

APPENDIX B.1

Calculation of Maximum Hourly, Daily, and Annual Emissions

Tables presented in this Appendix are as follows:

- B.1-1 Auxiliary Boilers #1 and #2 Emissions
- B.1-2 Auxiliary Boilers #1 and #2 HAP Emissions
- B.1-3 Emergency Generators #1 and #2 Emissions
- B.1-4 Fire Pump Engines #1 and #2 Emissions
- B.1-5 Cooling Towers #1 and #2 Emissions
- B.1-6 Cooling Towers #1 and #2 HAP Emissions
- B.1-7 Dedicated Site Vehicle Emissions

Also included in this appendix:

- Attachment B.1-1 HTF Fugitive, Venting, and System Loss Emissions
- Attachment B.1-2 Engine Specification Sheets
- Attachment B.1-3 Auxiliary Boiler Specification Sheets
- Attachment B.1-4 Cooling Tower Specification Sheets
- Attachment B.1-5 Diesel Fuel Analysis Data
- Attachment B.1-6 Natural Gas Fuel Analysis Data
- Attachment B.1-7 HTF MSDS
- Attachment B.1-8 Vehicle Use Rate and Growth Data (1980-2020)

Table B.1-1 Boilers #1 and #2
Calculation of Criteria Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode: Normal firing mode
 Ops Hr/Day: 14 Worst Case
 Ops Hr/Yr: 1000

of Units: 2
 Fuel Type: Nat Gas

Calculation of Criteria Pollutant Emissions from Each Identical Unit

Compound	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr (2)	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr (3)	All Units			
						Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr
NOx	11.230	3.30E-01	4.62E+00	1.65E+02	8.26E-02	6.61E-01	9.25E+00	3.30E+02	1.65E-01
CO	19.150	5.63E-01	7.89E+00	2.82E+02	1.41E-01	1.13E+00	1.58E+01	5.63E+02	2.82E-01
VOC	2.990	8.79E-02	1.23E+00	4.40E+01	2.20E-02	1.76E-01	2.46E+00	8.79E+01	4.40E-02
SOx	0.272	8.00E-03	1.12E-01	4.00E+00	2.00E-03	1.60E-02	2.24E-01	8.00E+00	4.00E-03
PM10	5.090	1.50E-01	2.10E+00	7.49E+01	3.74E-02	2.99E-01	4.19E+00	1.50E+02	7.49E-02
PM2.5	5.090	1.50E-01	2.10E+00	7.49E+01	3.74E-02	2.99E-01	4.19E+00	1.50E+02	7.49E-02
	lbs/mmbtu								
CO2	116.95	3.51E+03	4.91E+04	3.51E+06	1.75E+03	7.02E+03	9.82E+04	7.02E+06	3.51E+03
Methane	0.0130	3.90E-01	5.46E+00	3.90E+02	1.95E-01	7.80E-01	1.09E+01	7.80E+02	3.90E-01
N2O	0.0002	6.62E-03	9.26E-02	6.62E+00	3.31E-03	1.32E-02	1.85E-01	1.32E+01	6.62E-03
CO2e									3.52E+03

Notes:

- (1) natural gas criteria pollutant EF factors
- (2) Based on maximum hourly boiler fuel use of and fuel HHV of 1020 Btu/scf gives 30 MMBtu/hr/boiler, 0.0294 MMscf/hr/boiler.
- (3) Based on maximum annual boiler fuel use of and fuel HHV of 1020 Btu/scf gives 15,000 MMBtu/yr/boiler, 14.7059 MMscf/yr/boiler.
- (4) LNBS only with GCPs
- (5) PM2.5 = PM10

Refs:

- (1) EFs from AP-42, Section 1.4, 7/98, and SCAQMD Rules 1146, and 1146.1.
- (2) GHG EFs from CCAR General Protocol, June 2006.

Table B.1-2 Boiler #1 and #2

Calculation of Noncriteria Pollutant Emissions for Boilers Firing Gaseous Fuels

Boiler Operation Mode: Normal firing mode

Ops Hr/Day: 14 Worst Case

Ops Hr/Yr: 1000

of Units: 2

Fuel Type: Nat Gas

Calculation of Noncriteria Pollutant Emissions from Each Identical Unit

Compound	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr (2)	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr (3)	All Units			
						Maximum Hourly Emissions, lb/hr	Maximum Daily Emissions, lb/day	Maximum Annual Emissions, lbs/yr	Annual Emissions, ton/yr
Acetaldehyde	4.61E-03	1.36E-04	1.90E-03	1.99E-03	9.97E-07	2.71E-04	3.80E-03	3.99E-03	1.99E-06
Acrolein	4.51E-03	1.33E-04	1.86E-03	1.95E-03	9.75E-07	2.65E-04	3.71E-03	3.90E-03	1.95E-06
Ammonia	(5)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	2.43E-03	7.15E-05	1.00E-03	1.05E-03	5.26E-07	1.43E-04	2.00E-03	2.10E-03	1.05E-06
1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethylbenzene	2.25E-03	6.62E-05	9.26E-04	9.73E-04	4.87E-07	1.32E-04	1.85E-03	1.95E-03	9.73E-07
Formaldehyde	4.75E-03	1.40E-04	1.96E-03	2.05E-03	1.03E-06	2.79E-04	3.91E-03	4.11E-03	2.05E-06
Hexane	6.30E-03	1.85E-04	2.59E-03	2.72E-03	1.36E-06	3.71E-04	5.19E-03	5.45E-03	2.72E-06
Naphthalene	2.37E-04	6.97E-06	9.76E-05	1.03E-04	5.13E-08	1.39E-05	1.95E-04	2.05E-04	1.03E-07
PAHs (4)	8.10E-05	2.38E-06	3.34E-05	3.50E-05	1.75E-08	4.76E-06	6.67E-05	7.01E-05	3.50E-08
Propylene	4.63E-01	1.36E-02	1.91E-01	2.00E-01	1.00E-04	2.72E-02	3.81E-01	4.01E-01	2.00E-04
Propylene oxide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	3.23E-02	9.50E-04	1.33E-02	1.40E-02	6.99E-06	1.90E-03	2.66E-02	2.79E-02	1.40E-05
Xylene	1.87E-02	5.50E-04	7.70E-03	8.09E-03	4.04E-06	1.10E-03	1.54E-02	1.62E-02	8.09E-06
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes:

(1) natural gas HAPs emission factors

(2) Based on maximum hourly boiler fuel use of and fuel HHV of 1020

30 MMBtu/hr/boiler
0.0294 MMscf/hr/boiler.

(3) Based on maximum annual boiler fuel use of and fuel HHV of 1020

15,000 MMBtu/yr/boiler
14.7059 MMscf/yr/boiler.

(4) Polycyclic aromatic hydrocarbons, excluding naphthalene (treated separately).

(5) LNB only with GCPs

Refs:

CARB Catef Database, Heater, NG, SCC 31000404
SDAPCD, B17, Toxics EFs Database

Table B.1-3 EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel		# of Identical Engines:	2
Emergency Generator			
Mfg:	Caterpillar	Stack Data	
Engine #:	C32 ATAAC	Height:	25 Ft.
Kw	1000 approx.	Diameter:	0.67 Ft.
BHP:	1341	Temp:	993 deg F
RPM:	-	ACFM:	8129
Fuel:	#2 Diesel	input the mfg ACFM or calculate per Exhaust sheet)	
Fuel Use:	72 Gph (1)	Area:	0.353 Sq.Ft.
FuelHHV:	139000 Btu/gal	Velocity:	384 Ft/Sec
mmbtu/hr:	10.01 HHV	Max Daily Op Hrs:	1
		Max Annual Op Hrs:	52

Fuel Wt:	6.87	Lbs/gal
Fuel S:	0.0015	% wt.
Fuel S:	0.10305	Lbs/1000 gal
SO2:	0.2061	Lbs/1000 gal

EFs (g/bhp-hr)	Single Engine					All Engines			
	Lb/Hr	Lb/Day	Lbs/Yr	Tons/Yr	Lb/Hr	Lb/Day	Lbs/Yr	Tons/Yr	
NOx	4.93	14.56	14.56	757.22	0.379	29.12	29.12	1514.44	0.76
CO	0.13	0.38	0.38	19.97	0.010	0.77	0.77	39.93	0.02
VOC	0.1	0.30	0.30	15.36	0.008	0.59	0.59	30.72	0.02
PM10	0.018	0.05	0.05	2.76	0.001	0.11	0.11	5.53	0.003
SOx	NA	0.01	0.01	0.77	0.0004	0.03	0.03	1.54	0.001
	lbs/gal								
CO2	22.38	1611	1611	83791	42	3223	3223	167581	84
Methane	0.0003	0.02	0.02	1.12	0.001	0.04	0.04	2.25	0.001
N2O	0.0001	0.01	0.01	0.37	0.0002	0.01	0.01	0.75	0.0004
CO2e					42.0				83.9

Notes:

1. fuel consumption based on 0.055 gal/hp-hr (avg EPA and SCAQMD values)
if no value given by mfg for specific engine.
2. PM10 equals PM2.5.
3. PM10 used in HRA to represent DPM emissions.
4. GHG EFs from CCAR General Protocol, June 2006.

Table B.1-4 EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel	# of Identical Engines: 2
Emergency Fire Pump	
Mfg: John Deere/Clarke	Stack Data
Engine #: JU6H-UFAD98	Height: 25 Ft.
Kw: 0 approx.	Diameter: 0.5 Ft.
BHP: 315	Temp: 961 deg F
RPM: -	ACFM: 1400
Fuel: #2 Diesel	input the mfg ACFM or calculate per Exhaust sheet)
Fuel Use: 15 Gph (1)	Area: 0.196 Sq.Ft.
FuelHHV: 139000 Btu/gal	Velocity: 119 Ft/Sec
mmbtu/hr: 2.09 HHV	Max Daily Op Hrs: 1
	Max Annual Op Hrs: 52

Fuel Wt: 6.87 Lbs/gal
Fuel S: 0.0015 % wt.
Fuel S: 0.10305 Lbs/1000 gal
SO2: 0.2061 Lbs/1000 gal

EFs (g/bhp-hr)	Single Engine				All Engines			
	Lb/Hr	Lb/Day	Lbs/Yr	Tons/Yr	Lb/Hr	Lb/Day	Lbs/Yr	Tons/Yr
NOx 2.69	1.87	1.87	97.05	0.049	3.73	3.73	194.11	0.10
CO 0.45	0.31	0.31	16.24	0.008	0.62	0.62	32.47	0.02
VOC 0.06	0.04	0.04	2.16	0.001	0.08	0.08	4.33	0.002
PM10 0.055	0.04	0.04	1.98	0.001	0.08	0.08	3.97	0.002
SOx NA	0.003	0.003	0.16	0.0001	0.01	0.01	0.32	0.0002
	lbs/gal							
CO2 22.38	336	336	17456	9	671	671	34913	17
Methane 0.0003	0.005	0.005	0.23	0.000	0.009	0.009	0.47	0.000
N2O 0.0001	0.002	0.002	0.08	0.0000	0.003	0.003	0.16	0.0001
CO2e				8.7				17.5

Notes:

1. fuel consumption based on 0.055 gal/hp-hr (avg EPA and SCAQMD values) if no value given by mfg for specific engine.
2. PM10 equals PM2.5.
3. PM10 used in HRA to represent DPM emissions.
4. GHG EFs from CCAR General Protocol, June 2006.

