

LEGEND

1	UMB	GAS TURBINE ENCLOSURE
2	MKJ	GENERATOR AIR INLET FILTER
3	MBL	GAS TURBINE AIR INLET FILTER
4	CJT	SEE/SFC PACKAGE
5	UBA03-04	MV SWITCHGEAR
6	BAC	GENERATOR CIRCUIT BREAKER
7	BBT	AUXILIARY TRANSFORMER
8	BAT	GENERATOR STEP UP TRANSFORMER
9	BAA	ISOPHASE BUS DUCT
10	UBH	OIL/WATER SEPERATOR
11	MBY	MOBILE COMPRESSOR WASH SKID
12	MBH	ROTOR AIR COOLER
13	EKT	DUCT FIRING SKID
14	HSK	SCR SKID
15	UHA	HEAT RECOVERY STEAM GENERATOR
16	UHN	HRSG EXHAUST STACK
17	CFE	CONTINUOUS EMISSIONS MONITORING
18	UHB	AUXILIARY BOILER
19	LAC	BOILER FEED WATER PUMPS
20	LCN	CONDENSATE RECIRC. PUMP
21	UHW	BOILER BLOWDOWN
22	EKC	FUEL GAS PREHEATER
23	QU	SAMPLING CONTAINER
24	USV	LABORATORY CONTAINER
25	UMA/MKA02	STEAM TURBINE ENCLOSURE & GENERATOR
26	MAL	DRAIN PIT
27	SCA	AIR COMPRESSOR SKID
28	PGB	CLOSED COOLING WATER PUMPS
29	URB	CLOSED COOLING WATER FIN FAN COOLER
30	URX	SURGE TANK
31	UBA05	CCW FIN FAN MOTOR CONTROL CENTER
32	MAJ	VACUUM PUMPS
33	ULC	CONDENSATE RETURN TANK
34	LCB	CONDENSATE EXTRACTION PUMPS
35	URC	AIR COOLED CONDENSER
36	UBA06	ACC POWER CONTROL CENTER
37	UBA07	STEAM TURBINE POWER CONTROL CENTER
38	UBA08	BALANCE OF PLANT POWER CONTROL CENTER
39	BFT	LV TRANSFORMER
40	XKA	EMERGENCY DIESEL GENERATOR
41	UGX	DEMIN. WATER FORWARDING PUMPS
42	UGC	DEMIN. WATER STORAGE TANK
43	UGD/GCB	WATER TREATMENT MODULE/MULTI-MEDIA FILTER
44	GAF	RAW WATER FORWARDING PUMPS
45	UGA/UGF	RAW/FIRE WATER STORAGE TANK
46	USG	FIRE WATER PUMPS
47	UBA09	WATER TREATMENT AREA MCC
48	UTR	AMMONIA STORAGE/UNLOADING
49	EKE	FUEL GAS CONDITIONING/METERING
50	UCA/UST/UYC	ADMIN./CONTROL RM. WAREHOUSE BUILDING
51	UYX	SAFETY SHOWER & EYE WASH
52	UZA	ROAD
53	UZD	PARKING AREA
54	UZJ	FENCE & GATES

0 5 10 20 30 50
SCALE IN METERS

0 10 20 50 100 200
SCALE IN FEET

CONCEPTUAL

Original		Original-No.	Orig.-PC
Project	SUMMIT POWER – PALMDALE		PKZPC US1327
	Date / Name	Scale	UMDCC Type / Contents Code
Drawn	15/04/13 D. STULLENBURGER	Title	
Coord.	15/04/13 A. IQBAL	GENERAL ARRANGEMENT	
Checked	15/04/13 G. BARDOE	FACILITY PLOT PLAN	
Dept.		SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER	
		HEAVY DUCT FIRING	Reg No. A-3363-02
SIEMENS Energy, Inc.	Dept. ORL PLCI	UNIO	Rev. 01 / Version
	GH99100101	Application	Page-No 1 of 1
Designed with: Intergraph	GH99100101_R1.dgn	Supersedes	

Rev.	Date	Coord.	Checked	Details of Revision

Figure C2a

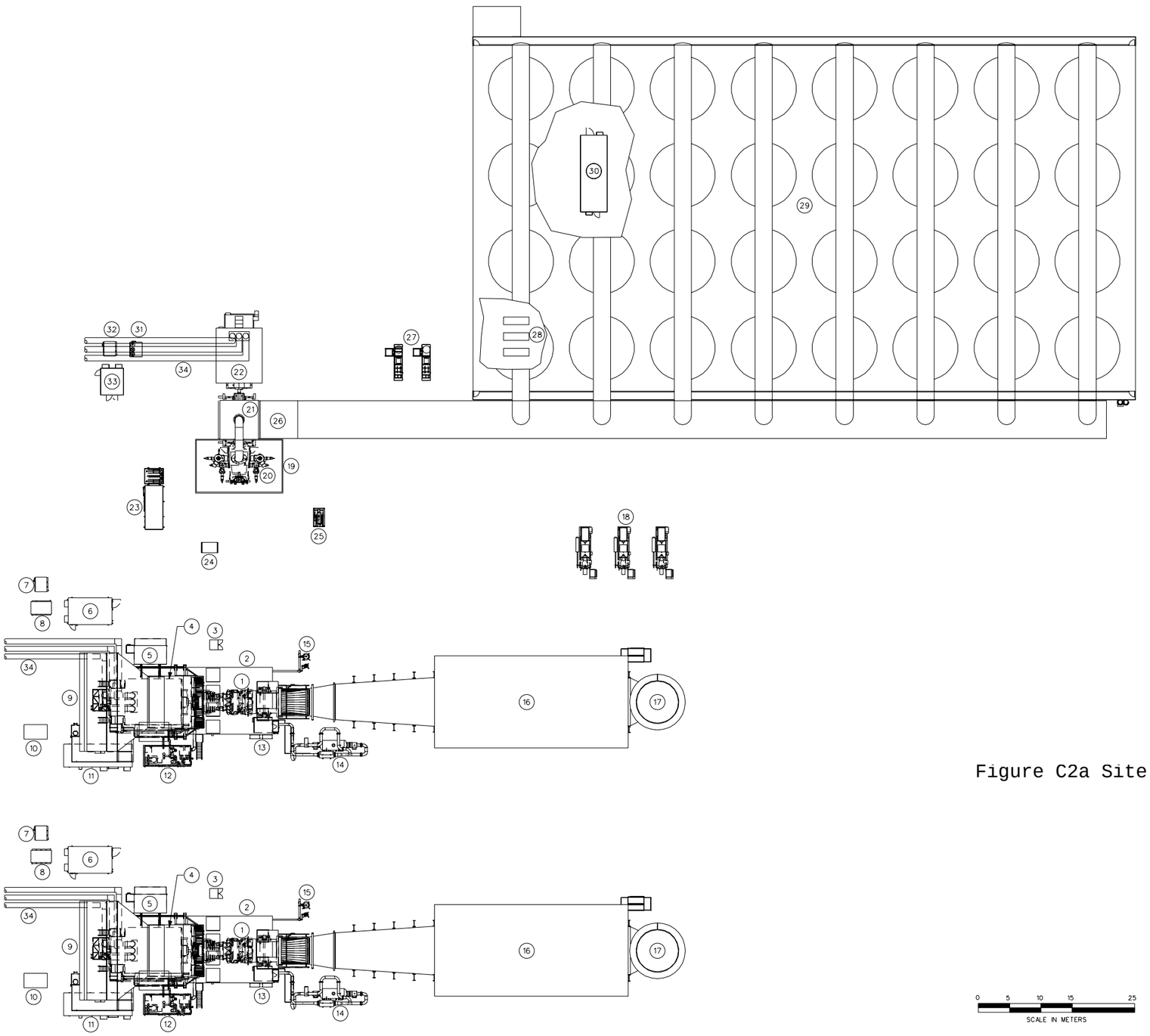
See Drawing File GH99090101_R1

Figure C2b

See Drawing File GH99100101_R1

Figure C2c

See Drawing File SKH99110101_R1



NOTES

1. THE EQUIPMENT SHOWN IS REPRESENTATIVE INFORMATION. THIS DESIGN IS SUBJECT TO CHANGE AT THE DISCRETION OF SIEMENS ENERGY, INC.
2. ROTOR AIR COOLER (ITEM 14) CANNOT BE MOVED DUE TO PRE-ENGINEERED PIPING. MOVING THE UNIT WILL IMPACT COOLER PIPING STRESSES AND LOADS.

