Appendix G1
Air Quality – Construction Emissions

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Table 1
Summary of Construction Emissions
Cabrillo Port LNG Deepwater Port

EMISSIONS BY ACTIVITY

Construction Activity	Daily Emissions (lb/day)						Total Emissions (tons)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Mooring/FSRU Installation	4,474	3.1	5,512	259	259	648	27.4	0.019	33.8	1.6	1.6	4.0
Offshore Pipeline Installation	5,724	4.0	7,051	332	332	830	97.0	0.068	119.5	5.6	5.6	14.1
Shore Crossing Construction	1,323	0.9	1,625	120	88	191	37.8	0.027	46.4	3.5	2.5	5.5
Onshore Pipeline Installation - Trenching	276	0.3	413	31	24	43	24.8	0.025	37.2	2.8	2.1	3.8
Onshore Pipeline Installation - Pipelay	237	1.3	1,123	149	49	60	17.3	0.10	85.5	12.1	3.9	4.5
Onshore Pipeline Installation - Boring	368	0.3	449	64	33	53	5.5	0.0040	6.7	0.96	0.50	0.79
Onshore Pipeline Installation - Drilling	865	0.6	1,060	93	62	125	13.0	0.009	15.9	1.4	0.9	1.9
Worker Commuting	11	1.2	179	3	3	6	0.5	0.057	8.5	0.1	0.1	0.3
TOTAL	-	-	-	-	-	-	**223**	**0.31**	**353**	**28**	**17**	**35**

EMISSIONS BY LOCATION

Construction Activity	Daily Emissions (lb/day)						Total Emissions (tons)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Federal Waters												
Mooring/FSRU Installation	4,474	3.1	5,512	259	259	648	27.4	0.02	33.8	1.6	1.6	4.0
Offshore Pipeline Installation	5,724	4.01	7,051	332	332	830	82.4	0.06	101.5	4.8	4.8	11.9
Subtotal							**109.8**	**0.08**	**135.3**	**6.4**	**6.4**	**15.9**
Ventura County												
Offshore Pipeline Installation	5,724	4.0	7,051	332	332	830	14.5	0.010	17.9	0.8	0.8	2.1
Shore Crossing Construction	1,323	0.9	1,625	120	88	191	37.8	0.027	46.4	3.5	2.5	5.5
Onshore Pipeline Installation - Trenching	276	0.3	413	31	24	43	16.5	0.017	24.8	1.9	1.4	2.6
Onshore Pipeline Installation - Pipelay	237	1.3	1,123	149	49	60	11.5	0.066	57.0	8.0	2.6	3.0
Onshore Pipeline Installation - Boring	368	0.3	449	64	33	53	5.5	0.004	6.7	1.0	0.5	0.8
Worker Commuting	8	0.9	135	2	2	4	0.3	0.030	4.5	0.1	0.1	0.1
Subtotal							**86.2**	**0.15**	**157.3**	**15.3**	**8.0**	**14.0**
Los Angeles County												
Onshore Pipeline Installation - Trenching	276	0.28	413	31	24	43	8.3	0.0084	12.4	0.94	0.71	1.3
Onshore Pipeline Installation - Pipelay	237	1.3	1,123	149	49	60	5.8	0.033	28.5	4.0	1.3	1.5
Onshore Pipeline Installation - Drilling	865	0.62	1,060	93	62	125	13.0	0.0092	15.9	1.4	0.93	1.9
Worker Commuting	3	0.30	44	0.7	0.7	1.5	0.2	0.027	4.0	0.1	0.06	0.1
Subtotal							**27.2**	**0.08**	**60.8**	**6.4**	**3.0**	**4.8**
TOTAL	-	-	-	-	-	-	**223**	**0.31**	**353**	**28**	**17**	**35**

Table 2
Emissions from Mooring/FSRU Installation
Cabrillo Port LNG Deepwater Port

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Average Load	Total Working Days[d]	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
								NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
AHTS[a]	2	15,000	diesel	24	10%	20	72,000	1,095	0.8	1,349	63	63	159	11.0	0.0077	13.5	0.63	0.63	1.59
Crew Boat	1	1,500	diesel	16	23%	20	5,520	84	0.06	103	5	5	12	0.8	0.0006	1.0	0.05	0.05	0.12
Construction Barge[b]	1	8,000	diesel	24	43%	20	82,560	1,256	0.9	1,547	73	73	182	12.6	0.0088	15.5	0.73	0.73	1.82
Tug[c]	1	6,500	diesel	24	9%	20	14,040	214	0.1	263	12	12	31	2.1	0.0015	2.6	0.12	0.12	0.31
Ocean Going Tug	1	25,000	diesel	24	20%	1	120,000	1,825	1.3	2,249	106	106	265	0.9	0.0006	1.1	0.05	0.05	0.13
TOTAL								**4,474**	**3**	**5,512**	**259**	**259**	**648**	**27.4**	**0.019**	**33.8**	**1.6**	**1.6**	**4.0**

Notes:
a. AHTS also handles risers
b. Barge used to transport anchors and equipment
c. Tug boat used as riser installation vessel.
d. Total vessel-days equivalent to task estimates, multiple vessels used in some tasks, composite daily estimate is conservative for planned activities due to vessel overlap

