Attachment D – Air Emission and Traffic Data

Western Half of OCS-P 0450 Development Project
Summary of Emissions by Platform and Activity, tons/year

Platform/Emission Category	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2	CO_2e
Platform Hidalgo Drilling Emissions (All in SBC)										
Turbine Emissions	7.68	2.41	9.51	0.16	1.89	1.89	0.32	0.06	8775	7920
Other Drilling Equipment	2.01	0.27	0.73	0.00	0.24	0.24	0.00	0.00	125	113
Mud Emissions	0.00	0.01999	0.00	0.00	0.00	0.00	0.10	0.00	0	2
Drilling: Offsite Emissions										
Supply Boats - Total (all counties)	19.56	1.04	4.25	0.01	1.72	1.65	0.05	0.01	1136	1025
Supply Boats - SBC Only	15.04	0.81	3.27	0.01	1.32	1.26	0.04	0.01	869	785
Supply Boats - Ventura County Only	4.53	0.24	0.98	0.00	0.40	0.38	0.01	0.00	267	241
Trucks, Ventura County Only	1.66	0.08	0.38	0.00	0.06	0.06	0.00	0.00	245	221
Platform Hidalgo Operational Emissions										
Fugitive Emissions (SBC Only)	0.00	0.68	0.00	0.00	0.00	0.00	3.34	0.00	0	63
Total Emissions										
Total Emissions SBC	24.73	4.19	13.51	0.17	3.44	3.39	3.79	0.07	9769	8883
Total Emissions	29.26	4.43	14.49	0.18	3.85	3.78	3.80	0.07	10036	9123
Excess Emissions, SBC Permit	128.06	32.27	47.19	20.02	12.48	12.13	32.96	0.03	29281	26985

Notes: CO_2e emissions in metric tonnes per year. GHG not included in permit at this time

The excess permitted emissions = total permitted emissions minus the 2011 actual emissions minus the estimated peak emissions from the project with SBC

*CO_2e emissions=(CH_4 emissions*21 + N_20 emissions*310+CO_2 emissions)*0.9*

Permitted Emissions

	NO_x	ROC	CO	SO_x	PM	PM_{10}	CH_4	N_2O	CO_2	CO_2e
Platform Harvest	367.58	85.26	204.18	43.61	26.11	25.71	88.54	0.42	215424	195672
Platform Hermosa	198.8	76.25	114.48	36.87	17.64	17.16	61.78	0.17	77498	70963
Platform Hidalgo	204.15	61.36	94.54	26.49	17.77	17.34	37.36	0.17	76821	69892
Supply Boats	76.25	3.99	16.67	0.04	6.79	6.51	0.13	0.03	3,280	2962

Notes

Criteria pollutants from PXP, Glenn Oliver, May 4, 2012 email (to Chittick on 5/8)

GHG Platform emissions from PXP email calculated, not part of permit

GHG Supply boat emissions calculated

Emissions for Platforms from PTOs include supply boats

2011 Emissions

Location	NOx	ROC	CO	SOx	PM	PM10	CH_4	N_2O	CO_2	CO_2e
Platform Harvest	87.06	45.73	63.27	9.73	9.35	9.32	1.63	0.18	101225	91184
Platform Hermosa	51.15	40.98	36.39	5.3	1.72	1.66	0.58	0.07	32923	29661
Platform Hidalgo	51.36	24.9	33.84	6.3	1.85	1.82	0.61	0.07	37771	34025
Total	189.57	111.61	133.5	21.33	12.92	12.8	2.82	0.32	171919	154870

Western Half of OCS-P 0450 Development Project
Drilling Emission Estimates - Turbines

Estimated Quantity, Size and Load Factors for Electrical Driven Drilling Equipment

Rocky Point Drill Rig Data	Quantity	Load (hp)	Load (kW)	Load Factor
Draw Works	2	1,000	1,492	0.25
Mud Pumps	2	1,000	1,492	0.6
Rotary Table	1	1,000	746	0.6
Top Drive	1	1,000	746	0.5

Notes:
Estimated data. Actual data for rig will not be known until a contract has been issued.