LEGEND

1	MB	GAS TURBINE
2	UMB	GAS TURBINE ENCLOSURE
3	MBX01	HYDRAULIC SUPPLY SKID
4	MKA01/02	GAS TURBINE GENERATOR
5	MKJ	GT GENERATOR INLET FILTER
6	CJT	SEE/SFC PACKAGE
7	MKC01	GT SEE TRANSFORMER
8	MBJ	SFC TRANSFORMER
9	MBL	TURBINE AIR INLET FILTER
10	MBX02	INLET FILTER PULSE AIR COMPRESSOR SKID
11	UBA01-02	ELECTRICAL PACKAGE
12	MBV	LUBE OIL SKID & COOLER
13	SGL	FM200 FIRE PROTECTION
14	MBH	ROTOR AIR COOLER
15	MBP	FUEL GAS MAIN & PILOT FILTER
16	UHA	HEAT RECOVERY STEAM GENERATOR
17	UHN	HRSG EXHAUST STACK
18	LAC	BOILER FEED WATER PUMPS
19	UMA	STEAM TURBINE ENCLOSURE
20	MAA/MAB	HP/IP STEAM TURBINE
21	MAC	LP STEAM TURBINE
22	MKA03	STEAM TURBINE GENERATOR
23	MAV	ST LUBE OIL SKID
24	MAX	ST HYDRAULIC SUPPLY SKID
25	MAW	GLAND STEAM CONDENSER
26	MAG	HOT BOX
27	MAJ	VACUUM PUMPS
28	LCB	CONDENSATE EXTRACTION PUMPS
29	URC	AIR COOLED CONDENSER
30	UBA06	ACC POWER CONTROL CENTER
31	BAB	VT & SURGE CUBICLE
32	MKC02	SEE TRANSFORMER
33	CJN	ST SEE PACKAGE
34	BAA	ISOPHASE BUS DUCT

Figure C2a Site Layout

0 5 10 15 25
SCALE IN METERS

0 5 10 25 50 100
SCALE IN FEET

CONCEPTUAL

Rev.	Date	Coord.	Checked	Details of Revision

Original | Original-No. | Orig.-PC

Project: SUMMIT POWER – PALMDALE | PKZPC: US1327

	Date	Name
Drawn	16/04/13	D. STULLENBURGER
Coord.	16/04/13	A. IQBAL
Checked	16/04/13	G. BARDE
Dept.		

Scale | UNIDOC Type | Contents Code

Title: GENERAL ARRANGEMENT
POWER ISLAND EQUIPMENT
SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER
HEAVY DUCT FIRING

Reg No. A-3363-02

SIEMENS Energy, Inc. | Dept. ORL PLCI | UNID | Rev. 01 | Version

GH99090101 | Application | Page-No. 1 of 1

Designed with: Intergraph | GH99090101_R1.dgn | Supersedes

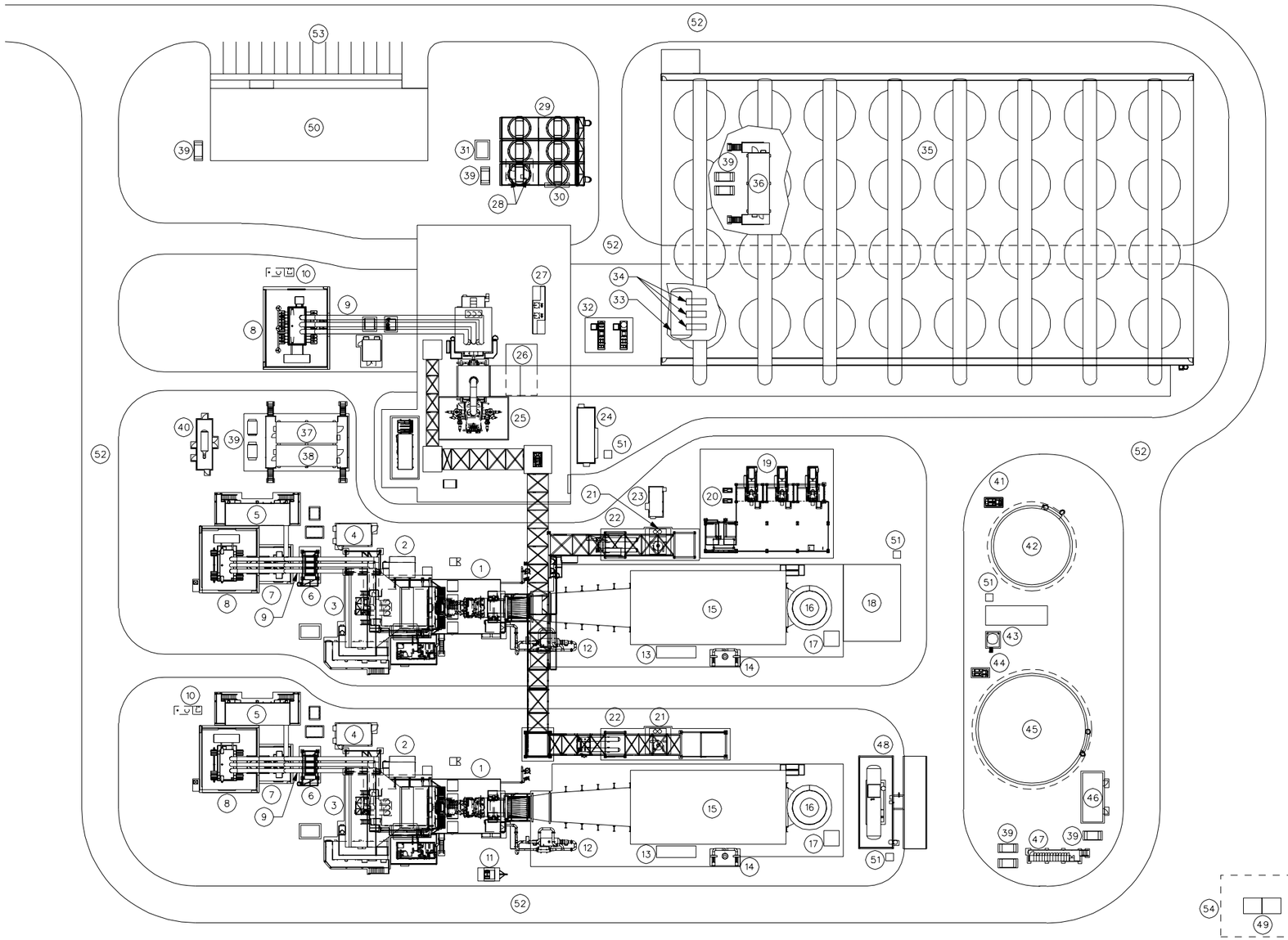


Figure C2b Site Layout

NOTES

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LEGEND

1	UMB	GAS TURBINE ENCLOSURE
2	MKJ	GENERATOR AIR INLET FILTER
3	MBL	GAS TURBINE AIR INLET FILTER
4	CJT	SEE/SFC PACKAGE
5	UBA03-04	MV SWITCHGEAR
6	BAC	GENERATOR CIRCUIT BREAKER
7	BBT	AUXILIARY TRANSFORMER
8	BAT	GENERATOR STEP UP TRANSFORMER
9	BAA	ISOPHASE BUS DUCT
10	UBH	OIL/WATER SEPERATOR
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12	MBH	ROTOR AIR COOLER
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18	UHB	AUXILIARY BOILER
19	LAC	BOILER FEED WATER PUMPS
20	LCN	CONDENSATE RECIRC. PUMP
21	UHW	BOILER BLOWDOWN
22	EKC	FUEL GAS PREHEATER
23	QU	SAMPLING CONTAINER
24	USV	LABORATORY CONTAINER
25	UMA/MKA02	STEAM TURBINE ENCLOSURE & GENERATOR
26	MAL	DRAIN PIT
27	SCA	AIR COMPRESSOR SKID
28	PGB	CLOSED COOLING WATER PUMPS
29	URB	CLOSED COOLING WATER FIN FAN COOLER
30	URX	SURGE TANK
31	UBA05	CCW FIN FAN MOTOR CONTROL CENTER
32	MAJ	VACUUM PUMPS
33	ULC	CONDENSATE RETURN TANK
34	LCB	CONDENSATE EXTRACTION PUMPS
35	URC	AIR COOLED CONDENSER
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42	UGC	DEMIN. WATER STORAGE TANK
43	UGD/GCB	WATER TREATMENT MODULE/MULTI-MEDIA FILTER
44	GAF	RAW WATER FORWARDING PUMPS
45	UGA/UGF	RAW/FIRE WATER STORAGE TANK
46	USG	FIRE WATER PUMPS
47	UBA09	WATER TREATMENT AREA MCC
48	UTR	AMMONIA STORAGE/UNLOADING
49	EKE	FUEL GAS CONDITIONING/METERING
50	UCA/UST/UYC	ADMIN./CONTROL RM. WAREHOUSE BUILDING
51	UYX	SAFETY SHOWER & EYE WASH
52	UZA	ROAD
53	UZD	PARKING AREA
54	UZJ	FENCE & GATES