Table 3
Emissions from Offshore Pipeline Installation
Cabrillo Port LNG Deepwater Port

Equipment Type[a]	No. of Devices	Engine Rating per Device (bhp)	Daily Operation per Device (hrs/day)	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
							NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Pipe Laying Vessel	1	25,000	24	47%	35	282,000	4,290	3.0	5,285	249	249	622	75.1	0.0526	92.5	4.35	4.35	10.88
AHTS[b]	2	15,000	24	10%	35	72,000	1,095	0.77	1,349	63	63	159	19.2	0.0134	23.6	1.11	1.11	2.78
Crew Boat	1	1,500	16	23%	35	5,520	84	0.1	103	5	5	12	1.5	0.0010	1.8	0.09	0.09	0.21
Tug Boat & Barge[c]	1	4,000	16	26%	10	16,640	253	0.2	312	15	15	37	1.3	0.0009	1.6	0.07	0.07	0.18
Dock Crane (35 ton)	1	130	1	80%	8	104	2	0.001	2	0.09	0.09	0.2	0.006	0.000004	0.008	0.0004	0.0004	0.001
TOTAL							**5,724**	**4**	**7,051**	**332**	**332**	**830**	**97.0**	**0.068**	**119.5**	**5.6**	**5.6**	**14.1**

Notes:
a. All equipment is diesel-fueled.
b. AHTS also provides welding power when needed.
c. Barge used to transport pipe and material off-shore (not powered) and tug boat pulls pipe barge.

Table 4
Emissions from Shore Crossing Construction
Cabrillo Port LNG Deepwater Port

EQUIPMENT EXHAUST EMISSIONS

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Daily Mileage per Device (mi/day)	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
In-hole head drive unit	1	400	diesel	6	-	100%	88	2,400	37	0.03	45	2	2	5	1.6	0.0011	2.0	0.09	0.09	0.23
Mud pumps	2	400	diesel	9	-	100%	88	7,200	110	0.08	135	6	6	16	4.8	0.0034	5.9	0.28	0.28	0.70
Solids control unit	1	500	diesel	9	-	100%	88	4,500	68	0.05	84	4	4	10	3.0	0.0021	3.7	0.17	0.17	0.44
Thrusting apparatus	1	300	diesel	6	-	100%	88	1,800	27	0.02	34	2	2	4	1.2	0.0008	1.5	0.07	0.07	0.17
Electrical generator	1	400	diesel	24	-	80%	85	7,680	117	0.08	144	7	7	17	5.0	0.0035	6.1	0.29	0.29	0.72
All Terrain Forklift	1	100	diesel	12	-	30%	60	360	5	0.004	7	0.3	0.3	1	0.2	0.0001	0.2	0.01	0.01	0.02
Mobile crane	1	400	diesel	7.2	-	80%	85	2,304	35	0.02	43	2	2	5	1.5	0.0010	1.8	0.09	0.09	0.22
Welding machines	3	100	diesel	12	-	80%	85	2,880	44	0.03	54	3	3	6	1.9	0.0013	2.3	0.11	0.11	0.27
Exit Hole Barge Tug	1	4,000	diesel	24	-	5%	35	4,800	73	0.05	90	4	4	11	1.3	0.0009	1.6	0.07	0.07	0.19
AHTS	1	15,000	diesel	24	-	10%	35	36,000	548	0.38	675	32	32	79	9.6	0.0067	11.8	0.56	0.56	1.39
*Contingency	1	700	diesel	24	-	100%	60	16,800	256	0.18	315	15	15	37	7.7	0.0054	9.4	0.44	0.44	1.11
18 Wheeler Truck	2	-	diesel	-	60	-	60	-	4	0.01	0.21	0.03	0.03	0.06	0.1	0.0004	0.01	0.001	0.001	0.002
Subtotal									**1,323**	**0.9**	**1,625**	**77**	**77**	**191**	**37.8**	**0.027**	**46.4**	**2.2**	**2.2**	**5.5**

FUGITIVE DUST EMISSIONS FROM PAVED AND UNPAVED ROADS IN CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All Terrain Forklift	1	1.6	0	1.6	60	-	-	-	0.58	0.09	-	-	-	-	0.017	0.003	-
18 Wheeler Truck	2	1.2	0.6	0.6	60	-	-	-	0.82	0.16	-	-	-	-	0.02	0.00	-
Subtotal						**-**	**-**	**-**	**1.4**	**0.3**	**-**	**-**	**-**	**-**	**0.04**	**0.01**	**-**

FUGITIVE DUST EMISSIONS FROM PAVED ROADS OUTSIDE CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
18 Wheeler Truck	2	58.8	58.8	0	60	-	-	-	37.4	9.3	-	-	-	-	1.12	0.28	-
Subtotal						**-**	**-**	**-**	**37.4**	**9.3**	**-**	**-**	**-**	**-**	**1.12**	**0.28**	**-**

FUGITIVE DUST EMISSIONS FROM EARTHMOVING

Equipment Type	No. of Devices	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
				NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Track Backhoe	1	12	60	-	-	-	4.3	2.4	-	-	-	-	0.13	0.07	-
Subtotal				**-**	**-**	**-**	**4.3**	**2.4**	**-**	**-**	**-**	**-**	**0.13**	**0.07**	**-**