Table B.1-5 Cooling Towers #1 and #2

Cooling Tower Particulate Emissions

	2			Per Tower	Per Cell	All Towers
# of Identical Towers:						
Operational Schedule:	Hrs/day	Days/Yr	Hrs/Yr			
	15	365	3200			
Pumping rate of recirculation pumps (gal/min)				94,623.0		
Flow of cooling water (lbs/hr)				47,292,575.4		
Avg TDS of circ water (mg/l or ppmw)				5,000.0		
Flow of dissolved solids (lbs/hr)				236462.88		
Fraction of flow producing drift*				1.00		
Control efficiency of drift eliminators, %	0.0005			0.000005		
Calculated drift rate (lbs water/hr)				236.5		
PM10 emissions (lbs/hr)				1.18	0.17	2.36
PM10 emissions (lbs/day)				17.73	2.53	35.47
PM10 emissions (tpy)				1.89	0.27	3.78
<i>PM2.5 fraction of PM10</i>				1.00		
PM2.5 emissions (lbs/hr)				1.18	0.17	2.36
PM2.5 emissions (lbs/day)				17.73	2.53	35.47
PM2.5 emissions (tpy)				1.89	0.27	3.78

Notes:

Based on Method AP 42, Section 13.4, Jan 1995

*Technical Report EPA-600-7-79-251a, Page 63

Effects of Pathogenic and Toxic Materials Transported Via Cooling Device Drift - Volume 1.

Cooling Tower Stack Parameters

Base Elevation	n/a	feet amsl
Number of Cells	7	
Length of Cooling Tower	294.67	feet
Width of Cooling Tower	42.67	feet
Height of Cooling Tower (to fan deck)	31.59	feet agl
Cell Release Height (fan shroud exit)	45.34	feet agl
Flow/Fan Discharge for each Cell	1,098,000	ACFM
Inlet air temperature (ambient):	variable	deg F
Discharge air temperature:	variable	deg F

Table B.1-6

Calculation of Hazardous and Toxic Pollutant Emissions from Cooling Towers

Cells per Tower:	7	Max Tower Drift Rate:	236.5	lbs/hr	Op Hrs/Day:	15					ppm
# of Identical Towers:	2				Op Hrs/Yr:	3200			Tower TDS:	5000	
									Tower C of C:	3.00	

Constituent	Concentration in Cooling Tower Water		Total Single Tower			Single Cell		Total All Towers			
			Emissions, lb/hr	Emissions, lb/day	Emissions, ton/yr	Emissions, lb/hr	Emissions, lb/day	Emissions, ton/yr	Emissions, lb/hr	Emissions, lb/day	Emissions, ton/yr
Manganese	0.029	ppm	2.06E-05	3.09E-04	3.29E-05	2.94E-06	4.41E-05	4.70E-06	4.12E-05	6.17E-04	6.58E-05
Magnesium	14	ppm	9.93E-03	1.49E-01	1.59E-02	1.42E-03	2.13E-02	2.27E-03	1.99E-02	2.98E-01	3.18E-02
Lead	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Arsenic	0.0092	ppm	6.53E-06	9.79E-05	1.04E-05	9.32E-07	1.40E-05	1.49E-06	1.31E-05	1.96E-04	2.09E-05
Aluminum	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Silver	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Beryllium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Vanadium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Barium	0.033	ppm	2.34E-05	3.51E-04	3.75E-05	3.34E-06	5.02E-05	5.35E-06	4.68E-05	7.02E-04	7.49E-05
Cobalt	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Antimony	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	0	ppm	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum	0.24	ppm	1.70E-04	2.55E-03	2.72E-04	2.43E-05	3.65E-04	3.89E-05	3.41E-04	5.11E-03	5.45E-04

- Notes:
- (1) Water analysis data supplied by project applicant. See support data on next page.
 - (2) analysis values for 800 bgs well
 - (3) mg/l = ppm

Support Data for Table B.1-6

ANALYTE	CONCENTRATION (mg/L unless noted)	
	350-550 ft bgs	800 ft bgs
pH	7.9 units	7.8 units
TDS	9,500	5,000
Total Alkalinity (as CaCO ₃ @ pH 4.3)	97	150
Specific Conductance (@ 25 degrees C)	19,000 uS/cm	8,800 uS/cm
Total Hardness (as CaCO ₃)	570	220
Chloride	5,600	2,300
Sulfate	1,500	810
Fluoride	4.6	1.1
Nitrite	ND	ND
Nitrate	ND	0.5
Dissolved Silica	--	15
Sodium	4,500	1,500
Magnesium	38	14
Potassium	30	12
Calcium	160	66
Manganese	0.065	0.029
Iron	1.4	0.46
Beryllium	ND	ND
Vanadium	ND	ND
Chromium	ND	ND
Cobalt	ND	ND
Nickel	ND	ND
Copper	ND	ND
Zinc	ND	ND
Arsenic	0.024	0.0092
Selenium	ND	ND
Molybdenum	0.44	0.24
Silver	ND	ND
Cadmium	ND	ND
Antimony	ND	ND
Barium	0.3	0.033
Mercury	ND	ND
Thallium	ND	ND
Lead	ND	ND

Table B.1-7 Operational Emissions from Dedicated On-Site Vehicles

Composite Emissions Factors for Gasoline On-Road Fueled Vehicles

lbs/VMT					
NOx	CO	VOC	SOx	PM10	CO2
0.001564	0.009596	0.000882	0.000014	0.000107	1.461717

Ref: MDAB, Emfac 2007, V2.3, Nov 2006
On Road Vehicles (1970-2014)
MD Gasoline Trucks

Composite Emissions Factors for Diesel On-Road Fueled Vehicles

lbs/VMT					
NOx	CO	VOC	SOx	PM10	CO2
0.021605	0.006966	0.001621	0.000001	0.000003	4.047915

Ref: MDAB, Emfac 2007, V2.3, Nov 2006
On-Road Heavy Duty Diesels (1970-2014)

Average Emissions Factors for Diesel Off-Road Fueled Vehicles

lbs/Hp-Hr				
NOx	CO	VOC	SOx	PM10
0.0061	0.0035	0.0011	0.000007	0.0004
Avg onsite equipment speed (mph):			5	
Avg HP of proposed onsite off-road equipment:				230
Estimated onsite off-road equipment mileage per year				2500
lbs/hr				
1.403	0.805	0.253	0.00161	0.092
lbs/VMT				
0.2806	0.161	0.0506	0.000322	0.0184
CO2				
Methane				
4.213				
0.000093				

EFs from Exhaust-Main Sheet

CO2 EF Data from SCAQMD EMFAC 2007, Version 2.3
Heavy-Heavy Duty Diesel Truck Values, Rev 03/07
AQMD Website, 3-2-09
Scenario Year 2014

Estimated number of gasoline fueled vehicles dedicated to site operations:
Estimated total annual mileage for gasoline fueled vehicles:

7
64090

Avg On-site VMT/day: 273
% of VMT on Onsite
Paved Roads: 10
Fraction 0.1

Estimated number of diesel fueled vehicles dedicated to site operations:
Estimated total annual mileage for diesel fueled vehicles:

6
33125

Avg On-site VMT/day on
Unpaved Roads: 246

Estimated Onsite On-Road Gasoline Vehicle Emissions

	NOx	CO	VOC	SOx	PM10	PM2.5	CO2	Methane	N2O	CO2e
lbs/yr	100.2	615.0	56.5	0.9	6.9	6.8	93681.4	20.0	10.6	97382.1
tons/yr	0.050	0.308	0.028	0.0004	0.0034	0.0034	46.841	0.010	0.005	48.691
lbs/avg day	0.275	1.685	0.155	0.0025	0.0188	0.0188	256.661	0.055	0.029	266.800

Estimated Onsite On-Road Diesel Vehicle Emissions

	NOx	CO	VOC	SOx	PM10	PM2.5	CO2	Methane	N2O	CO2e
lbs/yr	715.7	230.7	53.7	0.033	0.10	0.10	134087.2	6.8	4.3	135560.9
tons/yr	0.358	0.115	0.027	0.0000	0.0000	0.0000	67.044	0.003	0.002	67.780
lbs/avg day	1.961	0.632	0.147	0.0001	0.0003	0.0003	367.362	0.019	0.012	371.400

Estimated Onsite Off-Road Diesel Equipment Emissions

	NOx	CO	VOC	SOx	PM10	PM2.5	CO2	Methane	N2O	CO2e
lbs/yr	701.500	402.500	126.500	0.805	46.000	46.0000	10532.500	0.233	0.000	10537.4
tons/yr	0.351	0.201	0.063	0.0004	0.023	0.023	5.266	0.000	0.000	5.269
lbs/avg day	1.922	1.103	0.347	0.0022	0.126	0.126	28.856	0.001	0.000	28.870

Totals	NOx	CO	VOC	SOx	PM10	PM2.5	CO2	Methane	N2O	CO2e
tons/yr	0.759	0.624	0.118	0.001	0.026	0.026	119.151	0.014	0.007	121.740

Estimated Fugitive PM10/PM2.5 from Onsite Operations Unpaved Road Travel (General Site Operations)

Estimated Onsite Unpaved Road travel:	246	VMT/day
Estimated vehicle weight using onsite unpaved roads:	5	tons
Road surface silt content:	5.3	%
EPA AP-42, Section 13.2.2, Eq. 1a	Calc 1	0.48
	Calc 2	1.26
	EF PM10	0.90 lb/VMT
	EF PM2.5	0.19 lb/VMT
Control Efficiency:	0.75	
Emission Fraction:	0.25	

Controls	%Reduction	Fraction
Watering	55	0.55
Speed Limits	44	0.44
***	0	0
***	0	0

per South Coast AQMD Fugitive Dust Mitigation Tables, Rev 4/2007.

	lbs/day	tons/yr
PM10	56.1	10.2
PM2.5	11.9	2.2

Attachment B.1-1 HTF Venting and Fugitive Loss Rate Emissions

Gallons HTF Purchased to Hold System at Rated Capacity

SEGS	Years															Avg Gals Year	Gals Sys vol	% in 10 yrs Loss	% System Volume
	1990	1991	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	00-09				
III	X	X	0	15000	6000	4700	6000	5400	1720	1720	1960	0	0	0	27500	2750	106400	25.8%	2.58
IV	X	X	0	0	6000	4700	6000	5400	1720	1720	1960	0	0	0	27500	2750	106400	25.8%	2.58
V	X	X	0	2600	6000	4700	6000	5400	1720	1720	1960	0	0	0	27500	2750	121900	22.6%	2.26
VI	X	X	0	2400	6000	4700	6000	5400	1720	1720	1960	0	0	0	27500	2750	110000	25.0%	2.50
VII	X	X	0	2400	6000	4700	6000	5400	1720	1720	1960	40000	0	0	67500	6750	110000	61.4%	6.14
VIII	30000	12000	X	X	3500	5100	0	15022	0	5000	4000	5000	0	0	37622	3762.2	340500	11.0%	1.10
IX		0	X	X	3500	5100	0	0	0	5000	4000	5000	0	0	22600	2260	340500	6.6%	0.66

Avg Loss Rate of Newer Systems at SEGS VIII and IX 0.88 %
 New CST technology should be able to duplicate or lessen this loss rate.

Avg % Loss 2.55

Therminol Properties:

Form: Liquid
 Components: Diphenyl ether and biphenyl
 Density: 1.06 g/cm³ at 25 deg C (8.85 lbs/gal)
 Boiling Point: 257 deg C
 Autoignition Temp: 612 deg C

Genesis Project Data:

HTF System Capacity: 1000000 gals Ref: Final POD, CACA 48880, Table 2-3, June 2009
 8850000 lbs
 Losses at 0.88% Rate: 78262.1 lbs/year VOC
 214.4 lbs/day VOC
 39.1 tons/yr VOC

Estimated Loss Rate for the

Genesis System: 0.5 %
 44250.0 lbs/year VOC
 121.2 lbs/day VOC
 22.1 tons/yr VOC

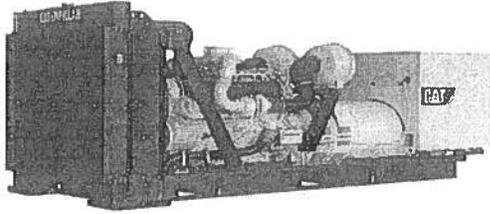


Image shown may not reflect actual package.