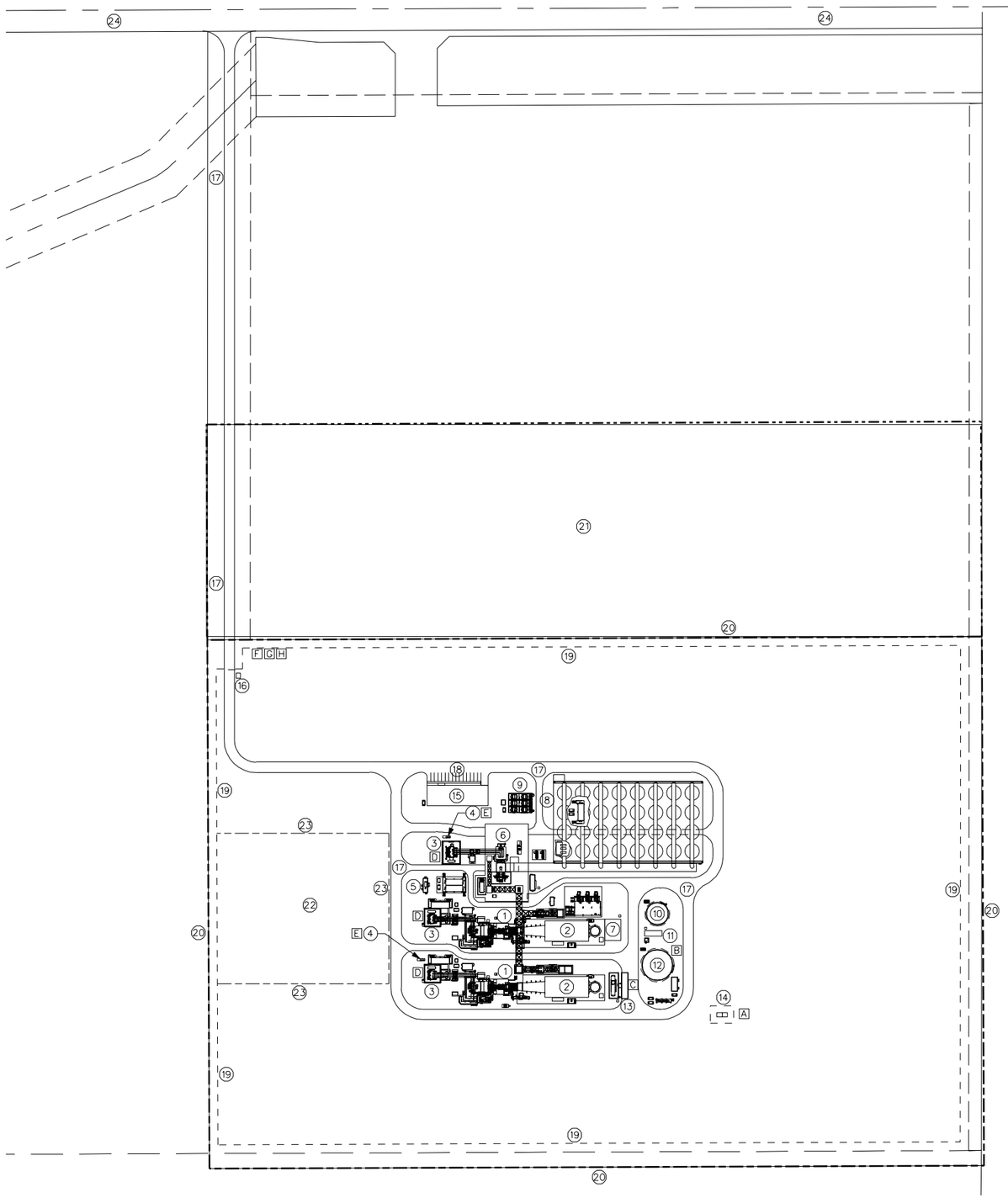
0 5 10 20 30 50
SCALE IN METERS

0 10 20 50 100 200
SCALE IN FEET

CONCEPTUAL

Original		Original-No.	Orig.-PC
Project	SUMMIT POWER – PALMDALE		PKZPC US1327
Drawn	15/04/13 D. STULLENBURGER	Scale	UMDCC Type
Coord.	15/04/13 A. IQBAL	Title GENERAL ARRANGEMENT FACILITY PLOT PLAN SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER HEAVY DUCT FIRING	Contents Code
Checked	15/04/13 G. BARDOE		
Dept.			Reg.No. A-3383-02
SIEMENS Energy, Inc.		Dept. ORL PLCI / UNIO	Rev. 01 / Version
		GH99100101	Application / Page-No. 1 of 1
Designed with: Intergraph	GH99100101_R1.dgn	Supersedes	

Rev.	Date	Coord.	Checked	Details of Revision



NOTES

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2. REFERENCE DRAWING GH99050101 FOR POWER ISLAND EQUIPMENT IDENTIFICATION.
3. REFERENCE DRAWING GH99060101 FOR FACILITY PLOT PLAN EQUIPMENT IDENTIFICATION.

LEGEND

1	UMB	GAS TURBINE ENCLOSURE
2	UHA	HEAT RECOVERY STEAM GENERATOR
3	BAT	GENERATOR STEP UP TRANSFORMER
4	UBH	OIL/WATER SEPERATOR
5	XKA	EMERGENCY DIESEL GENERATOR
6	MA/MKA	STEAM TURBINE & GENERATOR
7	UHB	AUXILIARY BOILER
8	URC	AIR COOLED CONDENSER
9	URB	CLOSED COOLING WATER FIN FAN COOLER
10	UGC	DEMIN. WATER STORAGE TANK
11	UGD	WATER TREATMENT MODULES
12	UGA/UGF	RAW/FIRE WATER STORAGE TANK
13	UYX	AMMONIA STORAGE/UNLOADING
14	EKD/EKE	FUEL GAS REGULATION/CONDITIONING/METERING
15	UCA/UST/UYC	ADMIN./CONTROL RM. WAREHOUSE BUILDING
16	UYE	GUARD HOUSE
17	UZA	ROAD
18	UZD	PARKING AREA
19	UZJ	FENCE & GATES
20		PROPERTY BOUNDARY
21		20 ACRE LAYDOWN AREA
22		SWITCHYARD (BY OTHERS)
23		SWITCHYARD FENCE (BY OTHERS)
24		EXISTING ROAD

TERMINAL POINTS

A	FUEL GAS SUPPLY
B	RAW WATER SUPPLY
C	AMMONIA SUPPLY
D	HV POWER
E	OILY WATER (MANUAL DISCHARGE)
F	POTABLE WATER
G	SANITARY SEWER
H	TEMPORARY CONSTRUCTION POWER

Figure C2c Site Layout

0 10 25 50 75 100
SCALE IN METERS

0 25 50 125 250 500
SCALE IN FEET

CONCEPTUAL

Original		Original-No.			Orig.-PC
Project	SUMMIT POWER – PALMDALE				PK2/PC US1327
	Date	Name	Scale		UA/OCC Type
Drawn	16/04/13	D. STULLENBURGER	Title		Contents Code
Coord.	16/04/13	A. IQBAL	GENERAL ARRANGEMENT		
Checked	16/04/13	G. BARDOE	SITE PLAN		
			SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER		
Dept.			HEAVY DUCT FIRING		Reg No. A-3383-02
SIEMENS Energy, Inc.		Dept. ORL PLCI	UNID		Rev. 01 Version
GH99110101				Application	Page-No. 1 of 1
Designed with: Intergraph		GH99110101_R1.dgn		Supersedes	

Rev.	Date	Coord.	Checked	Details of Revision

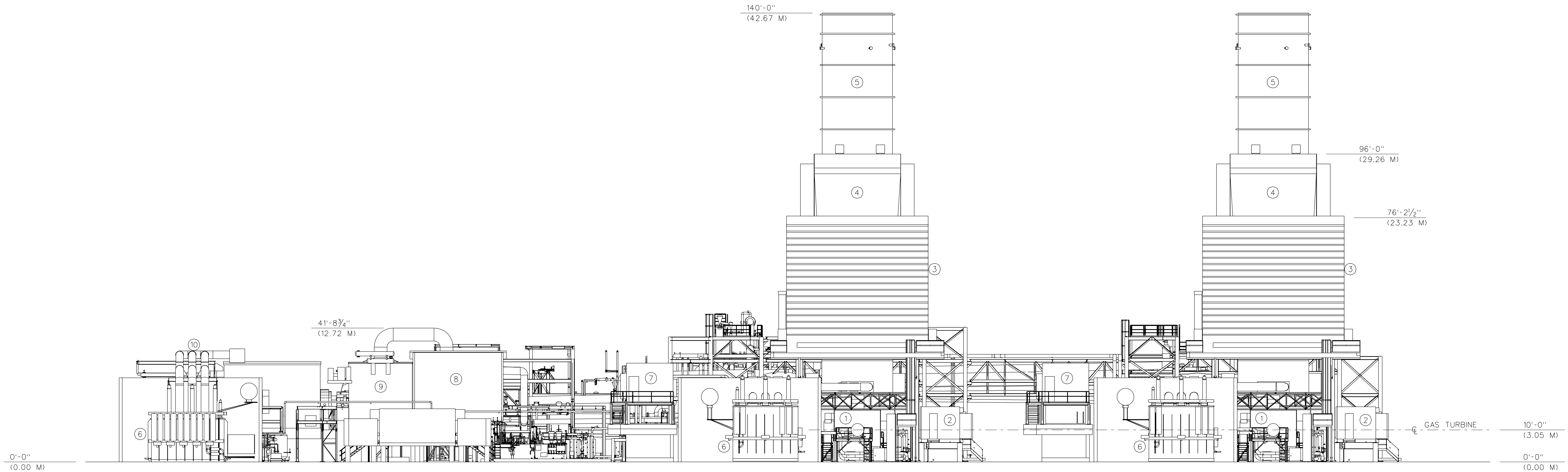

Figure C3a Elevation View #1

LEGEND

1	MKA01/02	GAS TURBINE GENERATOR
2	UBA01-02	GAS TURBINE PCC
3	MBL	TURBINE AIR INLET FILTER
4	UHA	HEAT RECOVERY STEAM GENERATOR
5	UHN	HRSG EXHAUST STACK
6	BAT	GENERATOR STEP UP TRANSFORMER
7	UBA03-04	MEDIUM VOLTAGE SWITCHGEAR
8	UMA	HP/IP STEAM TURBINE ENCLOSURE
9	MAC	LP STEAM TURBINE
10	UAA	ISOPHASE BUS DUCT