Platform Turbine Emission Factors, assumes all produced gas operations

Turbine Emission Factors	lbs/hr									
	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2	Size, kW
Hidalgo Emission Factors - G91g	6.89	0.72	4.54	0.28	0.10	0.10	0.10	0.01	5250.33	2800.00
Hidalgo Emission Factors - G92g	6.89	0.72	4.54	0.28	0.10	0.10	0.10	0.01	5250.33	2800.00
Hidalgo Emission Factors - G93g	6.89	0.72	4.54	0.28	0.10	0.10	0.10	0.01	5250.33	2800.00
Hidalgo Emission Factors - G94g	3.70	0.36	3.72	0.31	0.11	0.11	0.11	0.01	5729.14	3100.00
Hidalgo Emission Factors - G91d	6.90	2.46	8.86	0.06	1.99	1.99	0.30	0.06	7323.92	2800.00
Hidalgo Emission Factors - G92d	6.90	2.46	8.86	0.06	1.99	1.99	0.30	0.06	7323.92	2800.00
Hidalgo Emission Factors - G93d	6.90	2.46	8.86	0.06	1.99	1.99	0.30	0.06	7323.92	2800.00

Platform Turbine Emission Factors, weighted composite

Turbine Emission Factors	lbs/kW-hr								
	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Hidalgo Emission Factors-g	2.10E-03	2.17E-04	1.50E-03	1.00E-04	3.57E-05	3.57E-05	3.57E-05	3.48E-06	1.87E+00
Hidalgo Emission Factors-d	2.10E-03	6.59E-04	2.60E-03	4.49E-05	5.16E-04	5.16E-04	8.65E-05	1.62E-05	2.40E+00

Notes:
A composite emission factor was used for turbines in estimating the turbine emissions. Turbine G91 has hisotrically not been used, but was included
Emission factors taken from PTO 9105 for Hidalgo (October 2008)
PTO turbine emission factors are in lbs/hr. These were converted to lbs/kW-hr by dividing by the rating on each turbine.
GHG emission factors based on PXP part 70 permit

Peak Turbine Emissions from Drilling on the Western Half of OCS-P 0450

Turbine Drilling Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Platform Hidalgo									
lbs./hr	4.39	1.38	5.43	0.09	1.08	1.08	0.18	0.03	5009
lbs./day	105.27	33.02	130.33	2.25	25.86	25.86	4.34	0.81	120211
tons/qr	3.80	1.51	5.95	0.10	1.18	1.18	0.20	0.04	5485
tons/yr[B]	7.68	2.41	9.51	0.16	1.89	1.89	0.32	0.06	8775
Total Drilling Emissions (tons)									
Western Half of OCS-P 0450[C,D,E]	7.68	2.41	9.51	0.16	1.89	1.89	0.32	0.06	8775

Notes:
A. Tons/yr assumes drilling occurs for 100 days per well on Platform Hidalgo (2 wells).
C. Assumes 2 wells at Hidalgo, 70 days drilling, 30 days completion
D. Assumes completion is 10% the load of well drilling
E. Assumes emissions from diesel turbines
F. Assumes 91.25 days per quarter

Western Half of OCS-P 0450 Development Project
Drilling Emission Estimates - Other Equipment

Rocky Point Drill Rig Data	Quantity	Load (hp)	Fuel	Note
Well Logging Unit	1	100	Diesel	1
Acidizing Pump	1	100	Diesel	2
Emergency Generator	1	1,350	Diesel	3
Cement Pump	1	200	Diesel	4
Slurry Pump	1	1,000	Diesel	5

Notes:
Estimated data. Actual data for rig will not be known until a contract has been issued.
1. Well logging unit operates 10 days per month
2. Each acidizing pump is operated 5 days per well, 8 hours per day.
3. Each emergency generator tested 2 hours per month.
4. Cement pump operates 2 days per month, 8 hours per day.
5. Slurry Pump operates for 8 hrs per day, 70 days per well. This pump would only be needed if oil/synthetic based muds are injected offshore.

Emission Factors	g/hp-hr								
	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Well Logging Unit	8.4	1.14	3.03	0.0063	1	1	0.020	0.004	521.6
Acidizing Pump	8.4	1.14	3.03	0.0063	1	1	0.020	0.004	521.6
Emergency Generator	8.4	1.14	3.03	0.0063	1	1	0.020	0.004	521.6
Cement Pump	8.4	1.14	3.03	0.0063	1	1	0.020	0.004	521.6
Slurry Pump	8.4	1.14	3.03	0.0063	1	1	0.020	0.004	521.6

Notes:
Diesel I.C. Engines raw factors from AP-42, Table 3.3-1. NO_x reduced by 40% to reflect optimum injection timing retard.
SO_2 adjusted for 0.0015% sulfur in fuel. HC assumed to be 100% ROC. PM assumed to be 100% PM_{10}.
CO2 EF based on AP-42 Table 3.3-1. CH4 and N2O based on CARB Mandatory reporting requirements