STANDBY
1000 ekW 1250 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY

- EPA Tier 2

DESIGN CRITERIA

- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

UL 2200

- UL 2200 listed packages available. Certain restrictions may apply. Consult with your Caterpillar Dealer.

FULL RANGE OF ATTACHMENTS

- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER

- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT

- Caterpillar® dealers provide extensive post sale support including maintenance and repair agreements
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- The Cat® S•O•SSM program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT C32 ATAAC DIESEL ENGINE

- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Four-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

CAT GENERATOR

- Designed to match the performance and output characteristics of Caterpillar diesel engines
- Single point access to accessory connections
- UL 1446 recognized Class H insulation

CAT EMCP 3 SERIES CONTROL PANELS

- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	<ul style="list-style-type: none"> • Single element canister type air cleaner • Service indicator 	<ul style="list-style-type: none"> • Dual element air cleaners • Air inlet adapters
Cooling	<ul style="list-style-type: none"> • Radiator with guard (43°C) • Low profile (frontal area) • Low airflow • Coolant drain line with valve • Fan and belt guards • Caterpillar Extended Life Coolant • Coolant level sensors • Radiator duct flange 	<ul style="list-style-type: none"> • Radiator with 27°C ambient capability • Jacket water heater
Exhaust	<ul style="list-style-type: none"> • Dry exhaust manifold • Flanged faced outlets 	<ul style="list-style-type: none"> • Stainless steel exhaust flex fittings • Elbows, flanges, expanders & Y adapters
Fuel	<ul style="list-style-type: none"> • Primary fuel filter with water separator • Secondary fuel filter • Fuel priming pump • Flexible fuel lines • Fuel cooler 	
Generators	<ul style="list-style-type: none"> • Class H insulation • Class F temperature (105°C prime/130°C standby) • Winding temperature detectors (select models) • Anti-condensation space heaters 	<ul style="list-style-type: none"> • Oversize & premium generators
Power Termination	<ul style="list-style-type: none"> • Bus bar (NEMA and IEC mechanical lug holes) -right side standard • Bottom cable entry 	<ul style="list-style-type: none"> • Circuit breakers, UL listed, 3 pole with shunt trip, 100% rated, choice of trip units, manual or electrically operated (low voltage only) • Circuit breakers, IEC compliant, 3 or 4 pole with shunt trip (low voltage only), choice of trip units, manual or electrically operated • Shroud cover for bottom cable entry • Power terminations can be located on the left and/or rear as an option. Also, multiple circuit breakers can be ordered (up to 2) • Top cable entry
Governor	<ul style="list-style-type: none"> • ADEM™ A4 	<ul style="list-style-type: none"> • Load Share Module
Control Panels	<ul style="list-style-type: none"> • EMCP 3.1 • User Interface panel (UIP) - rear mount • Emergency Stop Push button 	<ul style="list-style-type: none"> • EMCP 3.2 and EMCP 3.3 • Right or left mount UIP • Local & remote annunciator modules • Discrete I/O Module • Generator temperature monitoring & protection • Load share module
Lube	<ul style="list-style-type: none"> • Lubricating oil and filter • Oil drain line with valves • Fumes disposal • Gear type lube oil pump 	<ul style="list-style-type: none"> • Deep sump oil pan
Mounting	<ul style="list-style-type: none"> • Formed steel welded base • Anti-vibration mounts (shipped loose) 	
Starting/Charging	<ul style="list-style-type: none"> • 24 volt starting motor(s) • Batteries with rack and cables • Battery disconnect 	<ul style="list-style-type: none"> • Battery chargers (10 Amp) • 45 amp charging alternator • Oversize batteries • Ether starting aid
General	<ul style="list-style-type: none"> • Right-hand service • Paint - Caterpillar Yellow (except rails and radiators that are gloss black) • SAE standard rotation • Flywheel and Flywheel housing - SAE No. 0 	<ul style="list-style-type: none"> • UL 2200 • CSA certification • EU Declaration of Incorporation • EEC Declaration of Conformity

SPECIFICATIONS

CAT GENERATOR

SR4B Generator

Frame size.....	692
Excitation.....	Permanent Magnet
Pitch.....	0.7143
Number of poles.....	4
Number of bearings.....	2
Number of Leads.....	12
Insulation.....	UL 1446 Recognized Class H with tropicalization and antiabrasion
IP rating.....	Drip Proof IP22
Alignment.....	Close Coupled
Overspeed capability - % of rated.....	150
Wave form.....	003.00
Voltage regulator.....	3 Phase sensing with selectable volts/Hz
Voltage regulation.....	Less than +/- 1/2% (steady state) Less than +/- 1% (no load to full load)
Telephone Influence Factor.....	Less than 50
Harmonic distortion.....	Less than 5%

CAT DIESEL ENGINE

C32 TA, V-12, 4-stroke watercooled diesel

Bore - mm.....	145.00 mm (5.71 in)
Stroke - mm.....	162.00 mm (6.38 in)
Displacement - L.....	32.10 L (1958.86 in ³)
Compression ratio.....	15.0:1
Aspiration.....	TA
Fuel system.....	MEUI
Governor type.....	ADEM™ A4

CAT EMCP 3 SERIES CONTROLS

- EMCP 3.1 (Standard)
- EMCP 3.2 / EMCP 3.3 (Option)
- Single location customer connector point
- True RMS metering, 3-phase
- Controls
 - Run / Auto / Stop control
 - Speed Adjust
 - Voltage Adjust
 - Emergency Stop Pushbutton
 - Engine cycle crank
- Digital Indication for:
 - RPM
 - Operating hours
 - Oil Pressure
 - Coolant temperature
 - System DC volts
 - L-L volts, L-N volts, phase amps, Hz
 - kW, kVA, kVAR, kW-hr, %kW, PF (EMCP 3.2 / 3.3)
- Shutdowns with common indicating light for:
 - Low oil pressure
 - High coolant temperature
 - Low coolant level
 - Overspeed
 - Emergency Stop
 - Failure to start (overcrank)
- Programmable protective relaying functions: (EMCP 3.2 & 3.3)
 - Under and over voltage
 - Under and over frequency
 - Overcurrent (time and inverse time)
 - Reverse power (EMCP 3.3)
- MODBUS isolated data link, RS-485 half duplex (EMCP 3.2 & 3.3)
- Options
 - Vandal door
 - Local annunciator module
 - Remote annunciator module
 - Input / Output module
 - RTD / Thermocouple Modules
 - Monitoring software

STANDBY 1000 ekW 1250 kVA
60 Hz 1800 rpm 480 Volts



TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM9933	
EPA Certified Tier 2		
Generator Set Package Performance Genset Power rating @ 0.8 pf Genset Power rating with fan	1250 kVA 1000 ekW	
Coolant to aftercooler Coolant to aftercooler temp max	49 °C	120 °F
Fuel Consumption 100% load with fan 75% load with fan 50% load with fan	272.5 L/hr 213.2 L/hr 144.7 L/hr	72.0 Gal/hr 56.3 Gal/hr 38.2 Gal/hr
Cooling System¹ Air flow restriction (system) Air flow (max @ rated speed for radiator arrangement) Engine Coolant capacity with radiator/exp. tank Engine coolant capacity Radiator coolant capacity	0.12 kPa 1126 m ³ /min 190.0 L 55.0 L 135.0 L	0.48 in. water 39764 cfm 50.2 gal 14.5 gal 35.7 gal
Inlet Air Combustion air inlet flow rate	86.9 m ³ /min	3068.8 cfm
Exhaust System Exhaust stack gas temperature Exhaust gas flow rate Exhaust flange size (internal diameter) Exhaust system backpressure (maximum allowable)	478.5 °C 230.2 m ³ /min 203 mm 10.0 kPa	893.3 °F 8129.4 cfm 8 in 40.2 in. water
Heat Rejection Heat rejection to coolant (total) Heat rejection to exhaust (total) Heat rejection to aftercooler Heat rejection to atmosphere from engine Heat rejection to atmosphere from generator	355 kW 988 kW 279 kW 196 kW 56.0 kW	20189 Btu/min 56187 Btu/min 15867 Btu/min 11146 Btu/min 3184.7 Btu/min
Alternator² Motor starting capability @ 30% voltage dip Frame Temperature Rise	1990 skVA 692 130 °C	234 °F
Lube System Sump refill with filter	68.0 L	18.0 gal
Emissions (Nominal)³ NOx g/hp-hr CO g/hp-hr HC g/hp-hr PM g/hp-hr	4.93 g/hp-hr .13 g/hp-hr .01 g/hp-hr .018 g/hp-hr	

¹ For ambient and altitude capabilities consult your Caterpillar dealer. Air flow restriction (system) is added to existing restriction from factory.

² UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40°C ambient per NEMA MG1-32.

³ Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

STANDBY 1000 eKW 1250 kVA

60 Hz 1800 rpm 480 Volts



RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046. Standby ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions. **Fuel rates** are based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Caterpillar dealer.

STANDBY 1000 ekW 1250 kVA
60 Hz 1800 rpm 480 Volts



DIMENSIONS

Package Dimensions		
Length	Information not available at this time.	
Width		
Height		
Weight	7932 kg	17,487 lb

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions. (General Dimension Drawing #).

Performance No.: DM9933

Feature Code: C32DE15

Gen. Arr. Number: 3245104

Source: U.S. Sourced

May 01 2009

14162330

www.CAT-ElectricPower.com

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Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