TOTAL EMISSIONS

Daily Emissions (lb/day)						Total Emissions (tons)					
NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
1,323	**0.9**	**1,625**	**120**	**88**	**191**	**38**	**0.027**	**46**	**3.5**	**2.5**	**5.5**

Table 5
Emissions from Onshore Pipeline Installation - Trenching
Cabrillo Port LNG Deepwater Port

EQUIPMENT EXHAUST EMISSIONS

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Daily Mileage per Device (mi/day)	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Trenching Machine	1	1,000	diesel	12	-	80%	180	9,600	146	0.10	180	8	8	21	13.1	0.0092	16.2	0.76	0.76	1.90
Track Backhoe	1	500	diesel	12	-	80%	180	4,800	73	0.05	90	4	4	11	6.6	0.0046	8.1	0.38	0.38	0.95
Front Loader	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Bulldozer	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Dragline	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Concrete Saw	1	50	gasoline	12	-	50%	180	300	2	0.087	76	0.1	0.1	3	0.2	0.0078	6.8	0.01	0.01	0.26
Subtotal									**276**	**0.3**	**413**	**16**	**16**	**43**	**24.8**	**0.025**	**37.2**	**1.4**	**1.4**	**3.8**

FUGITIVE DUST EMISSIONS FROM UNPAVED ROADS

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Front Loader	1	6.1	0	6.1	180	-	-	-	1.9	0.3	-	-	-	-	0.173	0.026	-
Subtotal						**-**	**-**	**-**	**1.9**	**0.3**	**-**	**-**	**-**	**-**	**0.17**	**0.03**	**-**

FUGITIVE DUST EMISSIONS FROM EARTHMOVING

Equipment Type	No. of Devices	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
				NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Track Backhoe	1	12	180	-	-	-	4.3	2.4	-	-	-	-	0.39	0.22	-
Bulldozer	1	12	180	-	-	-	4.3	2.4	-	-	-	-	0.39	0.22	-
Dragline	1	12	180	-	-	-	4.3	2.4	-	-	-	-	0.39	0.22	-
Subtotal				**-**	**-**	**-**	**13.0**	**7.2**	**-**	**-**	**-**	**-**	**1.17**	**0.65**	**-**

FUGITIVE DUST EMISSIONS FROM TERTIARY CRUSHING AND MATERIAL CONVEYING

Equipment Type	Pipe Diameter (ft)	Excavated Area (ft^2/ft)	Advance Rate (ft/hr)	Excavated Volume (ft^3/hr)	Soil Density (lb/ft^3)	Excavated Soil Weight (ton/hr)	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Trenching Machine[a]	3	20.93	53.78	1126	100	56.3	12	180	-	-	-	0.43	0.09	-	-	-	-	0.04	0.01	-

Notes:
a. Trenching includes two conveyor points.

TOTAL EMISSIONS

Daily Emissions (lb/day)						Total Emissions (tons)					
NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
276	**0.28**	**413**	**31**	**24**	**43**	**24.8**	**0.03**	**37.2**	**2.8**	**2.1**	**3.8**

Table 6
Emissions from Onshore Pipeline Installation - Pipelay
Cabrillo Port LNG Deepwater Port
(Page 1 of 2)