Support Equipment Drilling Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
lbs/hr									
Well Logging Unit	1.85	0.25	0.67	0.00	0.22	0.22	0.00	0.00	115.00
Acidizing Pump	1.85	0.25	0.67	0.00	0.22	0.22	0.00	0.00	115.00
Emergency Generator	25.00	3.39	9.02	0.02	2.98	2.98	0.06	0.01	1552.50
Cement Pump	3.70	0.50	1.34	0.00	0.44	0.44	0.01	0.00	230.00
Total Hourly Emissions	***32.41***	***4.40***	***11.69***	***0.02***	***3.86***	***3.86***	***0.08***	***0.02***	***2012.50***
lbs/day									
Well Logging Unit	44.45	6.03	16.03	0.03	5.29	5.29	0.11	0.02	2760.00
Acidizing Pump	14.82	2.01	5.34	0.01	1.76	1.76	0.04	0.01	920.00
Emergency Generator	50.00	6.79	18.04	0.04	5.95	5.95	0.12	0.02	3105.00
Cement Pump	29.63	4.02	10.69	0.02	3.53	3.53	0.07	0.01	1840.00
Total Daily Emissions	***138.89***	***18.85***	***50.10***	***0.10***	***16.53***	***16.53***	***0.33***	***0.07***	***8625.00***
tons/qr									
Well Logging Unit	0.67	0.09	0.24	0.00	0.08	0.08	0.00	0.00	41.40
Acidizing Pump	0.07	0.01	0.03	0.00	0.01	0.01	0.00	0.00	4.60
Emergency Generator	0.08	0.01	0.03	0.00	0.01	0.01	0.00	0.00	4.66
Cement Pump	0.09	0.01	0.03	0.00	0.01	0.01	0.00	0.00	5.52
Total Quarterly Emissions	***0.90***	***0.12***	***0.33***	***0.00***	***0.11***	***0.11***	***0.00***	***0.00***	***56.18***
tons/yr									
Well Logging Unit	1.48	0.20	0.53	0.00	0.18	0.18	0.00	0.00	92.00
Acidizing Pump	0.16	0.02	0.06	0.00	0.02	0.02	0.00	0.00	10.22
Emergency Generator	0.17	0.02	0.06	0.00	0.02	0.02	0.00	0.00	10.35
Cement Pump	0.20	0.03	0.07	0.00	0.02	0.02	0.00	0.00	12.27
Total Annual Emissions	***2.01***	***0.27***	***0.73***	***0.00***	***0.24***	***0.24***	***0.00***	***0.00***	***124.84***
Total Drilling Emissions (tons)									
Western Half of OCS-P 0450[B,C]	2.01	0.27	0.73	0.00	0.24	0.24	0.00	0.00	124.84

Notes:
A. The slurry pump would only be needed if the oil/synthetic based muds are injected at the platforms.
B. Assumes 2 wells at Hidalgo 2 wells
C. Assumes each well takes months to finish --> 3.33 months

Western Half of OCS-P 0450 Development Project
Drilling Emission Estimates - ROC Emissions from Mud System

Assumptions

Volume of gas in drilling mud from one well = 85,000 scf
Density of gas =0.0056 lbs/scf
Fraction of gas that is reactive organic compounds=20.5%
Density of reactive organic compound gas = 0.00115 lbs/scf
Time required to drill one well = 100 days
Time when gas may be present in mud per well =20 days
The mud-gas separator and mud degasser removal efficiency = 98%
Mud-gas separator and mud degasser are vented at the top of the derrick