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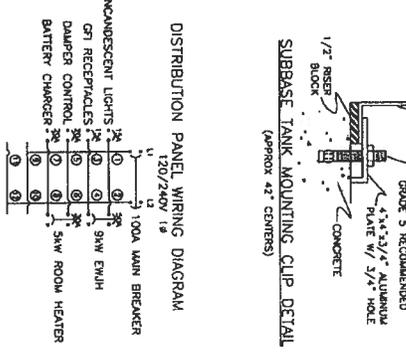
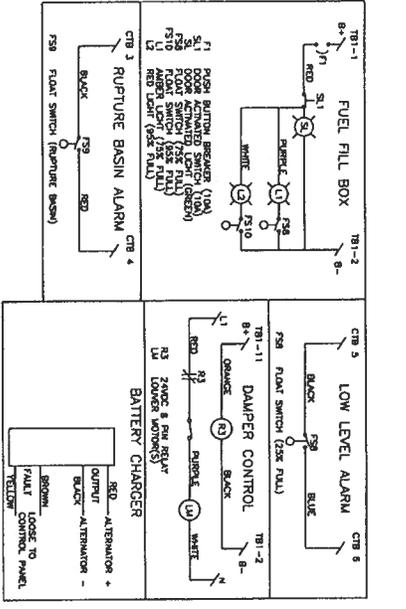
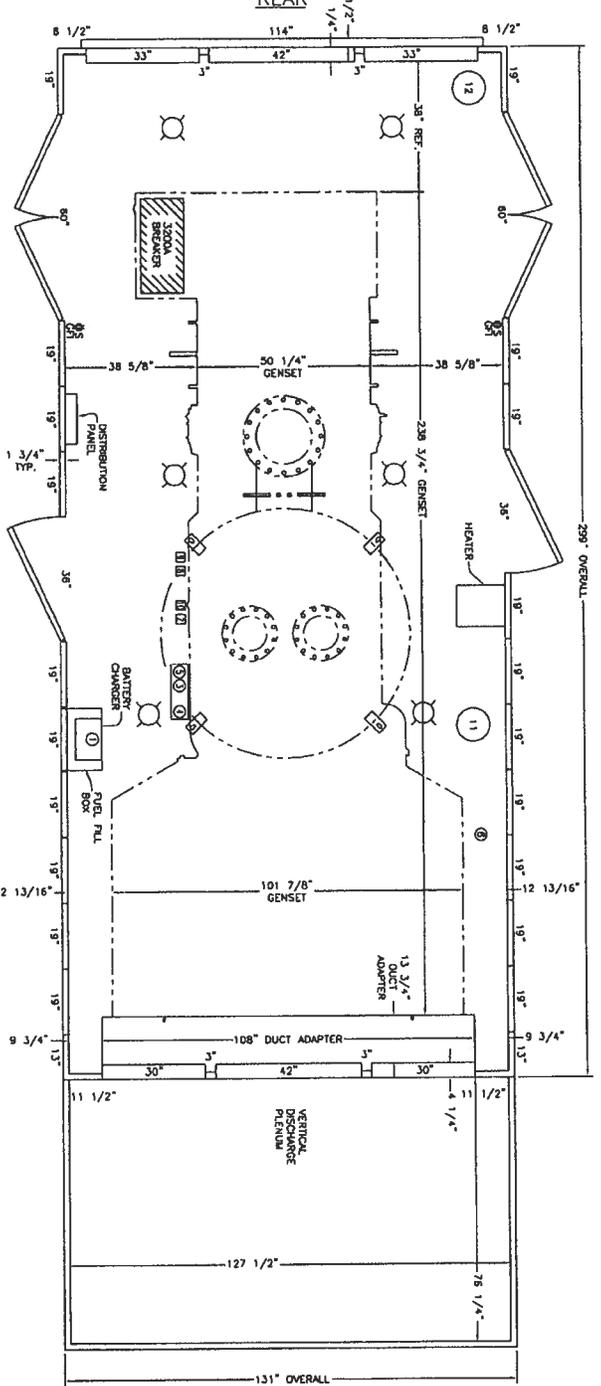
FABRICATION NOTES
 WALLS: 1" ALUMINUM INSULATED
 FLOOR: 1" ALUMINUM INSULATED
 CEILING: 1" ALUMINUM INSULATED

PAINT: PRIME AND PAINT ONE COAT
 (PULVERIZED ALUMINUM FLAKE)
 (PULVERIZED ALUMINUM FLAKE)
 (PULVERIZED ALUMINUM FLAKE)

EXHAUST SYSTEM:
 EXHAUST MOTOR: 1/2 HP
 EXHAUST MOTOR: 1/2 HP
 EXHAUST MOTOR: 1/2 HP

APPROXIMATE WEIGHTS:
 1. 1000 LB
 2. 1000 LB
 3. 1000 LB

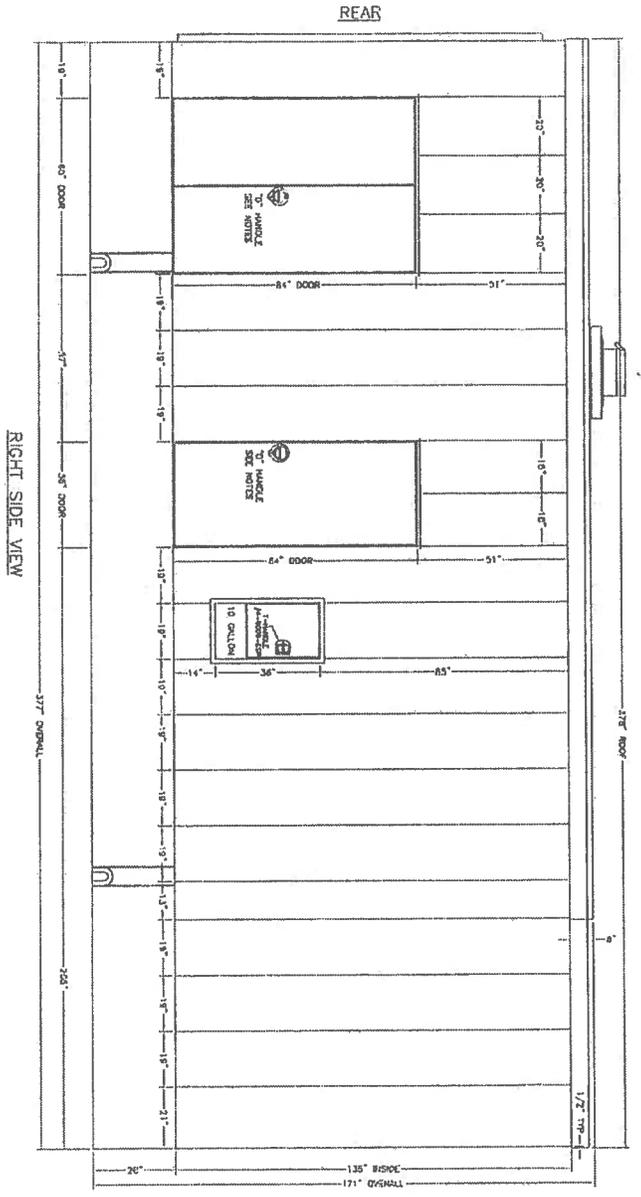
ENCLOSURE LAYOUT VIEW



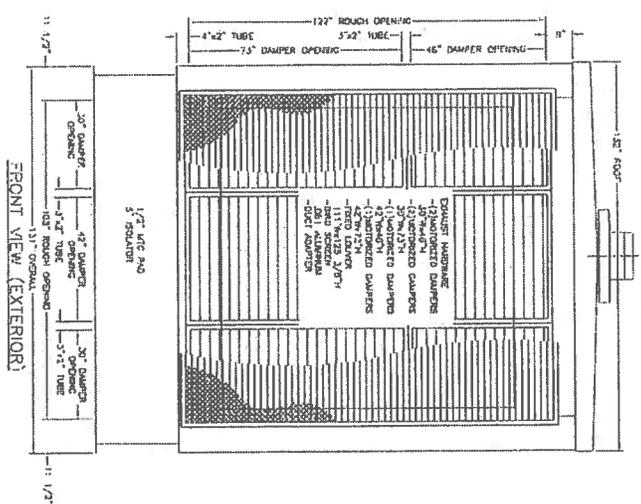
WEIGHT	
9704 # ENCLOSURE	16474 # TANK (DRY)
35000 # GENSET (WET)	62178 # TOTAL

DATE	REV	DESCRIPTION OF CHANGE	DATE	BY
3/1/06	1	REVISED		
3/6	2	REVISED		
3/1/06	3	REVISED		

D.T.S., INC.
 23157 42ND AVENUE
 BOULDER, CO 80504
 PHONE (303) 440-3304
 FAX (303) 440-3310



STOCK



THIS IS FOR A 1500KW
GENERATOR, SHOULD BE
SIMILAR TO 1000 KW

WEIGHT	
970# ENCLOSURE	
1847# TANK (DRY)	
3800# GENSET (WET)	
6217# TOTAL	

- APPROVED
- APPROVED AS NOTED
- NOT APPROVED
- DATE: _____ BY: _____

Q20747B	REV	DATE	BY	APPROV. OCCASION BY CHANGE
516010				
MAX SUBBASE ENCLOSURE W/A 3400 GALLON UL LISTED RUPTURE BASIN FUEL TANK FOR A CAT 35166 GENSET!	DATE	BY		
N4767	1 = 6	3/1/06	RAV	JAW

PHONE (800)556-3308 FAX (505)324-1170
D.T.S., INC.
 3113 47TH STREET P.O. BOX 1004
 TULSA, OK 74101 TULSA, OK 74101
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**JU6H-UFAD98
INSTALLATION & OPERATION DATA (Continued)
USA Production**

<u>Exhaust System</u>		1760
Exhaust Flow - ft. ³ /min. (m ³ /min.).....	1400 (39.7)	
Exhaust Temperature - °F (°C).....	961 (516)	
Maximum Allowable Back Pressure - in. H ₂ O (kPa).....	30 (7.5)	
Minimum Exhaust Pipe Dia. - in. (mm)**.....	5 (127)	
<u>Fuel System</u>		
Fuel Consumption - gal./hr. (L/hr.).....	15 (56.8)	
Fuel Return - gal./hr. (L/hr.).....	21.3 (80.6)	
Total Supply Fuel Flow - gal./hr. (L/hr.).....	15.4 (58.3)	
Fuel Pressure - lb./in. ² (kPa).....		
Minimum Line Size - Supply - (in.).....	.50 Schedule 40 Steel Pipe	
Pipe Outer Diameter in. (mm).....	.848 (0.33)	
Minimum Line Size - Return - (in.).....	.375 Schedule 40 Steel Pipe	
Pipe Outer Diameter in. (mm).....	.675 (0.26)	
Maximum Allowable Fuel Pump Suction		
With Clean Filter - in. H ₂ O (mH ₂ O).....	80 (2.0)	
Maximum Allowable Fuel Head above Fuel pump, Supply or Return - ft. (m).	6.6 (2.0)	
Fuel Filter Micron Size.....	2(Secondary)	
<u>Heater System</u>		
Jacket Water Heater		
Wattage (Nominal).....	1500	
Voltage - AC, 1P.....	115 (+5%, -10%)	
Optional Voltage - AC, 1P.....	230 (+5%, -10%)	
<u>Induction Air System</u>		
Air Cleaner Type.....	Indoors Service Only - Washable	
Air Intake Restriction Maximum Limit		
Dirty Air Cleaner - in. H ₂ O (kPa).....	25 (6.25)	
Clean Air Cleaner - in. H ₂ O (kPa).....	15 (3.75)	
Engine Air Flow - ft. ³ /min. (m ³ /min.).....	547 (15.5)	
Maximum Allowable Temperature (Air To Engine Inlet) - °F (°C)***.....	130 (54)	
<u>Lubrication System</u>		
Oil Pressure - normal - lb./in. ² (kPa).....	40-60 (276-414)	
In Pan Oil Temperature - °F (°C).....	220-245 (104-118)	
Oil Pan Capacity - High - qt. (L).....	34 (33)	
Low - qt. (L).....	28 (31)	
Total Oil Capacity with Filter - qt. (L).....	30.4 (33.5)	
<u>Performance</u>		
BMEP - lb./in. ² (kPa).....	341 (2353)	
Piston Speed - ft./min. (m/min.).....	1467 (447)	
Mechanical Noise - dB(A) @ 1m.....	Consult Clarke	
Power Curve.....	C132618	

** Based On Nominal System. Flow Analysis Must Be Done To Assure Adherence To System Limitations.
(Minimum Exhaust pipe Diameter is based on 15 feet of pipe, one elbow, and a silencer pressure drop no greater than one half the max. allowable back pressure.)

*** Review For Power Deration If Air Entering Engine Exceeds 77 ° F (25°C)

Tier 3 Emissions Data - John Deere Power Systems

Nameplate Rating Information

Clarke Model	JU6H-UFAD98
Power Rating (BHP / kW)	315 / 235
Certified Speed (RPM)	1760

Certificate Data

John Deere Engine Rating	6068HFC48A
Engine Model Year *	2009
EPA Family Name	9JDXL06.8101
EPA Certificate Number	JDX-NRCI-09-15
CARB Executive Order Number	U-R-004-0361
Emissions Label Part Number	R528920

* The Engine Model Year is listed on the emissions label.

Emissions Data **

Units	g/hp-hr	g/kW-hr
CO	0.45	0.61
Pm	0.055	0.074
NOx	2.69	3.61
HC	0.06	0.08
NOx + HC	2.75	3.69
Test Engine	PE6068L000130	

** The emission data listed is measured from the calibration engine under laboratory test conditions. It is intended to represent an "average" engine but is not a guarantee that all engines meet these values.