EQUIPMENT EXHAUST EMISSIONS

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Daily Mileage per Device	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Heavy Fork Lift	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Sideboom Tractor	2	200	diesel	12	-	50%	180	2,400	37	0.03	45	2	2	5	3.3	0.0023	4.0	0.19	0.19	0.48
Mobile Crane	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Pipe Bending Machine	1	100	diesel	12	-	50%	90	600	9	0.01	11	1	1	1	0.4	0.0003	0.5	0.02	0.02	0.06
Hydrostatic Test Pump	1	200	diesel	12	-	50%	30	1,200	18	0.01	22	1	1	3	0.3	0.0002	0.3	0.02	0.02	0.04
Fill Dirt Screener	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Sheepsfoot Compactor	1	200	diesel	12	-	50%	180	1,200	18	0.01	22	1	1	3	1.6	0.0012	2.0	0.10	0.10	0.24
Cement Pump	1	100	diesel	12	-	50%	90	600	9	0.01	11	1	1	1	0.4	0.0003	0.5	0.02	0.02	0.06
Asphalt Paving Machine	1	200	diesel	12	-	50%	90	1,200	18	0.01	22	1	1	3	0.8	0.0006	1.0	0.05	0.05	0.12
Asphalt Roller	1	100	diesel	12	-	50%	90	600	9	0.01	11	1	1	1	0.4	0.0003	0.5	0.02	0.02	0.06
Welding Generator	2	50	gasoline	12	-	50%	180	600	4	0.173	151	0.2	0.2	6	0.4	0.0156	13.6	0.02	0.02	0.52
Utility Generator	2	50	gasoline	12	-	50%	180	600	4	0.173	151	0.2	0.2	6	0.4	0.0156	13.6	0.02	0.02	0.52
Air Compressor	2	50	gasoline	12	-	50%	180	600	4	0.173	151	0.2	0.2	6	0.4	0.0156	13.6	0.02	0.02	0.52
Dewatering Pump	2	50	gasoline	12	-	50%	30	600	4	0.173	151	0.2	0.2	6	0.1	0.0026	2.3	0.00	0.00	0.09
Vibratory Roller	2	50	gasoline	12	-	50%	180	600	4	0.173	151	0.2	0.2	6	0.4	0.0156	13.6	0.02	0.02	0.52
Hydraulic Tamper	2	50	gasoline	12	-	50%	180	600	4	0.173	151	0.2	0.2	6	0.4	0.0156	13.6	0.02	0.02	0.52
Dump Truck	2	-	diesel	-	60	-	180	-	4	0.01	0.21	0.03	0.03	0.06	0.4	0.0012	0.02	0.003	0.003	0.005
Water Truck	2	-	diesel	-	60	-	180	-	4	0.01	0.21	0.03	0.03	0.06	0.4	0.0012	0.02	0.003	0.003	0.005
Utility Truck	2	-	diesel	-	60	-	180	-	4	0.01	0.21	0.03	0.03	0.06	0.4	0.0012	0.02	0.003	0.003	0.005
Lowboy Truck	4	-	diesel	-	120	-	180	-	16	0.05	0.83	0.13	0.13	0.24	1.4	0.0046	0.07	0.011	0.011	0.022
Pipe Stringing Truck	2	-	diesel	-	60	-	180	-	4	0.01	0.21	0.03	0.03	0.06	0.4	0.0012	0.02	0.003	0.003	0.005
Cement Truck	2	-	diesel	-	60	-	90	-	4	0.01	0.21	0.03	0.03	0.06	0.2	0.0006	0.01	0.001	0.001	0.003
Asphalt Truck	2	-	diesel	-	60	-	90	-	4	0.01	0.21	0.03	0.03	0.06	0.2	0.0006	0.01	0.001	0.001	0.003
Subtotal									**237**	**1.3**	**1,123**	**11**	**11**	**60**	**17**	**0.10**	**85**	**0.8**	**0.8**	**4.5**

FUGITIVE DUST EMISSIONS FROM PAVED AND UNPAVED ROADS IN CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Mobile Crane	1	0.1	0	0.1	180	-	-	-	0.03	0.005	-	-	-	-	0.0028	0.0004	-
Heavy Forklift	1	3.1	0	3.1	180	-	-	-	0.97	0.15	-	-	-	-	0.088	0.013	-
Dump Truck	2	1.2	0.6	0.6	180	-	-	-	0.50	0.09	-	-	-	-	0.04	0.01	-
Water Truck	2	1.2	0.6	0.6	180				0.50	0.09					0.04	0.01	
Utility Truck	2	1.2	0.6	0.6	180				0.50	0.09					0.04	0.01	
Lowboy Truck	4	2.4	1.2	1.2	180				1.99	0.35					0.18	0.03	
Pipe Stringing Truck	2	1.2	0.6	0.6	180				0.50	0.09					0.04	0.01	
Cement Truck	2	1.2	0.6	0.6	90				0.50	0.09					0.02	0.00	
Asphalt Truck	2	1.2	0.6	0.6	90				0.50	0.09					0.02	0.00	
Subtotal						**-**	**-**	**-**	**6.0**	**1.0**	**-**	**-**	**-**	**-**	**0.49**	**0.08**	**-**

Table 6
Emissions from Onshore Pipeline Installation - Pipelay
Cabrillo Port LNG Deepwater Port
(Page 2 of 2)

FUGITIVE DUST EMISSIONS FROM PAVED ROADS OUTSIDE CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Dump Truck	2	58.8	58.8	0	180	-	-	-	11.8	2.9	-	-	-	-	1.06	0.26	-
Water Truck	2	58.8	58.8	0	180				11.8	2.9					1.06	0.26	
Utility Truck	2	58.8	58.8	0	180				11.8	2.9					1.06	0.26	
Lowboy Truck	4	117.6	117.6	0	180				47.1	11.7					4.24	1.05	
Pipe Stringing Truck	2	58.8	58.8	0	180				11.8	2.9					1.06	0.26	
Cement Truck	2	58.8	58.8	0	90				11.8	2.9					0.53	0.13	
Asphalt Truck	2	58.8	58.8	0	90				11.8	2.9					0.53	0.13	
Subtotal						**-**	**-**	**-**	**117.8**	**29.2**	**-**	**-**	**-**	**-**	**9.54**	**2.36**	**-**

FUGITIVE DUST EMISSIONS FROM EARTHMOVING

Equipment Type	No. of Devices	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
				NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Sideboom Tractor	2	12	180	-	-	-	8.6	4.8	-	-	-	-	0.78	0.43	-
Sheepsfoot Compactor	1	12	180	-	-	-	4.3	2.4	-	-	-	-	0.39	0.22	-
Subtotal				**-**	**-**	**-**	**13.0**	**7.2**	**-**	**-**	**-**	**-**	**1.17**	**0.65**	**-**