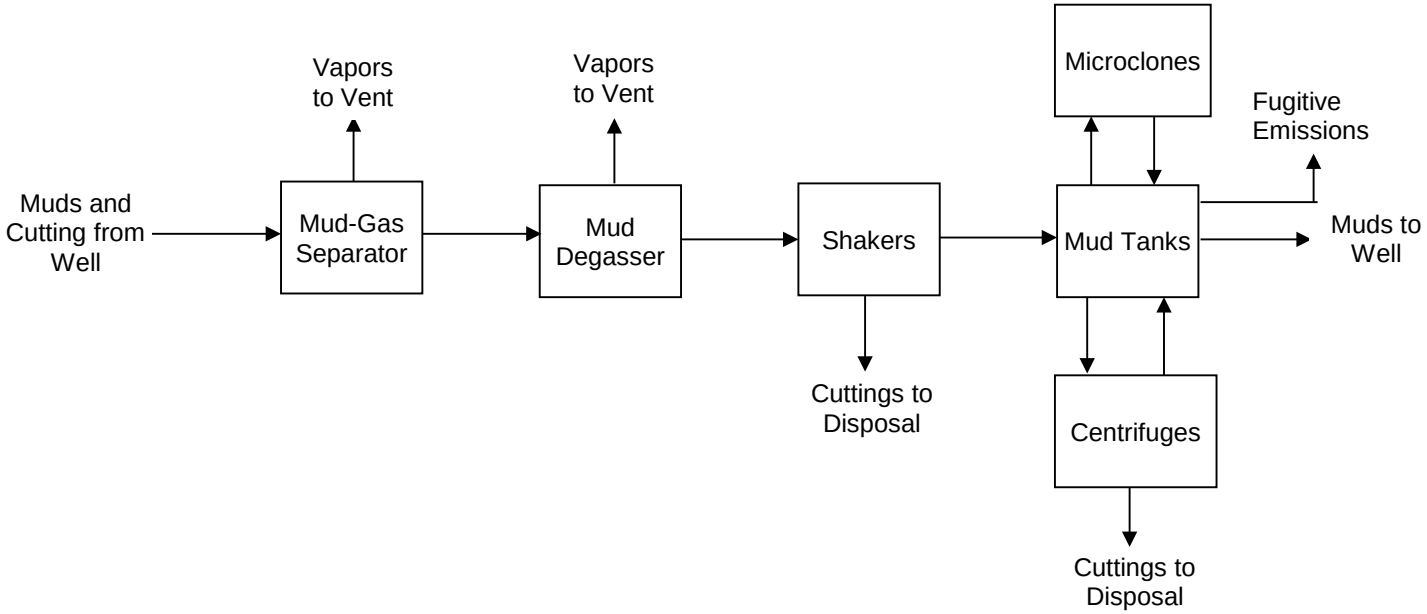
Emissions Estimates per Well

				ROC Emissions				
Source	SCF/hr	SCF/day	% ROC	lbs/hr	lbs/day	lbs/well	lbs/yr	Total[A] (lbs)
Mud-gas Separator/Mud Degasser Vent	174	4165	20.5%	0.041	0.980	19.590	39.180	39.180
Fugitives from Mud Tanks	4	85	20.5%	0.001	0.020	0.400	0.800	0.800
Total	177	4250		0.042	0.999	19.990	39.980	39.980

Note:

A. Assumes 2 wells at Hidalgo

Process Flow Diagram of Typical Mud Handling System



Western Half of OCS-P 0450 Development Project
Supply Boat Emission Estimates

Supply Boat Engine Data

Engine	Fuel	%S	Size (bhp)	Fuel Usage (gals/bhp-hr)	Load Factor	gals/hr
Main Engines-Controlled	D	0.0015	4,000	0.049	0.65	127.4
Main Engines-Uncontrolled	D	0.0015	4,000	0.049	0.65	127.4
Generator Engines	D	0.0015	490	0.055	0.5	13.5
Bow Thruster	D	0.0015	515	0.055	1.0	28.3

Notes:
Data taken from PTO 9104 for Hermosa, PTO 9105 for Hidalgo, and PTO 9103 for Harvest and PXP infomatioin/permits

Supply Boat Emission Factors

Emission Source	lbs/1,000 gals								
	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Main Engines-Controlled	337	16.80	78.30	0.21	33.00	31.68	0.910	0.180	22538
Main Engines-Uncontrolled	561	16.80	78.30	0.21	33.00	31.68	0.910	0.180	22538
Generator Engines	600	48.98	129.26	0.21	42.18	40.49	0.910	0.180	22538
Bow Thruster	600	48.98	129.26	0.21	42.18	40.49	0.910	0.180	22538

Notes:
Emission factors taken from PTO 9104 for Hermosa, PTO 9105 for Hidalgo, and PTO 9103 for Harvest (October 2008)
GHG EF based on CARB Mandatory Reporting

Supply Boat Fuel Usage, gallons		Port Hueneme to Platforms/trip		Platform Offload (gals/round trip)
Fuel Usage	gals/hr	Total	SBC	
Main Engines-Controlled	127.4	1,847.30	1,401.40	0.00
Main Engines-UnControlled	127.4	1,847.30	1,401.40	0.00
Generator Engines	13.5	195.39	148.23	26.95
Bow Thruster	28.3	56.65	56.65	113.30

Notes:
A. Total is from Port Hueneme to the platforms (round trip assumes 14.5-hrs main engines and generator engines, 2-hrs bow thrusters).
B. SBC is from SB County line to the platforms (round trip assumes 11-hrs main engines and generator engines, 2-hrs bow thrusters).
C. PTO is within 25 miles of the platforms (round trip assumes 4-hrs main engines and generator engines, 2-hrs bow thrusters).
D. Platform offload at Platform Hidalgo (round trip assumes 2-hrs generator engines, 4-hrs bow thrusters).
E. Total qtr fuel use 54,583 all areas 41,763 SBC only

Western Half of OCS-P 0450 Development Project

Supply Boat Emission Estimates

Total Supply Boat Emissions (Port Hueneme to the Platforms)