John Deere Power Systems
 3801 W. Ridgeway Ave., PO Box 5100
 Waterloo, Iowa USA 50704-5100



"RENTECH Boilers for people who know and care."®

General Design Parameters

The boiler systems described in this proposal have been designed for the following parameter:

Steam Conditions

Capacity	24,000 lbs/hr (20,000#/hr net)
Steam Pressure:.....	150 PSIG
Steam Temperature:.....	460 ±10 deg F.
Steam Purity:.....	1.0 PPM TDS
Feedwater Temperature:.....	228°

Fuels Fired:

Primary Fuels: Natural Gas

Unit Design Pressures

Boiler: 250 PSIG

Technical Discussion

To meet your process and mechanical requirements, we are pleased to offer one (1) shop assembled, D-Style watertube boiler. The boiler will have a design pressure of 250 Psig and will generate 24000 lbs/hr of superheated steam at 460°F± 10° F at an operating pressure of 150 Psig with feedwater supplied at 228°F, and firing the indicated fuels.

The membrane wall construction of the furnace minimizes the need for refractory and refractory seals. By eliminating the refractory front and rear walls, faster start-up times are possible without costly refractory damage. This design is ideal for boilers that operate under adverse conditions such frequent start and stop operation. The design can also significantly reduce maintenance costs and extend the life expectancy of the unit.

The proposed boiler has been carefully designed for your specific application with regard to:

- Membrane wall construction
- Conservative furnace size to assure long equipment life
- Tube thickness Convection (0.120" min. wall)
- Tube thickness Membrane (0.135" min. wall)
- Boiler design for low maintenance and long life expectancy



"RENTTECH Boilers for people who know and care."®

Scope of Supply

Each Boiler furnished by Renttech will be equipped as follows:

Scope of Supply	Included	Not Included	Option
Packaged Boiler	X		
Steam Trim			
Safety Valves	X		
Main Steam Stop Valve	X		
Main Steam Non-Return Valve	X		
Water Column w/ gauge glass	X		
Auxiliary low water cutout	X		
Steam Gauge	X		
Continuous Blowdown Stop & Control valves	X		
Blowoff Valves	X		
Chemical Feed Stop & Check	X		
Vent	X		
Feedwater Trim			
Stop Valve	X		
Check Valve	X		
Flow Control Valve	X		
Feedwater control valve bypass	X		
Super heater Assembly			
Integral Convection-type superheater rated for 460°F ± 10°F.	X		
Interconnecting superheater piping from boiler outlet to superheater inlet.	X		
Safety valve, vent valve and drain valve.	X		
Burner Assembly :			
Burner Register and Windbox	X		
Fuel Trains	X		
Flame Safety (Burner Management) System	X		
Combustion Control System with 3 element feedwater control (Utilizing AB compactlogix)	X		
Fan Assembly:			
Electric Motor	X		
Fan Silencer	X		
Structural Support with outlet duct	X		
Economizer Assembly			
Breeching into economizer	X		
Structural Support	X		
Outlet Transition to stub stack	X		
Feedwater piping w/ 3-valve bypass	X		
Deaerator Assembly:			
One (1) 100% capacity feedwater pump	X		
Two (2) Feedwater pumps	X		
Platforms and ladders.		X	
Trim including safety valve and gauge glass.	X		



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Stack Assembly	Included	Not include	Option
30" diameter by 40 ft. high economizer top mounted stack, fabricated of 1/4" carbon steel plate.	X		
All necessary nuts, bolts and gaskets as required for flanged bolt field erection.	X		
Platforms & ladders to access EPA ports.	X		
Auxiliary's)			
SCR system (AFCU, vaporization skid, storage etc. to be by others)		X	
Chemical Dosing System		X	
Blowdown Tank		X	
Special Tools		X	
Spare parts		X	
Gas PRV	X		
Insulation of Ducts, Stack, drum heads		X	
Commissioning Spares	X		
Motor controls & Starters		X	
Miscellaneous			
Freight To Jobsite		X	
Field Engineering Service (per diem)		X	
Equipment off loading or Installation		X	
Interconnecting Piping, Wiring & Tubing between skid mounted equipment		X	

Terminal Points

The terminal points list is intended to define the limits of the scope of supply included in this proposal. Rentech will furnish the equipment and materials inside these terminal points as defined further in this proposal.

Steam

- At the outlet of the superheater outlet.

Water

- At the inlet of the FW control valve station. (piping between deaerator and FW control valve station by others)

Fuel

- Inlet to burner main gas fuel train

Electrical

- Inlet to miscellaneous connections for electrical equipment..

Structural

- Foundations and anchor bolts provided by others.



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Exhaust Gas

- Stack outlet

Combustion Air

- Forced draft fan inlet

Instrument Air

- Inlet to miscellaneous connections for control equipment.

Predicted Performance

The performance of each packaged boiler is as detailed below:

Fuel Fired		Natural Gas
DESCRIPTION	UNITS	
System Performance		
Steam Flow	Lb/hr	20,000 (net)
Steam Pressure	PSIG	150
Steam Purity @ Drum Outlet	PPM TDS	1
Steam Temperature (100% - 25% MCR)	°F	460
System Efficiency	%	83.5
Emissions		
NOx	PPM @ 3% O2	9
CO	PPM @ 3% O2	25
VOC	PPM @ 3% O2	3
PM10	lb/mmbtu	0.005

Notes:

1. System performance guarantees are at 100% MCR only.
2. Feedwater temperature to boiler is 228°F.
3. Ambient temperature is 80°F.
4. The blowdown rate is as defined in the attached Predicted Operating Performance Tables.
5. Feedwater analysis must meet suggested Water Quality Limits per latest edition of ASME.
6. Boiler performance will be measured by a performance test based upon the principles of ASME PTC 4.1. Testing is to be by others.
7. The steam conditions are at the Rentech terminal points.
8. Emission guarantees are from 25% to 100% MCR. Refer to the attached burner proposal for other qualifications that apply to the above emission guarantees.

ASME Heating Surface

Convection Heating Surface	2160 sq. ft.
Radiant Heating Surface	684 sq. ft.
Total Heating Surface	2844 sq. ft.
Furnace Volume	1100 cu. ft.



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COMMERCIAL INFORMATION

Price, FCA manufacturing plant Abilene, Texas

Capacity / Operating Pressure	Qty	Budget Price
24,000 lbs/hr @ 150psig	1	\$1,500,000.00

Refer to attached project notes and clarifications. Prices quoted do not include applicable taxes. Pricing is valid for 30 days from the date of this proposal.

Terms of Payment

- 10% With receipt of Purchase Order
- 10% Upon submittal of General Arrangement Drawings
- 30% Upon receipt of boiler tubes
- 20% Upon receipt of drum cylinders
- 10% Upon stabbing first tube
- 20% Upon shipment

Payment Terms: Net 30 from receipt of invoice.

Warranty: 12 months from acceptance, not to exceed 18 months from shipment
The design and workmanship of the membrane water cooled furnace front wall will be warranted for five (5) years from date of acceptance.

Shipment:

The following preliminary schedule is provided in full accordance with your specifications:

- Submittal of General Arrangement drawing with loadings and anchor bolt locations, ASME Code Calculations 8 weeks after receipt of purchase order. Drawings will consist of one set of prints and one diskette containing the drawings, in AutoCAD Release 12.
- Remaining submittal drawings submitted approximately 8-10 weeks after receipt of purchase order.
- Return of approved drawings 2 weeks after receipt of drawings.

- Shipment 36 weeks after drawing approval with authorization to purchase major materials upon receipt of purchase order
- The equipment as offered will be shipped FCA rail Natchez Adams County, Mississippi (subject to clearance availability).



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Approximate Unit Dimensions and Weight

Height to Steam Outlet	13'-4"
Width	11'-2"
Length Including Burner Windbox	25'-6"
Boiler Dry Weight, lbs.	56,000

Thank you for your interest in doing business with RENTECH BOILER SYSTEMS, INC. We look forward to providing a prompt response to all of your questions, attention to all details, and a top quality boiler package. Please do not hesitate to contact myself if you have any questions, or concerns.

Sincerely,

Harry Kumpula
Rentech Boiler Systems Inc.

Specification for Start-Up Boiler
ATTACHMENT A – Start-Up Boiler Data Sheet

By: J.Foster - 10/15/2007
 Checked by: G.Pratt - 10/15/2007
 REV A

Start-Up Boiler

Heat Duty	30	MMBtu/hr
Steam Flow before deaerator pegging	20,000 Minimum	lb/hr
Deaerator operating pressure	5 psig	
Makeup Temperature	70	deg F
Steam Outlet Temperature	100	Deg F superheat
Steam Outlet Pressure	150	psia
Natural Gas Data		
HHV (average between Apr 2003 and Apr 2004)	1,020	Btu/scf
C6	0.03	
nitrogen	0.04	
methane	96.11	
carbon dioxide	1.24	
ethane	1.80	
propane	0.30	
i-butane	0.05	
n-butane	0.05	
i-pentane	0.00	
n-pentane	0.00	
By Vendor		
Heat Duty	30.94	MMBtu/hr <i>Input</i>
Steam Flow	24,000	lb/hr
Feedwater Inlet Temperature	228° F	deg F (<i>Into Economizer</i>)
Feedwater Inlet Pressure	2.50	deg F <i>PSIG @ Pump</i>
Steam Outlet Temperature	460° F	Deg F superheat
Steam Outlet Pressure	150	psia
Exhaust Temperature	360° F	deg F (<i>Out of Economizer</i>)
Exhaust Velocity	60	ft/s
Stack Diameter	30"	<i># inches</i>
Stack Height	40'	ft (<i>Above grade</i>)
Emissions	Emissions Factor (lb/MMBtu) (Natural Gas)	Emissions Factor (lb/MMBtu) (Propane)

Attachment B.1-4 (3 Pages)

BEST™ Version 2.48
Product Data: 6/17/2008

Optimization 1.opt
Revised 6/26/2009 5:08:32 PM

Customer

Solar Project
Worley Parsons
Mohave, CA

Contact

SPX Cooling Technologies, Inc.
PO Box 1055
El Dorado, CA 95623-1055
Tel 916-705-2369
Fax 913-693-9639

Definition

Model (ID 9)	F477-6.6-7	Fill	DF254-6.6
Fan	336HP7-9	Eliminator	TU12C
Stack	336"x14' Rflx/V Rib	Louver	No louvers
Speed Reducer	4000, 12.18:1	Spray System	24x8 Rotomold
Drive	301 Shaft	Nozzles	252 NS5A-120 per cell
Motor	1800 rpm, TEFC		28 NS6-160 per cell

Dimensions

Tower Width	42.67 ft	Basin Width Min	48.33 ft
Tower Length	294.67 ft	Basin Length Min	295.00 ft
Tower Height (TOC)	45.34 ft	Basin Depth	4.00 ft
Fan Deck Height (TOC)	31.59 ft	Water Depth	3.00 ft
Static Lift (TOC)	19.62 ft	Curb Offset Min	3.17 ft
Pump Head (TOC)	26.09 ft	Plenum Height	7.69 ft
Air Inlet Elev. (TOC)	10.00 ft	Effective Air Inlet Ht.	11.00 ft
Closed Sides	0	Transverse Partitions	Yes
Closed Ends	2	Wind Walls	Yes

Conditions

Tower Water Flow	94623 gpm	Altitude	0 ft
Hot Water Temperature	105.30 °F	Barometric Pressure	29.92 in Hg
Range	17.00 °F	Air Density In	0.06869 lb/ft ³
Cold Water Temperature	88.30 °F	Air Density Out	0.06924 lb/ft ³
Approach	8.70 °F	Humidity Ratio In	0.0141
Wet-Bulb Temperature	79.60 °F	Humidity Ratio Out	0.0424
Dry-Bulb Temperature	112.86 °F	Wet-Bulb Temp. Out	99.39 °F
Relative Humidity	23.5 %	Evaporation	1729 gpm
Total Dissolved Solids	5000 ppm	Drift	<0.0010 %
Site Factor	1.030		