FUGITIVE DUST EMISSIONS FROM TERTIARY CRUSHING AND MATERIAL CONVEYING

Equipment Type	Pipe Dia. (ft)	Excavated Area (ft^2/ft)	Advance Rate (ft/hr)	Excavated Volume (ft^3/hr)	Soil Density (lb/ft^3)	Excavated Soil Weight (ton/hr)	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Fill Dirt Screener	3	20.93	53.78	1126	100	56.3	12	180	-	-	-	0.50	0.03	-	-	-	-	0.04	0.003	-

TOTAL EMISSIONS

Daily Emissions (lb/day)						Total Emissions (tons)					
NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
237	**1.3**	**1,123**	**149**	**49**	**60**	**17**	**0.10**	**85**	**12**	**3.9**	**4.5**

Table 7
Emissions from Onshore Pipeline Installation - Boring
Cabrillo Port LNG Deepwater Port

EQUIPMENT EXHAUST EMISSIONS

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Daily Mileage per Device (mi/day)	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Horizontal Boring Rig	1	1,000	diesel	24	-	80%	30	19,200	292	0.20	360	17	17	42	4.4	0.0031	5.4	0.25	0.25	0.63
Track Backhoe	1	200	diesel	12	-	50%	30	1,200	18	0.01	22	1	1	3	0.3	0.0002	0.3	0.02	0.02	0.04
All Terrain Forklift	1	100	diesel	12	-	50%	30	600	9	0.01	11	1	1	1	0.1	0.0001	0.2	0.01	0.01	0.02
Light Towers	6	20	diesel	12	-	100%	30	1,440	22	0.02	27	1	1	3	0.3	0.0002	0.4	0.02	0.02	0.05
Heavy Lift Crane	1	500	diesel	6	-	50%	30	1,500	23	0.02	28	1	1	3	0.3	0.0002	0.4	0.02	0.02	0.05
18 Wheeler Truck	2	-	diesel	-	60	-	30	-	4	0.01	0.21	0.03	0.03	0.06	0.1	0.0002	0.00	0.000	0.000	0.001
Subtotal									**368**	**0.3**	**449**	**21**	**21**	**53**	**5.5**	**0.004**	**6.7**	**0.3**	**0.3**	**0.8**

FUGITIVE DUST EMISSIONS FROM PAVED AND UNPAVED ROADS IN CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All Terrain Forklift	1	1.6	0	1.6	30	-	-	-	0.58	0.09	-	-	-	-	0.009	0.001	-
18 Wheeler Truck	2	1.2	0.6	0.6	30	-	-	-	0.82	0.16	-	-	-	-	0.01	0.00	-
Subtotal						**-**	**-**	**-**	**1.4**	**0.3**	**-**	**-**	**-**	**-**	**0.02**	**0.00**	**-**

FUGITIVE DUST EMISSIONS FROM PAVED ROADS OUTSIDE CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
18 Wheeler Truck	2	58.8	58.8	0	30	-	-	-	37.4	9.33	-	-	-	-	0.56	0.14	-
Subtotal						**-**	**-**	**-**	**37.4**	**9.3**	**-**	**-**	**-**	**-**	**0.56**	**0.14**	**-**

FUGITIVE DUST EMISSIONS FROM EARTHMOVING

Equipment Type	No. of Devices	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
				NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Track Backhoe	1	12	30	-	-	-	4.3	2.4	-	-	-	-	0.06	0.04	-
Subtotal				**-**	**-**	**-**	**4.3**	**2.4**	**-**	**-**	**-**	**-**	**0.06**	**0.04**	**-**

TOTAL EMISSIONS

	Daily Emissions (lb/day)						Total Emissions (tons)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
	368	**0.27**	**449**	**64**	**33**	**53**	**5.5**	**0.0040**	**6.7**	**1.0**	**0.5**	**0.8**

Table 8
Emissions from Onshore Pipeline Installation - Drilling
Cabrillo Port LNG Deepwater Port

EQUIPMENT EXHAUST EMISSIONS

Equipment Type	No. of Devices	Engine Rating per Device (bhp)	Fuel Type	Daily Operation per Device (hrs/day)	Daily Mileage per Device (mi/day)	Average Load	Total Working Days	Engine Output (bhp-hr/day)	Daily Emissions (lb/day)						Total Emissions (tons)					
									NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Large Drilling Rig (HDD)	2	500	diesel	24	-	80%	30	19,200	292	0.20	360	17	17	42	4.4	0.0031	5.4	0.25	0.25	0.63
Mud Cleaner Generator	1	400	diesel	24		80%	30	7,680	117	0.08	144	7	7	17	1.8	0.0012	2.2	0.10	0.10	0.25
Mud Pumps	2	500	diesel	24		80%	30	19,200	292	0.20	360	17	17	42	4.4	0.0031	5.4	0.25	0.25	0.63
Fluid Handling Pumps	4	75	diesel	24		80%	30	5,760	88	0.06	108	5	5	13	1.3	0.0009	1.6	0.08	0.08	0.19
Track Backhoe	1	200	diesel	12	-	50%	30	1,200	18	0.01	22	1	1	3	0.3	0.0002	0.3	0.02	0.02	0.04
All Terrain Forklift	1	100	diesel	12	-	50%	30	600	9	0.01	11	1	1	1	0.1	0.0001	0.2	0.01	0.01	0.02
Light Towers	6	20	diesel	12	-	100%	30	1,440	22	0.02	27	1	1	3	0.3	0.0002	0.4	0.02	0.02	0.05
Heavy Lift Crane	1	500	diesel	6	-	50%	30	1,500	23	0.02	28	1	1	3	0.3	0.0002	0.4	0.02	0.02	0.05
18 Wheeler Truck	2	-	diesel	-	60	-	30	-	4	0.01	0.21	0.03	0.03	0.06	0.1	0.0002	0.00	0.000	0.000	0.001
Subtotal									**865**	**0.6**	**1,060**	**50**	**50**	**125**	**13.0**	**0.009**	**15.9**	**0.7**	**0.7**	**1.9**