NOTES

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2. ALL DIMENSIONS SHOWN ARE IN FEET AND INCHES (METERS).

CONCEPTUAL

Project	SUMMIT POWER – PALMDALE			PKZ/PC US1327
	Date	Name	Scale	UA/DCC Type
Drawn	15 / 04 / 28	D. STULLENBURGER	Title: GENERAL ARRANGEMENT POWER BLOCK ELEVATION SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER HEAVY DUCT FIRING	Contents Code
Coord.	15 / 04 / 28	A. IQBAL		
Checked	15 / 04 / 28	G. SARODE		
Dept.				Reg.No. A-3363-02
SIEMENS Energy, Inc.			Dept. ORL PLCI	Rev. 01
GH99120101			Application	Page-No. 1 of 1
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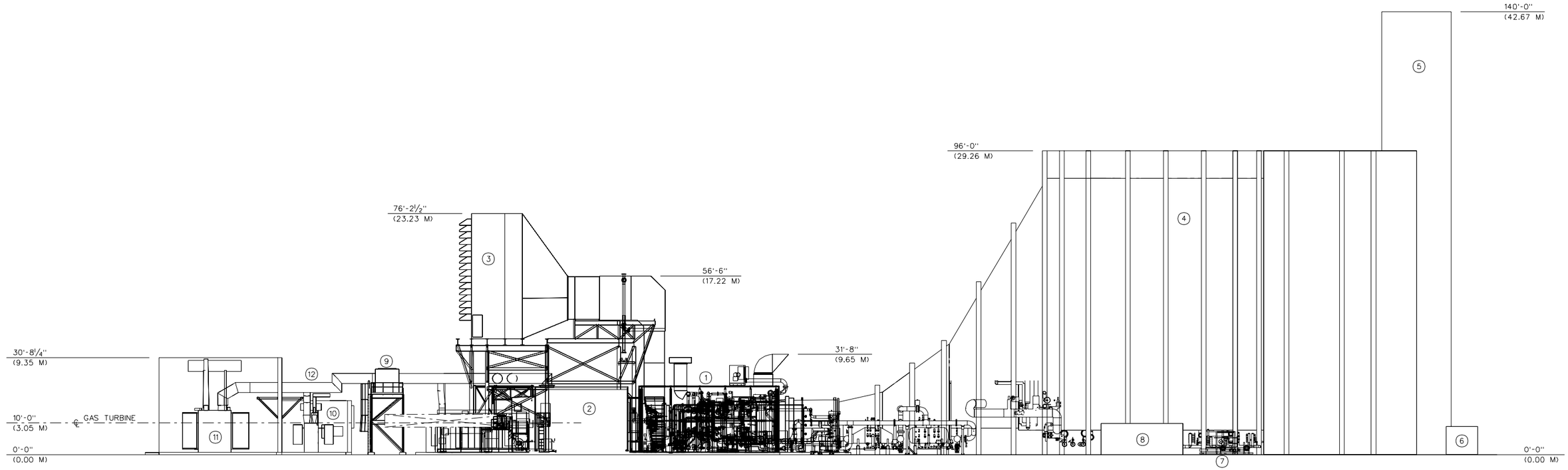

Figure C3b Elevation View #2

LEGEND

1	UMB	GAS TURBINE ENCLOSURE
2	MKA01/02	GAS TURBINE GENERATOR
3	MBL	TURBINE AIR INLET FILTER
4	UHA	HEAT RECOVERY STEAM GENERATOR
5	UHN	HRSG EXHAUST STACK
6	CFE	CONTINUOUS EMISSIONS MONITORING
7	HSK	SCR SKID
8	UHN	DUCT FIRING SKID
9	BAC	GENERATOR CIRCUIT BREAKER
10	BBT	AUXILIARY TRANSFORMER
11	BAT	GENERATOR STEP UP TRANSFORMER
12	BAA	ISOPHASE BUS DUCT

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2. ALL DIMENSIONS SHOWN ARE IN FEET AND INCHES (METERS).

CONCEPTUAL

Original		Original-No.		Orig.-PC
Project	SUMMIT POWER – PALMDALE			PKZ/PC US1327
	Date	Name	Scale	UNIOCC Type
Drawn	16 / 04 / 16	D. STULLENBURGER	Title	Contents Code
Coord.	16 / 04 / 16	A. IQBAL	GENERAL ARRANGEMENT	
Checked	16 / 04 / 16	G. BARDE	GAS TURBINE ELEVATION	
			SCC6-5000F 2 X 1 W/AIR COOLED CONDENSER	
Dept.			HEAVY DUCT FIRING	Reg No. A-3363-02
SIEMENS Energy, Inc.	Dept. ORL PLCI	UNIO		Rev. 01 Version
GH99080101		Application		Page-No. 1 of 1
Designed with: Intergraph	GH99080101_R1.dgn	Supersedes		