Thermal Analysis

Fill Area	11760 ft ²	Water Rate	8.046 gpm/ft ²
Fill Height	6.56 ft	Dry Air Rate	43.42 lb/min/ft ²
KaV/L (CTI)	1.647	L/G	1.543

Air Flow

Flow/Fan Tower Air Inlet	1077000 cfm	External P.D. In	0.000 in H2O
Flow/Fan Discharge	1098000 cfm	Entrance P.D.	0.047 in H2O
Inlet Velocity	1166 fpm	Louver P.D.	0.000 in H2O
Fill Velocity	647 fpm	Falling Water P.D.	0.137 in H2O
Eliminator Velocity	654 fpm	Fill P.D.	0.537 in H2O
Discharge Velocity	1398 fpm	Eliminator P.D.	0.066 in H2O
Air Inlet Pressure Ratio	9.544	Plenum P.D.	0.037 in H2O
Air Inlet Guide	No	Buoyancy P.D.	0.000 in H2O
Inlet P.D. Vel. Heads	0	External P.D. Out	0.000 in H2O
Outlet P.D. Vel. Heads	0	Static P.D.	0.824 in H2O
		Velocity P.D.	0.113 in H2O

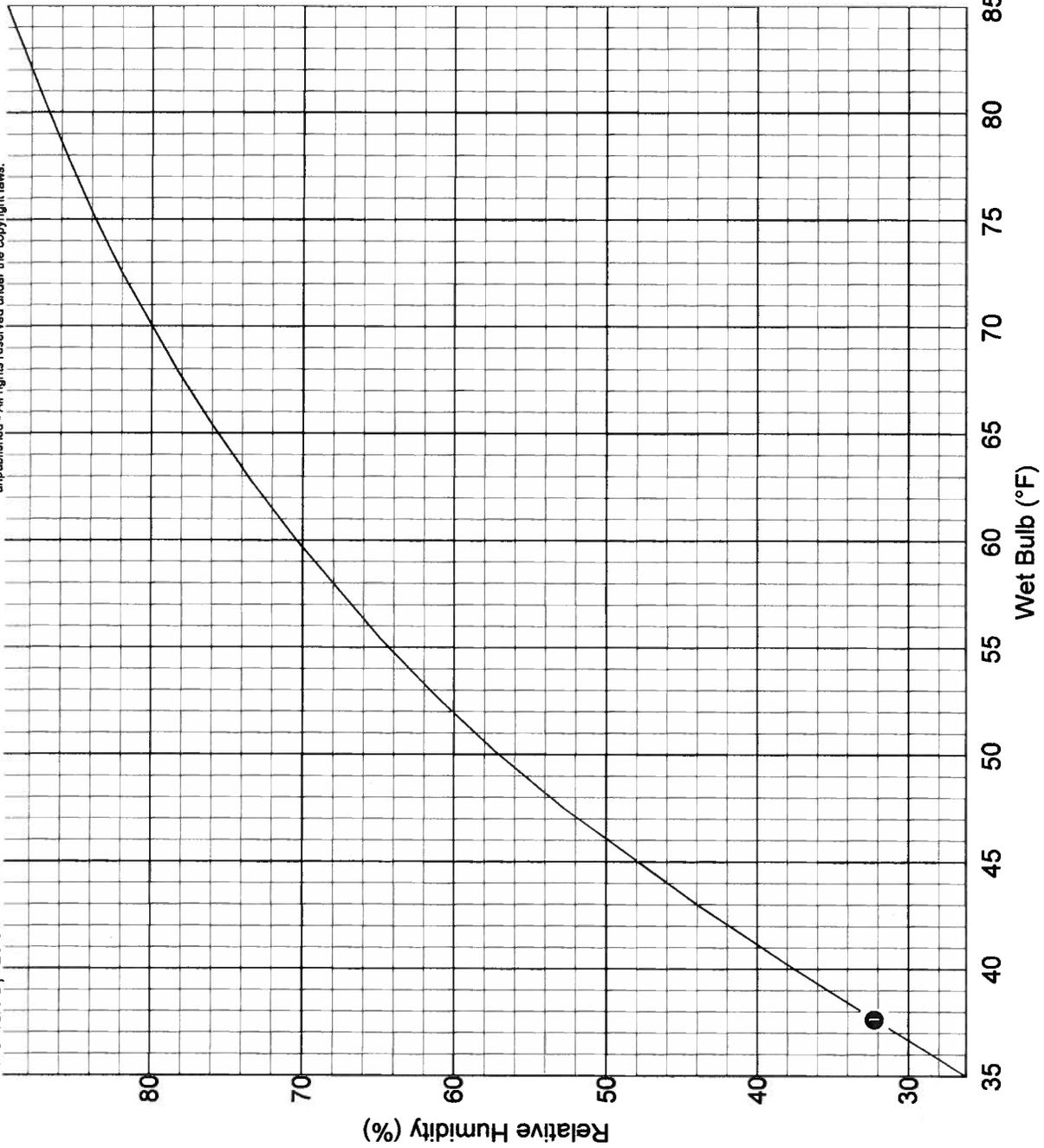
Fan Information

Fan Speed (100 %)	146 rpm	Fan Tip Speed	12840 fpm
Fan Power	224.7 Hp	Static Fan Efficiency	63.4 %
Motor Output	233.6 BHp	Total Fan Efficiency	72.0 %
Motor Capacity	250.0 BHp	Fan Pitch	14.5 °

Fill note: Tall fill height requires review by Engineering.

**Estimated Fogging Frequency Curve for
Worley Parsons - Solar Project
Mohave, CA**

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● 17 °F Range

**SPX Cooling Technologies
TRACS Version 18-SEP-08**

Model F477-6.6-07
Number of Cells 7
Motor Output 233.6HP
Motor RPM 1800
Fan 336HP7-9
Fan RPM 146
Fan Speed (Full Speed)

Design Conditions:
Flow Rate 94623GPM
Hot Water 105.30°F
Cold Water 88.30°F
Wet-Bulb 79.60°F

Curve Conditions:
Fan Pitch Constant
Flow Rate 94623GPM
(100% Design Flow)

Tangency 100.0%

FOGGING FREQUENCY CURVE: The curve shown to the left is referred to as a 'Fogging Frequency Curve'. The Fogging Frequency Curve separates entering cooling tower conditions that produce fog at the discharge (Top-Left region of chart) from those that do not produce fog (Bottom-Right region of chart)

Attachment B.1-5

Typical Diesel Fuel Analysis

Parameter	Average Data
Carbon %	85.86
Hydrogen %	13.35
Oxygen %	0.65
Nitrogen %	0.097
Sulfur %	0.0015 – 0.05
Ash %	0.01
Btu/gal (HHV)	~139,000
Lbs/gal	~6.87
Data derived from AB2588 fuel testing for sources in the South Coast AQMD. Total number of samples used for averages = 10.	

Attachment B.1-6 Natural Gas Analysis Data

Component Analysis (Average)	Chemical Analysis, % by Wt. (Average)
Methane - 95% Ethane - 2% Nitrogen - 2% Carbon Dioxide - 1%	Carbon - 72.8% Hydrogen - 23.79% Nitrogen - 1.08% Oxygen - 2.33% Sulfur - 0.25 gr/100 scf HHV 1020-1027 btu/scf HHV used 1020 btu/scf

Solutia Inc.

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: THERMINOL® VP1 Heat transfer fluid

Reference Number: 00000000211

Date: 05/16/2006

Company Information:

United States:

Solutia Inc.
575 Maryville Center Drive, P.O. Box 66760
St. Louis, MO 63166-6760
Emergency telephone: Chemtrec: 1-800-424-9300
International Emergency telephone: Chemtrec: 703-527-3887
Non-Emergency telephone: 1-314-674-6661

Canada:

Solutia Canada Inc.
6800 St. Patrick Street
LaSalle, PQ H8N 2H3
Emergency telephone: CANUTEC: 1-613-996-6666
Non-Emergency telephone: 1-314-674-6661

Mexico:

Solutia MEXICO, S. DE R.L. DE C.V.
Prol. Paseo de la Reforma 2654
Local 501, Piso-5
Col. Lomas Altas
11950 Mexico, D.F.
Emergency telephone: SETIQ: (in Mexico) 01-800-002-1400
Non-Emergency telephone: (in Mexico) 01-55-5259-6800

Brazil:

Solutia Brazil Ltd.
Avenue Carlos Marcondes, 1200
CEP: 12241-420-São José dos Campos/SP-Brazil
Emergency telephone: 55 12 3932 7100 (PABX)
Non-Emergency telephone: 55 11 3365 1800 (PABX)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Form: liquid
Colour: clear to colourless
Odour: characteristic

WARNING STATEMENTS

WARNING!
Causes eye irritation
Causes skin irritation
Causes respiratory tract irritation
Contains material which can cause liver and nerve damage

POTENTIAL HEALTH EFFECTS

Likely routes of exposure:	eye and skin contact inhalation
Eye contact:	Highly irritating to eyes.
Skin contact:	Highly irritating to skin. Prolonged or repeated skin contact may result in irritant dermatitis.
Inhalation:	Severely irritating if inhaled. No more than slightly toxic if inhaled. Significant adverse health effects are not expected to develop under normal conditions of exposure.
Ingestion:	No more than slightly toxic if swallowed. Significant adverse health effects are not expected to develop if only small amounts (less than a mouthful) are swallowed.
Signs and symptoms of overexposure:	headache fatigue nausea/vomiting indigestion abdominal pain tremors
Target organs/systems:	May cause liver damage May cause nerve damage

Refer to Section 11 for toxicological information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Components</u>	<u>CAS No.</u>	<u>Average concentration</u>	<u>Concentration range</u>	<u>Units</u>
diphenyl ether	101-84-8	73.5		%
biphenyl	92-52-4	26.5		%

4. FIRST AID MEASURES

If in eyes:	Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.
If on skin:	Immediately flush the area with plenty of water. Remove contaminated clothing. Wash skin gently with soap as soon as it is available. Get medical attention. Wash clothing before reuse.
If inhaled:	Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin and clothing.

If swallowed: Immediate first aid is not likely to be required.
A physician or Poison Control Center can be contacted for advice.
Wash heavily contaminated clothing before reuse.

5. FIRE FIGHTING MEASURES

Fire point: 127 C

Hazardous products of combustion: carbon monoxide (CO); carbon dioxide; hydrocarbons

Extinguishing media: Water spray, foam, dry chemical, or carbon dioxide

Unusual fire and explosion hazards: None known

Fire fighting equipment: Firefighters, and others exposed, wear self-contained breathing apparatus.
Equipment should be thoroughly decontaminated after use.

Miscellaneous advice: This product is not classified as a fire-resistant heat transfer fluid.
Precautions to avoid sources of ignitions should be taken.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protection recommended in section 8.

Environmental precautions: Keep out of drains and water courses.

Methods for cleaning up: Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Flush spill area with water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling

Avoid contact with eyes, skin and clothing.
Avoid breathing vapour or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Precautions against ignitions and fire should be taken with this product.
Heat transfer fluids are intended for INDIRECT heating purposes ONLY.
This product has not been approved for food grade use.

Emptied containers retain vapour and product residue. Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. Do not cut, drill, grind or weld on or near this container. The reuse of this material's container for non industrial purposes is prohibited and any reuse must be in consideration of the data provided in this material safety data sheet.