Estimated Supply Boat Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Drill Rig Transport from Port Hueneme to the Platforms									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	1,187.57	43.38	177.22	0.44	71.59	68.73	1.91	0.38	47,315
tons/qr	5.71	0.30	1.24	0.00	0.50	0.48	0.01	0.00	331
tons/yr	11.41	0.61	2.48	0.01	1.00	0.96	0.03	0.01	662
Additional Supply Boat Useage During Drilling									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	1,187.57	43.38	177.22	0.44	71.59	68.73	1.91	0.38	47,315
tons/qr	3.67	0.20	0.80	0.00	0.32	0.31	0.01	0.00	473
tons/yr	8.15	0.43	1.77	0.00	0.72	0.69	0.02	0.00	473
Drilling Transport and Supply Boat Daily Useage									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	1,187.57	43.38	177.22	0.44	71.59	68.73	1.91	0.38	47,315
tons/qr	9.37	0.50	2.04	0.01	0.82	0.79	0.02	0.01	804
tons/yr	19.56	1.04	4.25	0.01	1.72	1.65	0.05	0.01	1,136

Notes:

A. lbs/hr maximum based on all engines running simultaneously, and assumes uncontrolled main engines.

B. Assumes one round trip per day, and assumes uncontrolled main engines.

C. Drill rig transport based on 20 round trips over a 30-day period.

D. Annual emissions assume 20 trips to deliver drill rig and 20 trips to remove drill rig

E. Supply boat trips for drilling assume 1 additional round trip per week over current operations for 16 weeks per year (2 wells).

F. Assumes that uncontrolled main engines are used 10% of the time. (Same assumption as PTOs 9103, 9104, and 9105.)

G. Total length of drilling project, weeks 20 weeks, drilling only (not completions)

H. Time to transport drill rig, days 14 days, one way

Santa Barbara County Supply Boat Emissions (SB County Line to the Platforms)

Estimated Supply Boat Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Drill Rig Transport from Port Hueneme to the Platforms									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	909.12	33.58	136.21	0.34	54.89	52.69	1.46	0.29	36,202
tons/qr	4.39	0.24	0.95	0.00	0.38	0.37	0.01	0.00	253
tons/yr	8.77	0.47	1.91	0.00	0.77	0.74	0.02	0.00	507
Additional Supply Boat Useage During Drilling									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	909.12	33.58	136.21	0.34	54.89	52.69	1.46	0.29	36,202
tons/qr	6.27	0.34	1.36	0.00	0.55	0.53	0.01	0.00	362
tons/yr	6.27	0.34	1.36	0.00	0.55	0.53	0.01	0.00	362
Drilling Operations									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	909.12	33.58	136.21	0.34	54.89	52.69	1.46	0.29	36,202
tons/qr	10.65	0.57	2.32	0.01	0.93	0.90	0.02	0.00	615
tons/yr	15.04	0.81	3.27	0.01	1.32	1.26	0.04	0.01	869

Ventura County Supply Boat Emissions (Port Hueneme to SB County Line)

Estimated Supply Boat Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Drill Rig Transport from Port Hueneme to the Platforms									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	278.45	9.80	41.01	0.10	16.70	16.04	0.45	0.09	11,113
tons/qr	1.32	0.07	0.29	0.00	0.12	0.11	0.00	0.00	78
tons/yr	2.64	0.14	0.57	0.00	0.23	0.22	0.01	0.00	156
Additional Supply Boat Useage During Drilling									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	278.45	9.80	41.01	0.10	16.70	16.04	0.45	0.09	11,113
tons/qr	-2.60	-0.14	-0.56	0.00	-0.23	-0.22	-0.01	0.00	111
tons/yr	1.89	0.10	0.41	0.00	0.17	0.16	0.00	0.00	111
Drilling Operations									
lbs/hr (max.)	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day	278.45	9.80	41.01	0.10	16.70	16.04	0.45	0.09	11,113
tons/qr	-1.28	-0.07	-0.28	0.00	-0.11	-0.11	0.00	0.00	189
tons/yr	4.53	0.24	0.98	0.00	0.40	0.38	0.01	0.00	267

Western Half of OCS-P 0450 Development Project
Supply Boat Emission Estimates - Permitted Emissions

Supply Boat Engine Data

Engine	Fuel	%S	Size (bhp)	Fuel Usage (gals/bhp-hr)	Load Factor	gals/hr
Main Engines-Controlled	D	0.0015	4,000	0.049	0.65	127.4
Main Engines-Uncontrolled	D	0.0015	4,000	0.049	0.65	127.4
Generator Engines	D	0.0015	490	0.055	0.5	13.475
Bow Thruster	D	0.0015	515	0.055	1.0	28.325

Notes:
Data taken from PTO 9104 for Hermosa, PTO 9105 for Hidalgo, and PTO 9103 for Harvest

Supply Boat Emission Factors

	lbs/1,000 gals								
Emission Source	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Main Engines-Controlled	337	16.80	78.30	0.21	33.00	31.68	0.910	0.180	22537.9
Main Engines-Uncontrolled	561	16.80	78.30	0.21	33.00	31.68	0.910	0.180	22537.9
Generator Engines	600	48.98	129.26	0.21	42.18	40.49	0.910	0.180	22537.9
Bow Thruster	600	48.98	129.26	0.21	42.18	40.49	0.910	0.180	22537.9