Rev.	Date	Coord.	Checked	Details of Revision

Figure C4a

Winter Composite Wind Rose

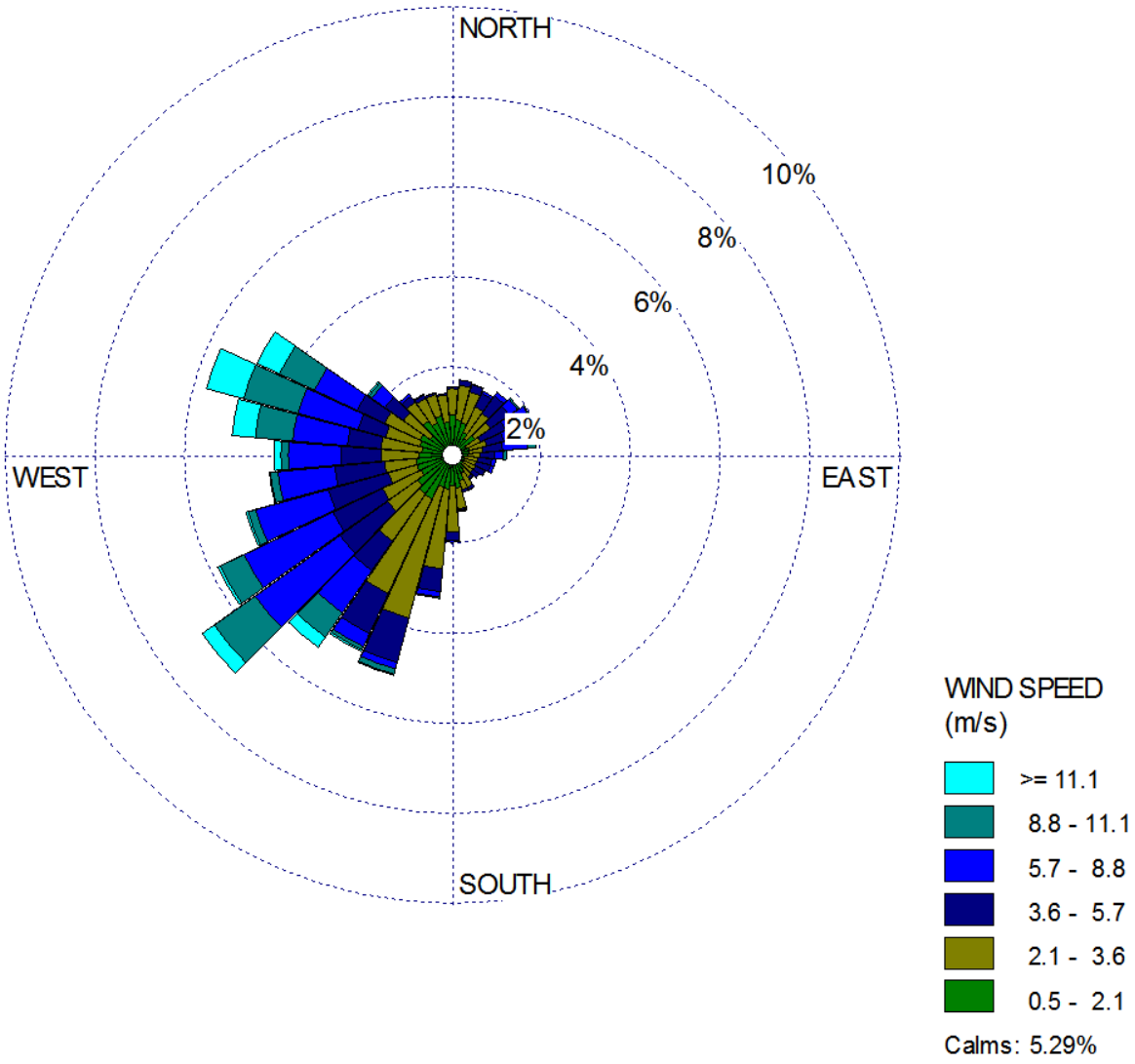


Figure C4b

Spring Composite Wind Rose

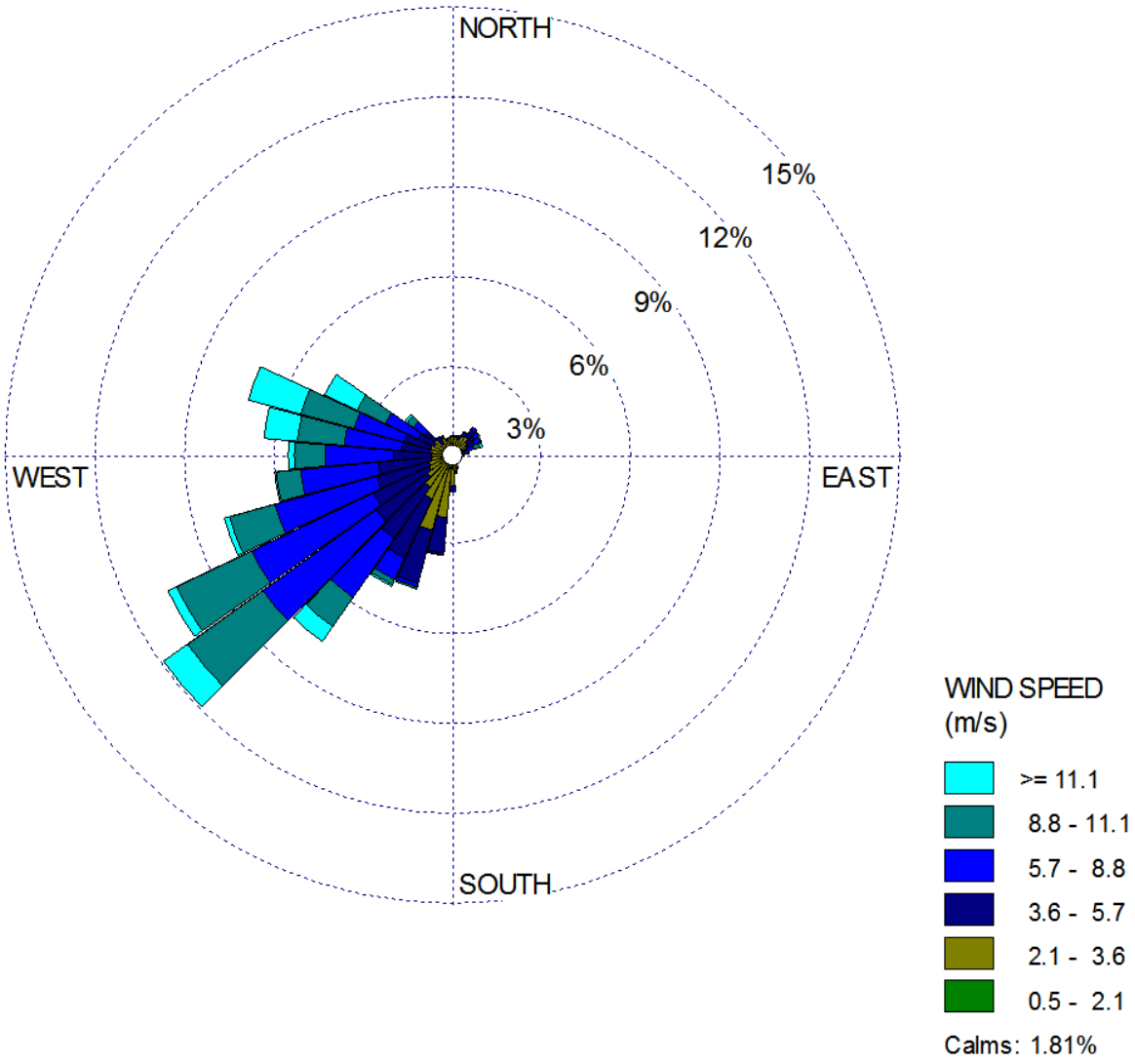