FUGITIVE DUST EMISSIONS FROM PAVED AND UNPAVED ROADS IN CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All Terrain Forklift	1	1.6	0	1.6	30	-	-	-	0.58	0.09	-	-	-	-	0.009	0.001	-
18 Wheeler Truck	2	1.2	0.6	0.6	30	-	-	-	0.82	0.16	-	-	-	-	0.01	0.00	-
Subtotal						**-**	**-**	**-**	**1.4**	**0.3**	**-**	**-**	**-**	**-**	**0.02**	**0.00**	**-**

FUGITIVE DUST EMISSIONS FROM PAVED ROADS OUTSIDE CONSTRUCTION ZONE

Equipment Type	No. of Devices	Daily Mileage per Device (mi/day)	Daily Mileage per Device on Paved Roads (mi/day)	Daily Mileage per Device on Unpaved Roads (mi/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
						NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
18 Wheeler Truck	2	58.8	58.8	0	30	-	-	-	37.4	9.3	-	-	-	-	0.56	0.14	-
Subtotal						**-**	**-**	**-**	**37.4**	**9.3**	**-**	**-**	**-**	**-**	**0.56**	**0.14**	**-**

FUGITIVE DUST EMISSIONS FROM EARTHMOVING

Equipment Type	No. of Devices	Daily Operation per Device (hrs/day)	Total Working Days	Daily Emissions (lb/day)						Total Emissions (tons)					
				NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Track Backhoe	1	12	30	-	-	-	4.3	2.4	-	-	-	-	0.06	0.04	-
Subtotal				**-**	**-**	**-**	**4.3**	**2.4**	**-**	**-**	**-**	**-**	**0.06**	**0.04**	**-**

TOTAL EMISSIONS

	Daily Emissions (lb/day)						Total Emissions (tons)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
	865	**0.62**	**1,060**	**93**	**62**	**125**	**13**	**0.009**	**16**	**1.4**	**0.9**	**1.9**

Table 9
Emission Factors for Construction
Cabrillo Port LNG Deepwater Port

Source Type	Emission Factors						Units	Reference	Assumptions
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC			
Diesel Off-Road Equipment	6.900	0.005	8.500	0.400	0.400	1.000	g/BHP-hr	URBEMIS2002, Appendix H	See Table 10
Gasoline Off-Road Equipment	3.015	0.131	114.315	0.131	0.131	4.326	g/BHP-hr	SCAQMD CEQA Air Quality Handbook, Table A9-3-A	See Table 10
Diesel Heavy Heavy Duty Truck	15.104	0.048	0.781	0.119	0.119	0.226	g/mi	EMFAC2002	See Table 10
Paved Roads (Shore Crossing Activities)	-	-	-	0.318	0.0794	-	lb/mi (lb/VMT)	AP-42, Section 13.2.1	See Table 11
Paved Roads (Onshore Pipeline Installation)	-	-	-	0.100	0.0248	-	lb/mi (lb/VMT)	AP-42, Section 13.2.1	See Table 11
Unpaved Roads (Shore Crossing Activities)	-	-	-	0.36	0.056	-	lb/mi (lb/VMT)	AP-42, Section 13.2.2	See Table 11
Unpaved Roads (Onshore Pipeline Installation)	-	-	-	0.31	0.048	-	lb/mi (lb/VMT)	AP-42, Section 13.2.2	See Table 11
Earth Moving (with Track and Non-wheeled Equipment)	-	-	-	0.36	0.20	-	lb/hr	AP-42, Section 11.9, Table 11.9-1	Bulldozing overburden; silt content = 8.5% (see Table 5); moisture content after wetting = 16.8% (AP-42 Table 11.9-3, upper bound for overburden).
Tertiary Crushing (Trenching Machine)	-	-	-	0.00054	0.00010	-	lb/ton	AP-42, Section 11.19, Table 11.19-2	Emission factors for source controlled with water supression
Conveyor Transfer Points (Trenching Machine)	-	-	-	0.000046	0.000013	-	lb/ton	AP-42, Section 11.19, Table 11.19-2	Emission factors for source controlled with water supression
Soil Screening (Fill Dirt Screener)	-	-	-	0.00074	0.000050	-	lb/ton	AP-42, Section 11.19, Table 11.19-2	Emission factors for source controlled with water supression

.