Notes:
Emission factors taken from PTO 9104 for Hermosa, PTO 9105 for Hidalgo, and PTO 9103 for Harvest (October 2008)
GHG EF based on CARB Mandatory Reporting

Supply Boat Usage, hours

Fuel Usage	Hrs	day	qtr	yr
Main Engines-Controlled	1	11	459	1,837
Main Engines-Uncontrolled	1	11	46	184
Generator Engines	1	11	459	1,837
Bow Thruster	1	2	78	312

Supply Boat Usage, hours

Fuel Usage	gals/hr
Main Engines-Controlled	127.4
Main Engines-Controlled	127.4
Generator Engines	13.5
Bow Thruster	28.3

Notes:
A. Total is from Port Hueneme to the platforms (round trip assumes 14.5-hrs main engines and generator engines, 2-hrs bow thrusters).
B. SBC is from SB County line to the platforms (round trip assumes 11-hrs main engines and generator engines, 2-hrs bow thrusters).
C. PTO is within 25 miles of the platforms (round trip assumes 4-hrs main engines and generator engines, 2-hrs bow thrusters).
D. Platform transfer at Platform Hidalgo (round trip assumes 2-hrs generator engines, 4-hrs bow thrusters).

Total Supply Boat Emissions (Port Hueneme to the Platforms)

Estimated Supply Boat Emissions	NO_X	ROC	CO	SO_X	PM	PM_{10}	CH_4	N_2O	CO_2
Drill Rig Transport from Port Hueneme to the Platforms [C]									
lbs/hr (max.)[A]	96.55	4.19	15.38	0.04	5.97	5.73	0.15	0.03	3,813
lbs/day[B]	909.12	33.58	136.21	0.34	54.89	52.69	1.46	0.29	36,202
tons/qr[F]	14.02	0.75	3.06	0.01	1.24	1.19	0.03	0.01	820
tons/yr[F]	56.09	2.99	12.25	0.03	4.96	4.76	0.13	0.03	3,280

Notes:
A. lbs/hr maximum based on all engines running simultaneously, and assumes uncontrolled main engines.
B. Assumes one round trip per day, and assumes uncontrolled main engines.
C. Drill rig transport based on 20 round trips over a 30-day period.
D. Annual emissions assume 20 trips to deliver drill rig and 20 trips to remove drill rig
E. Supply boat trips for drilling assume 1 additional round trip per week over current operations for 16 weeks per year (2 wells).
F. Assumes that uncontrolled main engines are used 10% of the time. (Same assumption as PTOs 9103, 9104, and 9105.)

Western Half of OCS-P 0450 Development Project
Fugitive Emission Estimates

Component Type	Quantity[A]	Emission Factor[B] (lbs/day-clp)	ROC Emissions			
			lbs/hr	lbs/day	tons/qr	tons/yr
Oil - 2 wells controlled[C]	216	0.0009	0.008	0.194	0.009	0.035
Oil - unsafe	0	0.0044	0.000	0.000	0.000	0.000
Gas - 2 wells controlled[D]	242	0.0147	0.148	3.557	0.162	0.649
Gas - unsafe	0	0.0736	0.000	0.000	0.000	0.000
Total	***458***		***0.156***	***3.752***	***0.171***	***0.685***

Notes:

A. Well component counts are estimates only and are based upon existing well data.
Actual counts will be developed when wells are installed.

B. Emission Factors from SBCAPCD PTOs 9103, 9104, and 9105.

C. Include 108 oil leak paths and 121 gas leak paths per well

Western Half of OCS-P 0450 Development Project
Offsite Truck Emissions

Truck Equipment List and Parameters

Source	Parameters					
	Vehicle Type	Number of Round Trips per Day	Number of Trips per Week	Number of Weeks per Year	Distance Round Trip (mi)	Total Round Trips
Truck Trips for Drill Rig Delivery/Removal	HHT Diesel	1	5	20	300	100
Truck Trips for Drilling Supplies	HHT Diesel	1	4	80	300	320
Truck Trips for Misc Wastes	HHT Diesel	1	1	20	300	20
	HHT Diesel	0	0	0	0	0

Notes:
A. Assumes all wells use water based muds, but some transported by truck.
B. These truck trips would not be needed if the cutting are injected at the platform.