Figure C4c

Summer Composite Wind Rose

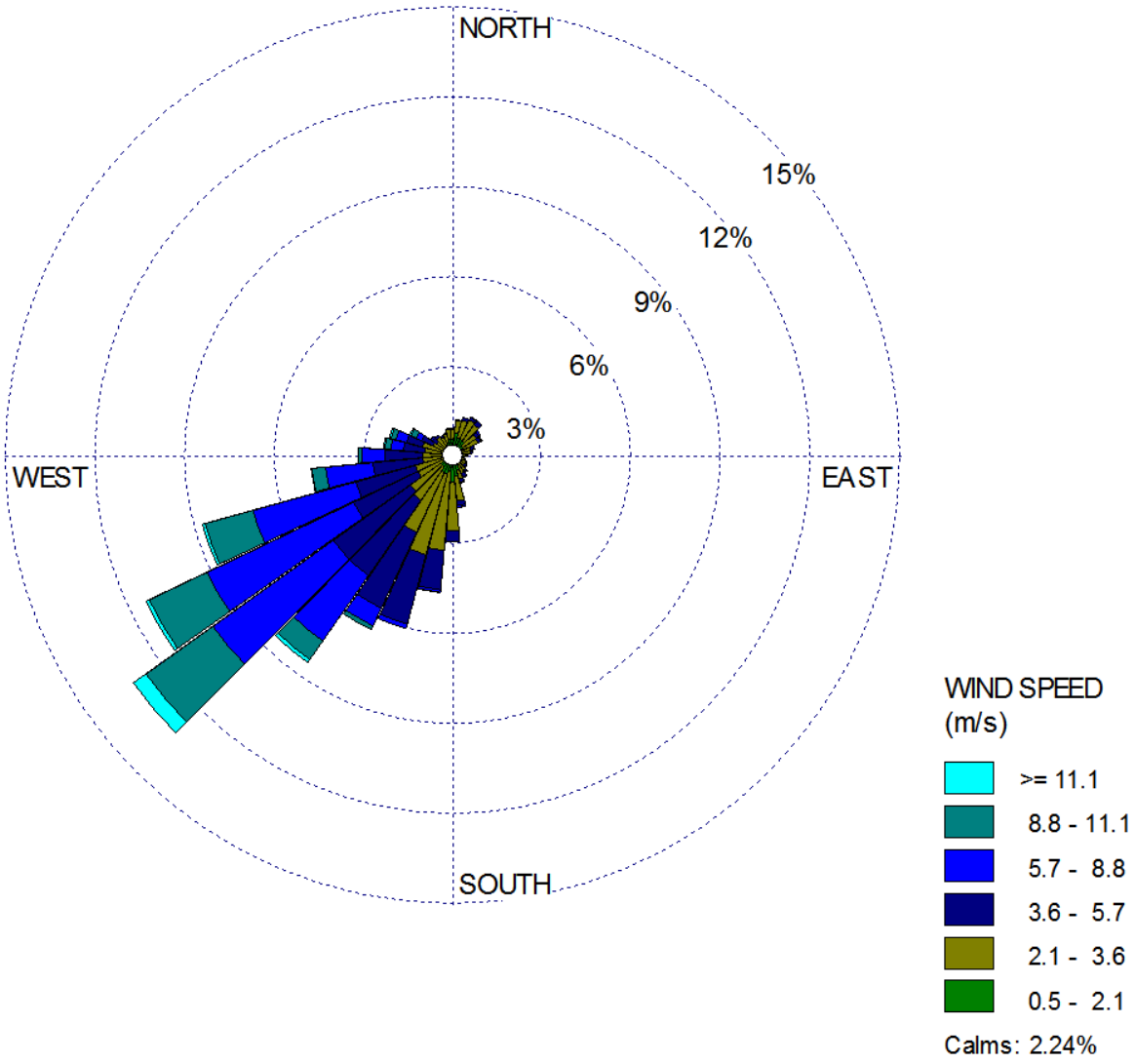


Figure C4d

Fall Composite Wind Rose

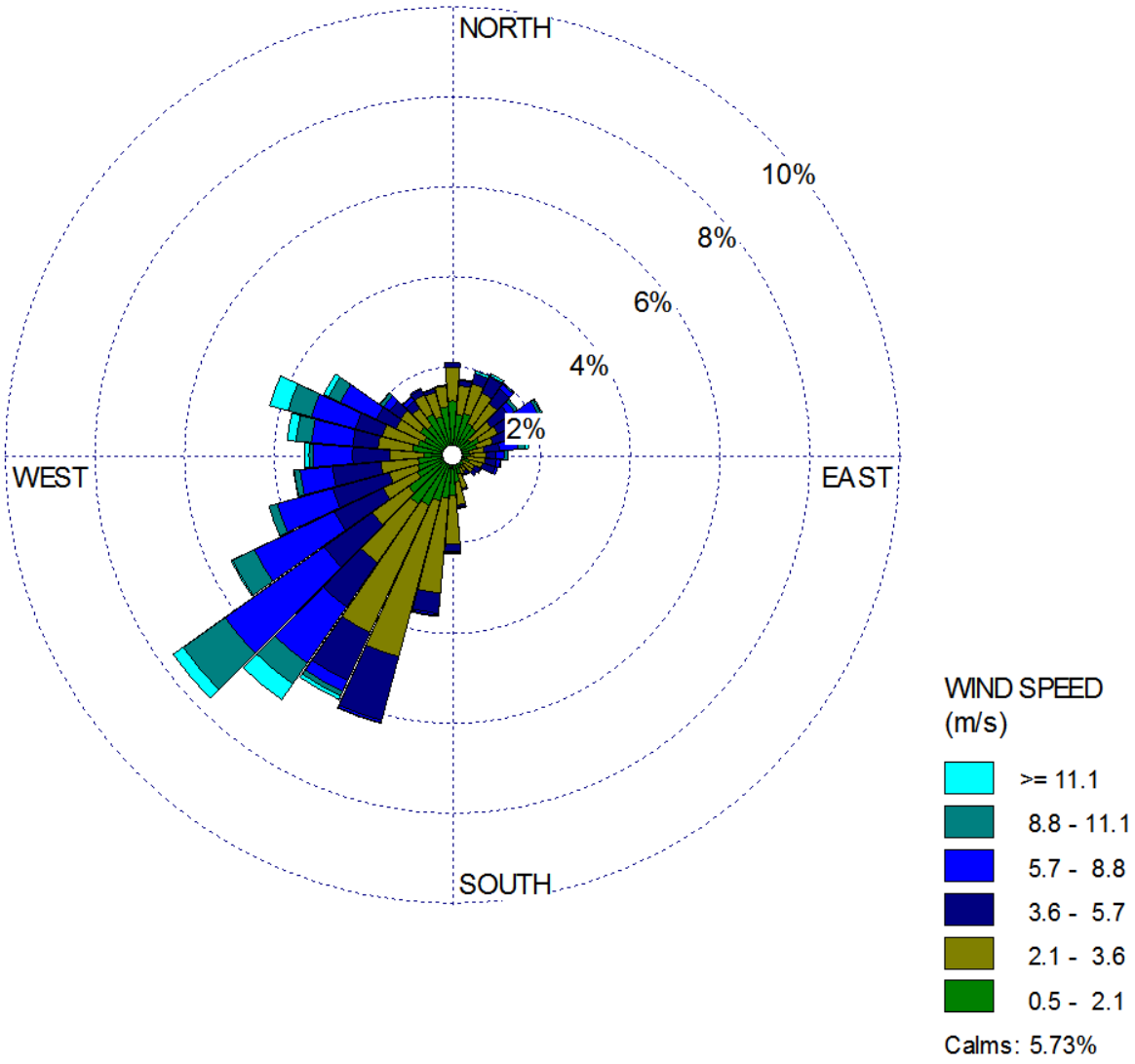
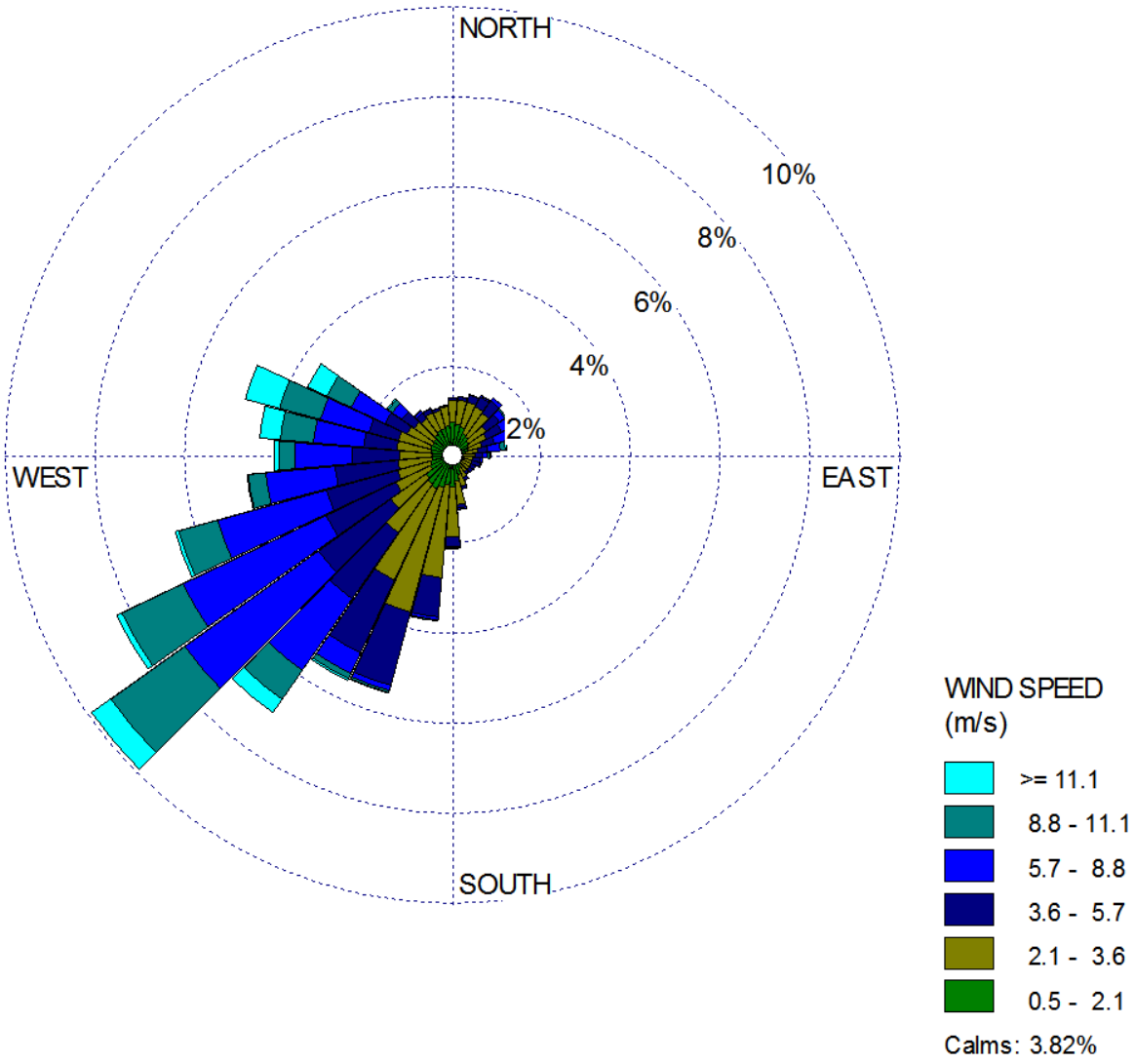