Table 10
Assumptions for Emission Factors - Vessels and Equipment
Cabrillo Port LNG Deepwater Port

Source Type	Reference	Assumptions
Diesel Off-Road Equipment	URBEMIS2002, Appendix H	Year 2000; 37.1% efficiency; diesel sulfur content of 15 ppm; $PM_{2.5}$ assumed equal to PM_{10}
Gasoline Off-Road Equipment	SCAQMD CEQA Air Quality Handbook, Table A9-3-A	34.6% efficiency; $PM_{2.5}$ assumed equal to PM_{10}
Diesel Heavy Heavy Duty Truck	EMFAC2002	HHD Trucks; T7; Summer; VCAPCD; Year 2000 with 100,000 miles; I/M; 37.1% efficiency; diesel sulfur content of 15 ppm; $PM_{2.5}$ assumed equal to PM_{10}

Table 11
Assumptions for Emission Factors - Paved and Unpaved Roads
Cabrillo Port LNG Deepwater Port

Paved Roads

Emission Factor = $[k (sL/2)^{0.65} (W/3)^{1.5} - C] [1 - (P/4N)]$

AP-42, Section 13.2.1, Equation (2)

Particulate Size Multiplier	k (for PM_{10})	0.016	lb/VMT	AP-42, Section 13.2.1, Table 13.2.1-1
	k (for $PM_{2.5}$)	0.004	lb/VMT	AP-42, Section 13.2.1, Table 13.2.1-1
Road Surface Silt Loading	sL	1.02	g/m^2	Based on silt loading of 0.03 oz/yd^2 for collector streets (SCAQMD CEQA Air Quality Handbook Table A9-9-C-1)
Average Weight of Vehicles	W	see below		
Emission Factor for Exhaust, Brake Wear, and Tire Wear	C (for PM_{10})	0.00047	lb/VMT	AP-42, Section 13.2.1, Table 13.2.1-2
	C (for PM2.5)	0.00036	lb/VMT	AP-42, Section 13.2.1, Table 13.2.1-2
Number of "Wet Days" in Period	P	17	days	=34 days (180 days/365 days) { 34 days is the average number of annual "wet days" in the South Coast Air Basin [SCAQMD CEQA Air Quality Handbook Table A9-9-C-1] }
Number of Days in Period	N	180	days	Length of construction period

Unpaved Roads

Emission Factor = $[k (s/12)^a (W/3)^b] * [1\text{-Control}]$

AP-42, Section 13.2.2, Equation (1a) modified to account for water control measures

Constants for Equation 1a	k (for PM_{10})	1.5	lb/VMT	AP-42, Section 13.2.2, Table 13.2.2-2
	k (for $PM_{2.5}$)	0.23	lb/VMT	AP-42, Section 13.2.2, Table 13.2.2-2
	a	0.9		AP-42, Section 13.2.2, Table 13.2.2-2
	b	0.45		AP-42, Section 13.2.2, Table 13.2.2-2
Surface Material Silt Content	s	8.5	%	AP-42, Section 13.2.2, Table 13.2.2-1
Average Weight of Vehicles	W	see below		
Water Control Effectiveness	Control	85%		AP-42, Section 13.2.2, Figure 13.2.2-2

Average Weight of Vehicles (W) During Shore Crossing Activities

Equipment	Loaded Weight (tons)	Vehicle Weight (tons)	Mean Weight (tons)	
All Terrain Forklift	5.5	3.5	4.5	
18 Wheeler Truck	40	20	30.0	
Average for Vehicles on Paved Roads[1]			30.00	W for Paved Roads
Average on Unpaved Roads[2]			17.25	W for Unpaved Roads

Notes:
1. Only 18-Wheeler Truck.
2. All vehicles

Average Weight of Vehicles (W) During Onshore Pipeline Installation

Equipment	Loaded Weight (tons)	Vehicle Weight (tons)	Mean Weight (tons)	
Front End Loader	6.5	4.5	5.5	
Dump Truck	16	6	11.0	
Water Truck	10	6	8.0	
Utility Truck	2.5	2.5	2.5	
Heavy Fork Lift	5.5	3.5	4.5	
Low Boy Truck	10.5	6	8.3	
Pipe Stringing Truck	16	6	11.0	
Mobile Crane	25	25	25.0	
Cement Truck	40	19	29.5	
Asphalt Truck	16	6	11.0	
All Terrain Forklift	5.5	3.5	4.5	
18 Wheeler Truck	40	20	30.0	
Average for Vehicles on Paved Roads[1]			13.91	W for Paved Roads
Average on Unpaved Roads[2]			12.56	W for Unpaved Roads

Notes:
1. All vehicles except front end loader, heavy fork lift, mobile crane, and all-terrain forklift
2. All vehicles

Table 12
Emissions from Worker Commuting
Cabrillo Port LNG Deepwater Port

Parameter	Units	Value	Comments
Average Trip Length	miles/trip	11.7	Average Trip Length for Region, 2010 (Reference 1, Table A9-5-D)
Average Roundtrip Distance	miles/roundtrip	23.4	= Average Trip Length x 2

References: 1. South Coast Air Quality Management District. April 1993. CEQA Air Quality Handbook

Vehicle Operation	Units	Emission Factor					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Running Exhaust & Evaporative	g/mile	0.29	0.048	2.75	0.005	0.005	0.06
Tire Wear	g/mile				0.10	0.10	
Cold Start	g/trip	1.21		47.65			1.30
Hot Start	g/trip	0.58		3.76			0.23
Diurnal	g/vehicle-day						0.54