Truck Emission Factors

	NO_x	ROC	CO	SO_x	PM	PM_{10}	CH_4	N_2O	CO_2
Exhaust Emission Factor (g/mile)	11.44	0.53	2.64	0.02	0.43	0.43	0.0051	0.0048	1686.50

Notes:
Emissions calculations based on EMFAC2011 for Ventura County, year 2013, T7 Tractor
GHG emissions based on CARB Mandatory reporting for diesel heavy duty trucks

Truck Emissions

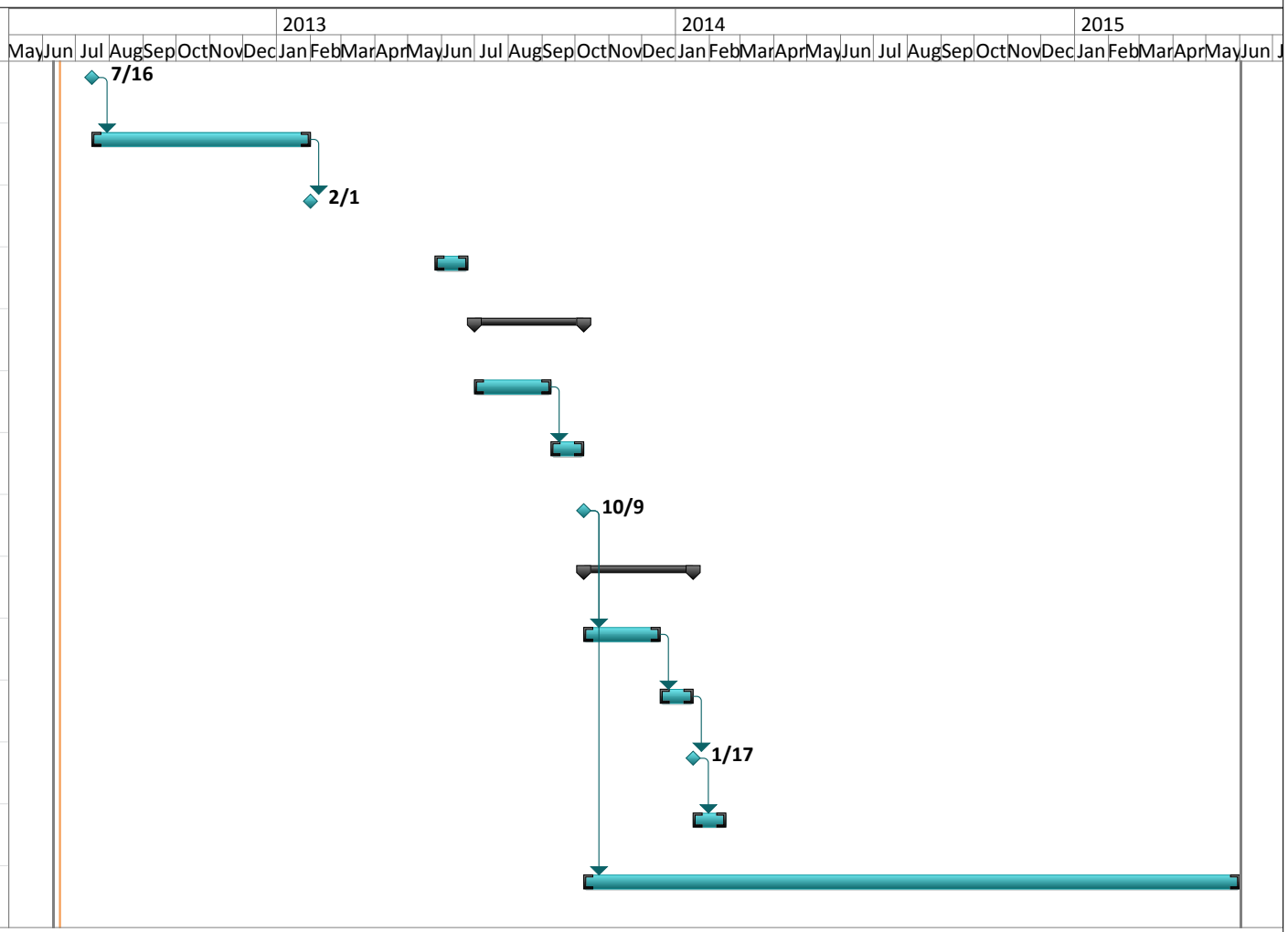
Source	lbs/day[C]					
	NO_x	ROC	CO	SO_x	PM	PM_{10}
Truck Trips for Drill Rig Delivery/Removal	7.57	0.35	1.74	0.01	0.28	0.29
Truck Trips for Drilling Supplies	7.57	0.35	1.74	0.01	0.28	0.29
Truck Trips for Misc Wastes	7.57	0.35	1.74	0.01	0.28	0.29
Total[C]	**22.70**	**1.06**	**5.23**	**0.03**	**0.85**	**0.86**

	tons								
	NO_x	ROC	CO	SO_x	PM	PM_{10}	CH_4	N_2O	CO_2
Truck Trips for Drill Rig Delivery/Removal	0.38	0.02	0.09	0.00	0.01	0.01	0.00	0.00	56
Truck Trips for Drilling Supplies	1.21	0.06	0.28	0.00	0.05	0.05	0.00	0.00	178
Truck Trips for Misc Wastes	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00	11
Total[C]	**1.66**	**0.08**	**0.38**	**0.00**	**0.06**	**0.06**	**0.00**	**0.00**	**245**