Storage

General: Stable under normal conditions of handling and storage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne exposure limits: (ml/m³ = ppm)

THERMINOL® VP1 No specific occupational exposure limit has been established.

biphenyl ACGIH TLV: 0.2 ml/m³ ; mist ; 8-hr TWA
OSHA PEL: 0.2 ml/m³ ; 1.0 mg/m³ ; ; 8-hr TWA
Mexican OEL: 0.2 ml/m³ ; 1.5 mg/m³ ; ; 8-hr TWA
Mexican OEL: 0.6 ml/m³ ; 4 mg/m³ ; ; 15-min STEL

diphenyl ether ACGIH TLV: 1 ml/m³ ; ; 8-hr TWA
ACGIH TLV: 2 ml/m³ ; ; 15-min STEL
OSHA PEL: 1 ml/m³ ; 7 mg/m³ ; ; 8-hr TWA
Mexican OEL: 1 ml/m³ ; 7 mg/m³ ; ; 8-hr TWA
Mexican OEL: 2 ml/m³ ; 14 mg/m³ ; ; 15-min STEL

Eye protection: Wear safety goggles.
Have eye flushing equipment available.

Hand protection: Wear chemical resistant gloves.
Consult the glove/clothing manufacturer to determine the appropriate type
glove/clothing for a given application.
See Solutia Glove Facts for permeation data.

Body protection: Wear suitable protective clothing.
Consult the glove/clothing manufacturer to determine the appropriate type
glove/clothing for a given application.
Wear full protective clothing if exposed to splashes.
Wash contaminated skin promptly.
Launder contaminated clothing and clean protective equipment before reuse.
Wash thoroughly after handling.
Have safety shower available at locations where skin contact can occur.

Respiratory protection: Avoid breathing vapour or mist.
Use approved respiratory protection equipment (full facepiece recommended) when
airborne exposure limits are exceeded.
If used, full facepiece replaces the need for face shield and/or chemical goggles.
Consult the respirator manufacturer to determine the appropriate type of equipment for
a given application.
Observe respirator use limitations specified by the manufacturer.

Ventilation: Provide natural or mechanical ventilation to control exposure levels below airborne
exposure limits.
If practical, use local mechanical exhaust ventilation at sources of air contamination
such as processing equipment.

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure
limits legislated for the province in which the substance will be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Flash point: 110 C Pensky-Martens closed tester
124 C Cleveland Open Cup

Mutagenicity: No genetic effects were observed in standard tests using bacterial and animal cells.

Components

Data from Solutia studies and/or the available scientific literature on the components of this material which have been identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200) or the Canadian Hazardous Products Act are discussed below.

biphenyl	Chronic exposure has been reported to cause headache, fatigue, nausea, indigestion, abdominal pain, tremor, central and peripheral nerve damage and liver injury. Slightly toxic following oral administration. Practically nontoxic after skin application in animal studies. Practically non irritating to skin (rabbit). Slightly irritating to eyes (rabbit). No mortality or signs of toxicity at the highest level achievable. Irritating to respiratory system in animal models. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies. Produced no dermal sensitization (guinea pigs). No effects on offspring observed in laboratory animals in the presence of maternal toxicity. No genetic effects were observed in standard tests using bacterial and animal cells.
diphenyl ether	Predictive patch testing on human volunteers did not produce irritation or sensitization. Slightly toxic following oral administration. Practically nontoxic after skin application in animal studies. Slightly irritating to eyes (rabbit). Slightly irritating to skin (rabbit). Repeated exposure produced respiratory tract irritation in animal models. Repeated exposure produced eye irritation in animal models. No genetic effects were observed in standard tests using bacterial and animal cells.

12. ECOLOGICAL INFORMATION

Environmental Toxicity

Invertebrates	48 h, EC50	Water flea (<i>Daphnia magna</i>)	2.4 mg/l
Fish:	96 h, LC50	Rainbow trout (<i>Oncorhynchus mykiss</i>)	7.6 mg/l
	96 h, LC50	Fathead minnow (<i>Pimephales promelas</i>)	24 mg/l
Algae:	96 h, EC50	Algae (<i>Selenastrum capricornutum</i>)	1.3 mg/l
Biodegradation	Modified SCAS (OECD 302A) Primary degradation 99 %		

13. DISPOSAL CONSIDERATIONS

US EPA RCRA Status: This material when discarded may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR 261.24, due to its toxicity characteristic. This material should be analyzed in accordance with Method 1311 for the compound(s) below.

US EPA RCRA D018 Compound/Characteristic: BENZENE

hazardous waste number:

Disposal considerations: Incineration

Miscellaneous advice: This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards.
Solutia operates a used fluid return program for certain fluids under these used oil standards. Contact your Sales Representative for details.
This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT

Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
biphenyl
Hazard Class: 9
Hazard Identification number: UN3082
Packing Group: Packing Group III
Transport label: Class 9
Special provisions: This material meets the definition of a marine pollutant.
Other: Applies ONLY to containers with an RQ or for shipments in bulk via water transportation.

Canadian TDG

Other: Not regulated for transport.

Reportable Quantity/Limit

US DOT RQ 100 lb *biphenyl*
Package size containing reportable amount: 377 lb

ICAO/IATA Class

Other: See DOT Information

15. REGULATORY INFORMATION

All components are in compliance with the following inventories: U.S. TSCA, EU EINECS, Canadian DSL, Australian AICS, Korean, Japanese ENCS, Phillipine PICCS, Chinese

Canadian WHMIS classification: D2(A) - Materials Causing Other Toxic Effects
D2(B) - Materials Causing Other Toxic Effects

SARA Hazard Notification:

Hazard Categories Under Title III Rules (40 CFR 370): Immediate
Delayed

Section 302 Extremely Hazardous Substances: Not applicable

Section 313 Toxic Chemical(s): biphenyl

CERCLA Reportable Quantity:

100 lbs biphenyl

For this/these chemicals, release of more than the Reportable Quantity to the environment in a 24 hour period requires notification to the National Response Center (800-424-8802 or 202-426-2675).

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

Safety data sheet also created in accordance with Brazilian law NBR 14725

16. OTHER INFORMATION

Product use: Heat transferring agents

Reason for revision: Significant changes to the following section(s):, Section 1

	Health	Fire	Reactivity	Additional Information
Suggested NFPA Rating	2	1	0	
Suggested HMIS Rating:	2	1	0	G

Prepared by the Solutia Hazard Communication Group. Please consult Solutia @ 314-674-6661 if further information is needed.

TM, ® is a registered trademark of Solutia Inc.

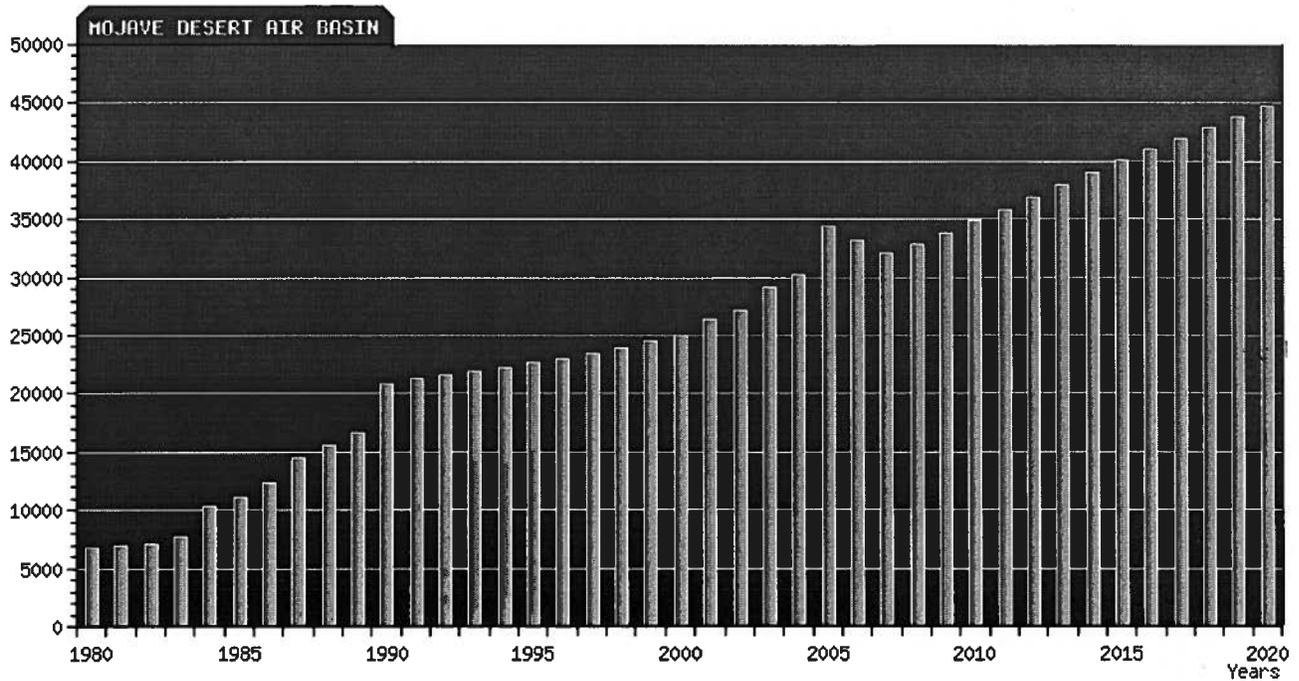
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Responsible Care® is a registered trademark of the American Chemistry Council.

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MOJAVE DESERT AIR BASIN
Daily Vehicle Miles Traveled
All Vehicles
 By Thousands of Miles / Day

Attachment B.1-8
(4 pages)



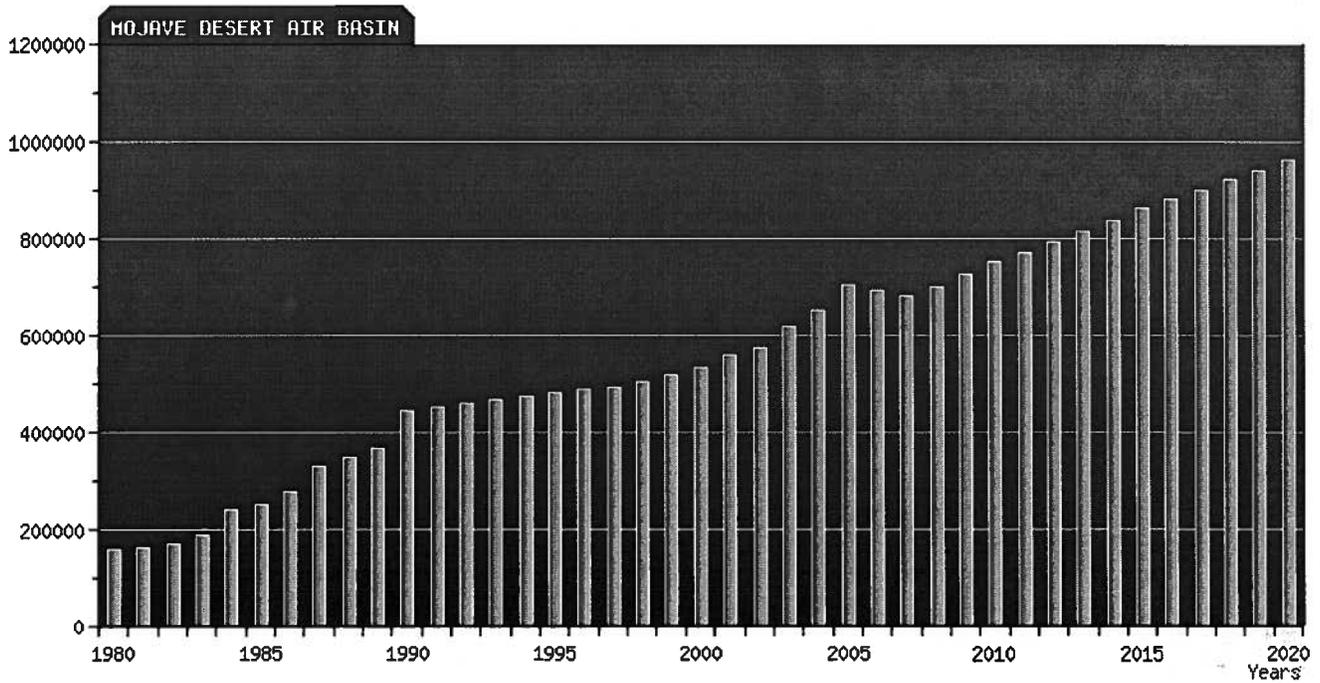
Passenger Cars | Light-Duty Trucks 1 (<3,750 lbs) | Light-Duty Trucks 2 (3,751-5,750 lbs)
 Medium-Duty Trucks (5,751-8,500 lbs) | Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)
 Medium Heavy-Duty Trucks (14,001-33,000 lbs) | Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)
 Heavy Heavy-Duty Trucks (>33,000lbs) | Urban Buses | Motorcycles | Motor Homes | School Buses | Other Buses
 [New-Query]