Figure C4e

Annual Composite Wind Rose



Palmdale AERMOD Turbine Screening Results

Regular Receptor Grids

160' Stack Height

Emissions Case	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 25**	**Case 10**	**Case 11**	**Case 12**	**Case 13**	**Case 14**	**Case 27**
Modeling Case	**11**	**12**	**13**	**14**	**15**	**21**	**22**	**23**	**24**	**25**	**26**
Evaporative Cooler	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**ON**	**OFF**	**OFF**	**OFF**
Duct Firing	**OFF**	**ON**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**OFF**	**OFF**	**OFF**
Load %	**100%**	**100%**	**75%**	**50%**	**40%**	**100%**	**100%**	**100%**	**75%**	**50%**	**43%**
Ambient Temp, °F	23	23	23	23	23	64	64	64	64	64	64
Stack Exit Temp (deg.F)	195	186	190	184	182	194	195	187	181	178	177
Volumetric Flowrate ACFM	1,337,241	1,322,717	1,075,349	875,178	797,863	1,327,666	1,334,691	1,323,975	1,022,155	836,978	784,096
Stack Inside Diameter (ft)	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Stack Height (m)	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768
Stack Exit Temp (deg.K)	363.7	358.7	360.9	357.6	356.5	363.2	363.7	359.3	355.9	354.3	353.7
Stack Exit Velocity (m/s)	17.87	17.68	14.37	11.70	10.66	17.74	17.84	17.69	13.66	11.19	10.48
Stack Inside Diameter (m)	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056
Normal Operations - Short-term Screening Emissions (lb/hr/turbine) and Unitized Screening Impacts (for 1.0 g/s/turbine)											
NOx (lb/hr/turbine)	17.1	18.5	13.6	10.5	9.2	16.4	16.7	18.1	13.0	10.0	9.2
CO (lb/hr/turbine)	10.4	11.3	8.3	6.4	5.6	10.0	10.2	11.0	7.9	6.1	5.6
SO2 (lb/hr/turbine)	1.4	1.5	1.1	0.9	0.8	1.4	1.4	1.5	1.1	0.9	0.8
PM10 (lb/hr/turbine)	9.8	11.8	8.0	8.0	8.0	9.7	9.7	11.7	8.0	8.0	8.0
1-Hr Unitized Conc (ug/m3)	7.34915	7.62897	8.26260	9.78110	10.41849	7.39375	7.35479	7.59418	8.93690	10.30569	10.72298
X(m)	392500.0	388000.0	398020.0	398020.0	398020.0	392500.0	392500.0	388000.0	398020.0	398020.0	398020.0
Y(m)	3825500.0	3831000.0	3834380.0	3834380.0	3834380.0	3825500.0	3825500.0	3831000.0	3834380.0	3834380.0	3834380.0
Z(m)	914.3	910.1	764.8	764.8	764.8	914.3	914.3	910.1	764.8	764.8	764.8
YYMMDDHH	14102504	12060105	10082424	10082424	10082424	14102504	14102504	12060105	10082424	10082424	10082424
3-Hr Unitized Conc (ug/m3)	5.93334	6.06396	7.14942	8.24275	8.75465	5.98564	5.93870	6.05471	7.42850	8.57670	8.92811
X(m)	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	11083015	11083015	11083015	10080118	10080118	11083015	11083015	11083015	11083015	10080118	10080118
8-Hr Unitized Conc (ug/m3)	5.30183	5.41476	6.34053	7.39423	7.89625	5.33892	5.30345	5.39359	6.63047	7.70439	8.04539
X(m)	398722.1	398722.1	398722.1	398702.1	398702.1	398722.1	398722.1	398722.1	398722.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	12052516	12052516	12052516	10071216	10071216	12052516	12052516	12052516	12052516	10071216	10071216
24-Hr Unitized Conc (ug/m3)	4.08550	4.19621	5.15790	6.35490	6.84349	4.12166	4.09336	4.18367	5.55867	6.65417	6.99455
X(m)	398880.0	398880.0	398722.1	398722.1	398722.1	398880.0	398880.0	398880.0	398722.1	398722.1	398722.1
Y(m)	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5	3833880.0	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5
Z(m)	762.9	762.9	761.3	761.3	761.3	762.9	762.9	762.9	761.3	761.3	761.3
YYMMDDHH	12102124	12102124	12050224	12050224	12050224	12102124	12102124	12102124	12050224	12050224	12050224
Normal Operations - Short-term Pollutant Emissions (g/s/turbine) and Pollutant Screening Impacts											
NOx (g/s/turbine)	2.155	2.331	1.714	1.323	1.159	2.066	2.104	2.281	1.638	1.260	1.159
CO (g/s/turbine)	1.310	1.424	1.046	0.806	0.706	1.260	1.285	1.386	0.995	0.769	0.706
SO2 (g/s/turbine)	0.176	0.189	0.139	0.113	0.101	0.176	0.176	0.189	0.139	0.113	0.101
PM10 (g/s/turbine)	1.235	1.487	1.008	1.008	1.008	1.222	1.222	1.474	1.008	1.008	1.008
1-Hour NOx (ug/m3)	15.837	**17.783**	14.162	12.940	12.075	15.275	15.474	17.322	14.639	12.985	12.428
1-Hour CO (ug/m3)	9.627	**10.864**	8.643	7.884	7.355	9.316	9.451	10.526	8.892	7.925	7.570
8-Hour CO (ug/m3)	6.945	**7.711**	6.632	5.960	5.575	6.727	6.815	7.476	6.597	5.925	5.680
1-Hour SO2 (ug/m3)	1.293	**1.442**	1.149	1.105	1.052	1.301	1.294	1.435	1.242	1.165	1.083
3-Hour SO2 (ug/m3)	1.044	**1.146**	0.994	0.931	0.884	1.053	1.045	1.144	1.033	0.969	0.902
24-Hour SO2 (ug/m3)	0.719	**0.793**	0.717	0.718	0.691	0.725	0.720	0.791	0.773	0.752	0.706
24-Hour PM10 (ug/m3)	5.046	6.240	5.199	6.406	6.898	5.037	5.002	6.167	5.603	6.707	**7.051**

Worst-Case Operating Scenarios are **bolded**.

Palmdale AERMOD Turbine Screening Results

Regular Receptor Grids

160' Stack Height

60' SH

Emissions Case	Case 15	Case 16	Case 17	Case 18	Case 19	Case 20	Case 21	Case 22	Case 23	Case 24	Aux.Boiler
Modeling Case	**31**	**32**	**33**	**34**	**35**	**41**	**42**	**43**	**44**	**45**	NA
Evaporative Cooler	**OFF**	**ON**	**ON**	**OFF**	**OFF**	**OFF**	**ON**	**ON**	**OFF**	**OFF**	NA
Duct Firing	**OFF**	**OFF**	**ON**	**OFF**	**OFF**	**OFF**	**OFF**	**ON**	**OFF**	**OFF**	NA
Load %	**100%**	**100%**	**100%**	**75%**	**50%**	**100%**	**100%**	**100%**	**75%**	**53%**	NA
Ambient Temp, °F	98	98	98	98	98	108	108	108	108	108	NA
Stack Exit Temp (deg.F)	201	208	200	192	184	205	213	206	196	190	300
Volumetric Flowrate ACFM	1,222,268	1,346,870	1,335,763	967,113	792,896	1,182,441	1,344,061	1,333,863	951,970	803,665	28,413
Stack Inside Diameter (ft)	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	3.00
Stack Height (m)	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	48.768	18.288
Stack Exit Temp (deg.K)	367.0	370.9	366.5	362.0	357.6	369.3	373.7	369.8	364.3	360.9	422.0
Stack Exit Velocity (m/s)	16.33	18.00	17.85	12.92	10.60	15.80	17.96	17.83	12.72	10.74	20.42
Stack Inside Diameter (m)	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	6.7056	0.9144
Normal Operations - Short-ter											
NOx (lb/hr/turbine)	14.6	16.3	17.7	11.9	9.2	14.0	16.1	17.6	11.4	9.2	1.21
CO (lb/hr/turbine)	8.9	9.9	10.8	7.2	5.6	8.5	9.8	10.7	6.9	5.6	4.05
SO2 (lb/hr/turbine)	1.2	1.3	1.5	1.0	0.8	1.2	1.3	1.4	1.0	0.8	0.066
PM10 (lb/hr/turbine)	8.8	9.5	11.5	8.0	8.0	8.5	9.4	11.5	8.0	8.0	0.81
1-Hr Unitized Conc (ug/m3)	7.54027	7.01690	7.23661	8.87323	10.38507	7.57268	6.90535	7.10146	8.81644	10.08316	96.63587
X(m)	388000.0	392500.0	392500.0	398020.0	398020.0	388000.0	392500.0	392500.0	398020.0	398020.0	398552.4
Y(m)	3831000.0	3825500.0	3825500.0	3834380.0	3834380.0	3831000.0	3825500.0	3825500.0	3834380.0	3834380.0	3833866.2
Z(m)	910.1	914.3	914.3	764.8	764.8	910.1	914.3	914.3	764.8	764.8	763.3
YYMMDDHH	12060105	14102504	14102504	10082424	10082424	12060105	14102504	14102504	10082424	10082424	13060103
3-Hr Unitized Conc (ug/m3)	6.37238	5.80534	5.90489	7.61867	8.75119	6.52908	5.78373	5.86125	7.64129	8.58672	65.34734
X(m)	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1	398702.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	11083015	11083015	11083015	10080118	10080118	11083015	11083015	11083015	10080118	10080118	14012006
8-Hr Unitized Conc (ug/m3)	5.69155	5.18881	5.27143	6.76642	7.89350	5.82701	5.15941	5.23020	6.79465	7.75323	56.26533
X(m)	398722.1	398722.1	398722.1	398722.1	398702.1	398722.1	398722.1	398722.1	398722.1	398702.1	398722.1
Y(m)	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5	3833866.5
Z(m)	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3	761.3
YYMMDDHH	12052516	12052516	12052516	12052516	10071216	12052516	12052516	12052516	12052516	10071216	14110808
24-Hr Unitized Conc (ug/m3)	4.37740	3.96185	4.05058	5.73758	6.84287	4.46619	3.93228	4.00657	5.77013	6.70560	34.30093
X(m)	398861.8	398880.0	398880.0	398722.1	398722.1	398861.8	398880.0	398880.0	398722.1	398722.1	398722.1
Y(m)	3833866.8	3833880.0	3833880.0	3833866.5	3833866.5	3833866.8	3833880.0	3833880.0	3833866.5	3833866.5	3833866.5
Z(m)	762.8	762.9	762.9	761.3	761.3	762.8	762.9	762.9	761.3	761.3	761.3
YYMMDDHH	12102124	12102124	12102124	12050224	12050224	12102124	12102124	12102124	12050224	12050224	14010224
Normal Operations - Short-ter											
NOx (g/s/turbine)	1.840	2.054	2.230	1.499	1.159	1.764	2.029	2.218	1.436	1.159	0.152
CO (g/s/turbine)	1.121	1.247	1.361	0.907	0.706	1.071	1.235	1.348	0.869	0.706	0.510
SO2 (g/s/turbine)	0.151	0.164	0.189	0.126	0.101	0.151	0.164	0.176	0.126	0.101	0.009
PM10 (g/s/turbine)	1.109	1.197	1.449	1.008	1.008	1.071	1.184	1.449	1.008	1.008	0.102
1-Hour NOx (ug/m3)	13.874	14.413	16.138	13.301	12.036	13.358	14.011	15.751	12.660	11.686	14.689
1-Hour CO (ug/m3)	8.453	8.750	9.849	8.048	7.332	8.110	8.528	9.573	7.661	7.119	49.284
8-Hour CO (ug/m3)	6.380	6.470	7.174	6.137	5.573	6.241	6.372	7.050	5.905	5.474	28.695
1-Hour SO2 (ug/m3)	1.139	1.151	1.368	1.118	1.049	1.143	1.132	1.250	1.111	1.018	0.870
3-Hour SO2 (ug/m3)	0.962	0.952	1.116	0.960	0.884	0.986	0.949	1.032	0.963	0.867	0.588
24-Hour SO2 (ug/m3)	0.661	0.650	0.766	0.723	0.691	0.674	0.645	0.705	0.727	0.677	0.309
24-Hour PM10 (ug/m3)	4.855	4.742	5.869	5.783	6.898	4.783	4.656	5.806	5.816	6.759	3.499