Onshore Pipeline Construction (Ventura and Los Angeles Counties)

Parameter	Units	Value	Comments
Number of Worker Roundtrips	roundtrips/day	120	
Daily Mileage for All Vehicles	miles/day	2808	= Average Roundtrip Distance x Number of Worker Roundtrips
Days with Roundtrips	days	180	

Vehicle Operation	Emission Units	Daily Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Exhaust & Evaporative, and Tire Wear	lb/day	1.8	0.30	17.0	0.650	0.650	0.4
Cold Start, Hot Start, and Diurnal	lb/day	0.95		27.2			1.10
All	**lb/day**	**2.7**	**0.30**	**44.2**	**0.65**	**0.65**	**1.5**

Vehicle Operation	Emission Units	Total Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All	tons	0.25	0.03	4.0	0.06	0.06	0.13

Shore Crossing Construction (Ventura County)

Parameter	Units	Value	Comments
Number of Worker Roundtrips	roundtrips/day	45	
Daily Mileage for All Vehicles	miles/day	1053	= Average Roundtrip Distance x Number of Worker Roundtrips
Days with Roundtrips	days	54	

Vehicle Operation	Emission Units	Daily Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Exhaust & Evaporative, and Tire Wear	lb/day	0.7	0.11	6.4	0.244	0.244	0.1
Cold Start, Hot Start, and Diurnal	lb/day	0.36		10.2			0.41
All	**lb/day**	**1.0**	**0.11**	**16.6**	**0.24**	**0.24**	**0.6**

Vehicle Operation	Emission Units	Total Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All	tons	0.03	0.003	0.45	0.01	0.01	0.01

Offshore Pipeline Construction (Ventura County)

Parameter	Units	Value	Comments
Number of Worker Roundtrips	roundtrips/day	200	
Daily Mileage for All Vehicles	miles/day	4680	= Average Roundtrip Distance x Number of Worker Roundtrips
Days with Roundtrips	days	2	Workers stay onboard during duration of offshore construction

Vehicle Operation	Emission Units	Daily Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Exhaust & Evaporative, and Tire Wear	lb/day	3.0	0.50	28.4	1.083	1.083	0.6
Cold Start, Hot Start, and Diurnal	lb/day	1.58		45.3			1.83
All	**lb/day**	**4.6**	**0.50**	**73.7**	**1.08**	**1.08**	**2.4**

Vehicle Operation	Emission Units	Total Emissions					
		NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
All	tons	0.0046	0.0005	0.07	0.001	0.001	0.002

TOTAL PER COUNTY

	Daily Emissions (lbs/day)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Ventura County	8.3	0.90	135	2.0	2.0	4.5
Los Angeles County	2.7	0.30	44	0.65	0.65	1.5
TOTAL	**11**	**1.2**	**179**	**2.6**	**2.6**	**5.9**
	Total Emissions (tons)					
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	ROC
Ventura County	0.28	0.03	4.5	0.07	0.07	0.15
Los Angeles County	0.25	0.03	4.0	0.06	0.06	0.13
TOTAL	**0.53**	**0.06**	**8.5**	**0.12**	**0.12**	**0.28**

Table 13
Summary of CO_2 Emissions from Construction
Cabrillo Port LNG Deepwater Port

Construction Activity	Source Type	Total Energy Output (bhp-hr)	Vehicles Miles Traveled (mi)	CO_2 Emission Factor[a,b]	CO_2 Emission Factor Units	CO_2 Emissions (lbs)	CO_2 Emissions (tons)
Mooring/FSRU Installation	Equipment	3,602,400	-	1.16	lb/hp-hr	4,178,784	2,089
Offshore Pipeline Installation	Equipment	12,750,432	-	1.16	lb/hp-hr	14,790,501	7,395
Shore Crossing Construction	Equipment	4,950,240	-	1.16	lb/hp-hr	5,742,278	2,871
	Trucks	-	3,600	2.4	lb/mi	8,640	4
Onshore Pipeline Installation - Trenching	Equipment	3,294,000	-	1.16	lb/hp-hr	3,821,040	1,911
Onshore Pipeline Installation - Pipelay	Equipment	2,160,000	-	1.16	lb/hp-hr	2,505,600	1,253
	Trucks	-	75,600	2.4	lb/mi	181,440	91
Onshore Pipeline Installation - Boring	Equipment	718,200	-	1.16	lb/hp-hr	833,112	417
	Trucks	-	1,800	2.4	lb/mi	4,320	2
Onshore Pipeline Installation - Drilling	Equipment	1,697,400	-	1.16	lb/hp-hr	1,968,984	984
	Trucks	-	1,800	2.4	lb/mi	4,320	2
TOTAL	-	-	-	-		-	**17,020**

Notes:

a. Emission factor for "Equipment" based in diesel internal combustion engines (from AP-42, Section 3.4, Table 3.4-1).

b. Emission factor for "Trucks" based in trucks getting approximately 7.7 miles per gallon (from EPA-420F-97-037: Annual Emissions and Fuel Consumption).