Notes:
A. Daily emission total based upon one round trip for drill drig delivery, drilling supplies and misc waste removal.
B. Assumes 2 wells at Hidalgo

Estimated Development Scheudle for Western Half of OCS-P 0450

ID	Task Name
1	Submit Permit Applications
2	Permit Processing
3	Obtain Permit Approvals
4	Prepare and Mobilze Rig
5	**Well C16**
6	Drilling Well
7	Complete Well
8	First Production
9	**Well C17**
10	Drill Well
11	Complete Well
12	First Production
13	DeMobilize Rig
14	Ongoing Production



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Traffic Impacts for Western Half of OCS-P 0450 Truck Trips in Ventura County

Roadway and Intersection Classification

Circulation conditions are often described in terms of levels of service (LOS). Level of service is a means of describing the amount of traffic on a roadway versus the design capacity of the roadways. The design capacity of a roadway is defined as the maximum rate of vehicle travel that can reasonably be expected along a section of roadway. Capacity is dependent on a number of variables including road classification and number of lanes, weather and driver characteristics. The LOS rating reflects qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists. These measures include freedom of movement, speed and travel time, traffic interruptions, types of vehicle, comfort, and convenience. Ideal conditions for a roadway would include good lane widths and roadside clearances, the absence of trucks or other heavy vehicles and level terrain. LOS is generally computed as function of the ratio of traffic volume (V) to the capacity (C) of the roadway or intersection, which provides the V/C ratio (see the table below).

Trucks impact the LOS by occupying more roadway space and by having poorer operating qualities than passenger cars. Because heavy vehicles accelerate slower than passenger cars, gaps form in traffic flow that affect the efficiency of the roadway. Also, intersections present a number of variables that can influence LOS including curb parking, transit buses, turn lanes, signal spacing, pedestrians, and signal timing.

The Transportation Research Board has developed the Highway Capacity Manual, which details the procedures to be used in predicting LOS for a range of roadways and intersections. The LOS of a roadway is defined with scales ranging from A to F, with A indicating excellent traffic flow quality and F indicating stop-and-go traffic. Level E is normally associated with the maximum design capacity that a roadway can accommodate. The highest quality of traffic service occurs on roadways when motorists are able to drive their desired speed without strict enforcement and are not delayed by slow-moving vehicles more than 30 percent of the time. This condition is representative of LOS A. The classifications of LOS B and C are characterized when average drivers are delayed up to 45 and 60 percent of the time, respectively, by slow moving vehicles. The LOS of A, B, and C are generally considered satisfactory.

When an area drops to a LOS of E, the speed of traffic is restricted 71 to 100 percent of the time; and intersection signal cycles have one or more vehicles waiting through more than one signal cycle during peak traffic periods. The LOS of D is considered tolerable in urban areas, since during peak hours 31 to 70 percent of the signal cycles have one or more vehicles which wait through at least one signal cycle. Current design practices indicate that a LOS of D during peak hours is acceptable due to the cost of improving roadways up to a LOS of C.

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Western Half of OCS-P 0450 Truck Traffic

Truck traffic in Ventura County for the Western Half of OCS-P 0450 project will originate in Port Hueneme. Trucks will exit the port at Hueneme Rd., heading east for several miles. They will turn left at Las Posas Rd. and enter the ramp of southbound Highway 101. The trucks will then take Highway 101 south to Los Angeles County.

The project will involve 10 truck trips per work week, or approximately 2 truck trips per week day. The project will result in traffic increases of 0.03%, 0.04%, 0.003%, and 0.0025% at Hueneme Rd., Las Posas Rd., Highway 101 at Las Posas Rd., and Highway 101 at Kanan Rd, respectively. These small increases will not affect the LOS of any of these roadways.

Road/ Route	Class	Current ADT	ADT LOS	Design Cap	V/C Ratio	Ref.
Port Hueneme to Ventura/L.A. County Border						
Hueneme Rd.	Major - 2 Lanes	11,900	C	16,000	0.74	1
Las Posas Rd.	Major - 2 Lanes	9,200	A	16,000	0.58	1
101 Southbound at Las Posas Rd.	Freeway 6 - Lanes	140,000	B	195,000	0.72	2
101 Southbound at Kanan Rd.	Freeway - 8 to 10 Lanes	163,000	B	292,500	0.56	2

References

1. *Traffic counts from Ventura County Department of Public Works – 2011 Traffic Volumes*
2. *Traffic counts and average design capacity of 32,500 vehicles per lane per day from CalTrans.*

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