Year	Thousands of Miles / Day	Year	Thousands of Miles / Day
1980	6,745	2001	26,444
1981	6,895	2002	27,185
1982	7,070	2003	29,211
1983	7,766	2004	30,291
1984	10,341	2005	34,411
1985	11,130	2006	33,169
1986	12,323	2007	32,059
1987	14,480	2008	32,869
1988	15,516	2009	33,820
1989	16,740	2010	34,880
1990	20,896	2011	35,840
1991	21,369	2012	36,871
1992	21,670	2013	37,963
1993	21,858	2014	39,050
1994	22,192	2015	40,184
1995	22,712	2016	41,055
1996	23,028	2017	41,960
1997	23,498	2018	42,884
1998	23,888	2019	43,811
1999	24,575	2020	44,740
2000	24,999		

[Download Data]

Source: EMFAC2007 ver2.3(Apr03-Default Activity)

MOJAVE DESERT AIR BASIN Vehicle Population All Vehicles By Number of Vehicles



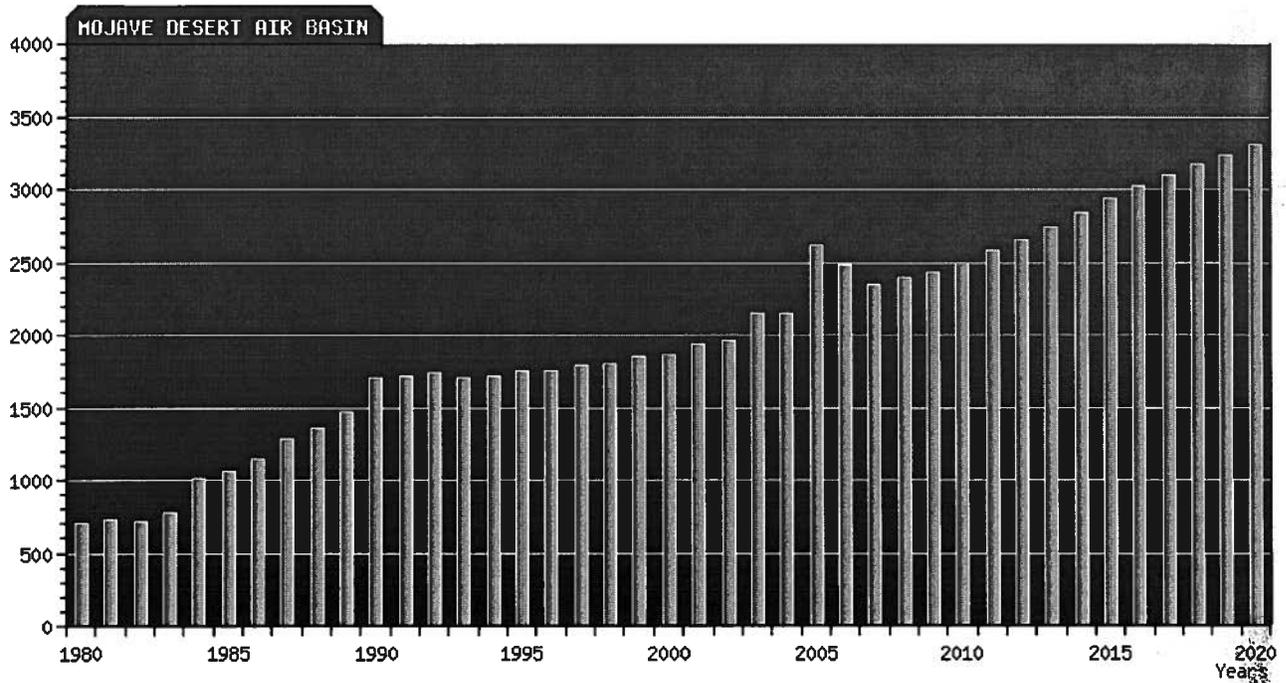
Passenger Cars | Light-Duty Trucks 1 (<3,750 lbs) | Light-Duty Trucks 2 (3,751-5,750 lbs)
 Medium-Duty Trucks (5,751-8,500 lbs) | Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)
 Medium Heavy-Duty Trucks (14,001-33,000 lbs) | Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)
 Heavy Heavy-Duty Trucks (>33,000lbs) | Urban Buses | Motorcycles | Motor Homes | School Buses | Other Buses
 [New-Query]

Year	Number of Vehicles	Year	Number of Vehicles
1980	160,823	2001	560,579
1981	164,766	2002	575,301
1982	171,723	2003	618,084
1983	190,544	2004	650,784
1984	239,494	2005	703,353
1985	253,690	2006	690,924
1986	277,582	2007	679,810
1987	329,144	2008	701,710
1988	347,746	2009	725,436
1989	366,429	2010	750,014
1990	443,767	2011	771,369
1991	453,079	2012	793,346
1992	459,169	2013	815,965
1993	467,238	2014	838,566
1994	474,636	2015	861,829
1995	481,293	2016	881,065
1996	490,361	2017	900,741
1997	492,418	2018	920,874
1998	502,792	2019	941,470
1999	518,445	2020	962,539
2000	532,579		

[Download Data]

Source: EMFAC2007 ver2.3(Apr03-Default Activity)

MOJAVE DESERT AIR BASIN
Daily Vehicle Fuel Consumption (Gasoline and Diesel)
All Vehicles
 By Thousands of Gallons / Day



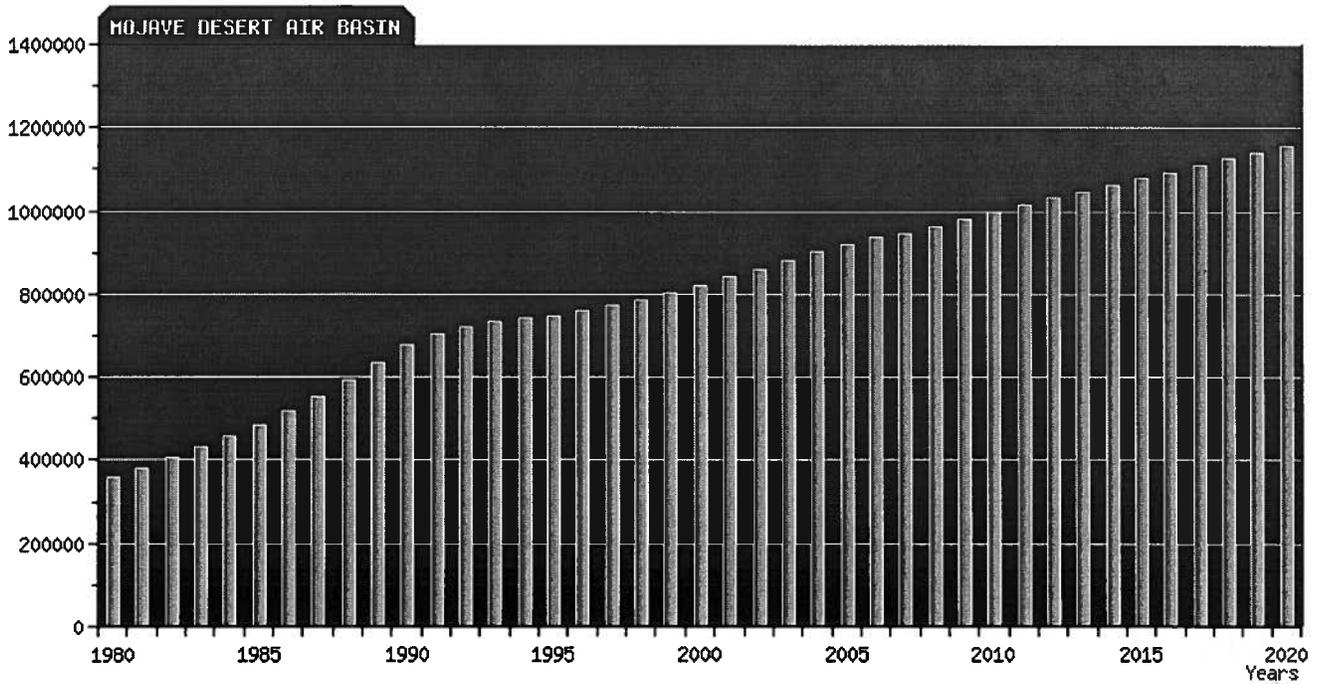
Gasoline | Diesel
 Passenger Cars | Light-Duty Trucks 1 (<3,750 lbs) | Light-Duty Trucks 2 (3,751-5,750 lbs)
 Medium-Duty Trucks (5,751-8,500 lbs) | Light Heavy-Duty Trucks 1 (8,501-10,000 lbs)
 Medium Heavy-Duty Trucks (14,001-33,000 lbs) | Light Heavy-Duty Trucks 2 (10,001-14,000 lbs)
 Heavy Heavy-Duty Trucks (>33,000lbs) | Urban Buses | Motorcycles | Motor Homes | School Buses | Other Buses
 [New-Query]

Year	Thousands of Gallons / Day	Year	Thousands of Gallons / Day
1980	700	2001	1,937
1981	723	2002	1,958
1982	722	2003	2,142
1983	783	2004	2,153
1984	1,015	2005	2,623
1985	1,066	2006	2,485
1986	1,143	2007	2,351
1987	1,287	2008	2,392
1988	1,363	2009	2,434
1989	1,464	2010	2,499
1990	1,699	2011	2,583
1991	1,717	2012	2,660
1992	1,738	2013	2,745
1993	1,707	2014	2,841
1994	1,716	2015	2,933
1995	1,748	2016	3,022
1996	1,749	2017	3,095
1997	1,792	2018	3,167
1998	1,807	2019	3,238
1999	1,850	2020	3,306
2000	1,862		

[Download Data]

Source: pending

MOJAVE DESERT AIR BASIN Human Population By Number of People



[New-Query]

Year	Number of People	Year	Number of People
1980	357,420	2001	841,889
1981	380,477	2002	860,189
1982	405,712	2003	880,956
1983	430,747	2004	901,393
1984	456,619	2005	919,846
1985	485,698	2006	936,128
1986	518,528	2007	948,260
1987	554,728	2008	965,228
1988	593,363	2009	982,198
1989	634,383	2010	999,166
1990	676,413	2011	1,015,079
1991	702,971	2012	1,030,989
1992	721,925	2013	1,046,901
1993	732,661	2014	1,062,813
1994	741,228	2015	1,078,726
1995	749,355	2016	1,094,635
1996	758,814	2017	1,110,548
1997	771,928	2018	1,126,459
1998	784,926	2019	1,142,370
1999	802,230	2020	1,158,282
2000	822,210		

[Download Data]

Source: Developed using reports from the California Department of Finance. [See references](#)