Worst-Case Operating Scenario

Keyword: **DFAULT**

Table 5.1B-4B
Palmdale Emission Rates and Stack Parameters for Refined Modeling

	Stack Height meters	Temp, deg K	Exhaust Velocity, m/s	Stack Diam, m	Emission Rates, g/s NOx	SO2	CO	PM10	Emission Rates, lb/hr NOx	SO2	CO	PM10
Averaging Period: One hour for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	2.331	0.189	1.424	-	18.5	1.5	11.3	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	2.331	0.189	1.424	-	18.5	1.5	11.3	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	8.316E-3	0.510	-	1.21	0.066	4.05	0.81
Fire Pump	5.944	823.71	28.13	0.1270	0.109	2.389E-4	0.144	-	0.864	1.896E-3	1.142	-
Emergency Generator	6.096	677.04	158.76	0.2032	1.056	1.358E-3	0.187	-	8.379	1.078E-2	1.485	-
Averaging Period: Three hours for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	0.189	-	-	-	1.5	-	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	0.189	-	-	-	1.5	-	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	2.772E-3	-	-	-	2.200E-2	-	-
Fire Pump	5.944	823.71	28.13	0.1270	-	7.964E-5	-	-	-	6.320E-4	-	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	4.527E-4	-	-	-	3.593E-3	-	-
Averaging Period: Eight hours for Normal Operations												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	-	1.424	-	-	-	11.3	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	-	1.424	-	-	-	11.3	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.064	-	-	-	0.506	-
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-	-	-	0.143	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-	-	-	0.186	-
Averaging Period: 24 hours for Normal Operations												
Turbine S/HRSG - SO2/Case 2	48.768	358.7	17.68	6.7056	-	0.189	-	1.487	-	1.5	-	11.8
Turbine N/HRSG - SO2/Case 2	48.768	358.7	17.68	6.7056	-	0.189	-	1.487	-	1.5	-	11.8
Turbine S/HRSG - PM/Case 27	48.768	353.7	10.48	6.7056	-	-	-	1.008	-	-	-	8.0
Turbine N/HRSG - PM/Case 27	48.768	353.7	10.48	6.7056	-	-	-	1.008	-	-	-	8.0
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	6.930E-4	-	8.505E-3	-	5.500E-3	-	6.750E-2
Fire Pump	5.944	823.71	28.13	0.1270	-	9.954E-6	-	3.565E-4	-	7.900E-5	-	2.829E-3
Emergency Generator	6.096	677.04	158.76	0.2032	-	5.659E-5	-	1.047E-3	-	4.491E-4	-	8.313E-3
Averaging Period: Annual Periods (includes all Startups/Shutdowns), based on Case 11 (No DB, EVAP on)												
Turbine S/HRSG	48.768	363.7	17.84	6.7056	1.988	-	-	1.160	15.781	-	-	9.209
Turbine N/HRSG	48.768	363.7	17.84	6.7056	1.988	-	-	1.160	15.781	-	-	9.209
Auxiliary Boiler	18.288	422.04	20.42	0.9144	1.455E-2	-	-	9.740E-3	1.155E-1	-	-	7.730E-2
Fire Pump	5.944	823.71	28.13	0.1270	6.464E-4	-	-	5.079E-5	5.130E-3	-	-	4.031E-4
Emergency Generator	6.096	677.04	158.76	0.2032	6.267E-3	-	-	1.492E-4	4.974E-2	-	-	1.184E-3
Averaging Period: One hour for Cold Start based on Case 27 (CAAQS)												
Turbine S/HRSG	48.768	353.7	10.48	6.7056	7.241	-	52.849	-	57.465	-	419.440	-
Turbine N/HRSG	48.768	353.7	10.48	6.7056	7.241	-	52.849	-	57.465	-	419.44	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: One hour for Warm Start based on Case 27 (NAAQS) for NO2, Cold start for CO												
Turbine S/HRSG	48.768	353.7	10.48	6.7056	6.795	-	52.849	-	53.925	-	419.440	-
Turbine N/HRSG	48.768	353.7	10.48	6.7056	6.795	-	52.849	-	53.925	-	419.440	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: Eight hours for Cold Start based on Case 2												
Turbine S/HRSG	48.768	358.7	17.68	6.7056	-	-	15.944	-	-	-	126.541	-
Turbine N/HRSG	48.768	358.7	17.68	6.7056	-	-	15.944	-	-	-	126.541	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.128	-	-	-	1.013	-
Fire Pump	5.944	823.71	28.13	0.1270	-	-	0.018	-	-	-	0.143	-
Emergency Generator	6.096	677.04	158.76	0.2032	-	-	0.023	-	-	-	0.186	-
Averaging Period: One hour for Commissioning (Case 27)												
Turbine N/HRSG	48.768	353.7	10.66	6.7056	16.632	-	567.000	-	132.000	-	4500.000	-
Turbine S/HRSG	48.768	353.7	10.66	6.7056	15.372	-	100.296	-	122.000	-	796.000	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	0.152	-	0.510	-	1.21	-	4.05	-
Averaging Period: Eight hours for Commissioning (Case 27)												
Turbine N/HRSG	48.768	353.7	17.68	6.7056	-	-	567.000	-	-	-	4500.000	-
Turbine S/HRSG	48.768	353.7	17.68	6.7056	-	-	100.296	-	-	-	796.000	-
Auxiliary Boiler	18.288	422.04	20.42	0.9144	-	-	0.128	-	-	-	1.013	-

Assumptions:

Turbine operates 24 hours per day for all cases and pollutants	
Aux.Boiler operates up to 1 hours per day	836 hours per year
Fire Pump operates up to 1 hours per day	52 hours per year
Emer. Gen operates up to 0.5 hours per day	26 hours per year

Startup Emissions Calculations

	1-hr NOx	1-hr CO	8-hr CO	mins/event
Cold Start (lbs/event)	51.480	415.800	415.8	39
Shutdown (lb/event)	-	-	75.9	25
Warm Start (lbs/event)	-	-	378	35
Balance (lb/hr)	17.10	10.40	10.40	
Total (lb/hr)	57.465	419.440	126.541	

Annual NOx & PM: Case I calc sheet (8000 hours made up of 1500 hours DB, 5 cold starts, 35 warm starts 40 shutdowns)
CO and NOx 1-hour Startup Impacts: Cold start is 39 minutes, which is the worst case start, plus 21 minutes of worst-case base load emissions, but no DB.
CO 8-hour Startup Impacts: Calculated as one cold start (39 mins) + one shutdown (25 mins) + one warm start (35 mins) + one shutdown (25 minutes)
+ one hour of max CO with DB plus remaining hours with DB.
Fire pump and gen set not tested during 1 hour start cycle
Aux boiler assumed to operate 2 hours for 8-hour CO startup modeling

Figure C5

AVAQMD (MDAB) Air Monitoring Sites