

MILES CITY FIELD OFFICE
Supplemental Air Quality Analysis

APPENDIX A
EMISSIONS INPUT

APPENDIX A

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Supplemental Air Quality Analysis

A.1 Montana Project Emission Calculations

A.1.1 Construction Emission Calculations for the Montana CBM Project Activities – Alternative H Revised

Fugitive Dust Emissions

Emission Factors for Construction Activities

			Reference
E	=	1.2 Tons of TSP/acre/month	EPA, AP-42, Volume I, Section 13.2.3 Heavy Construction Operations (1/95)
PM10	=	26 % of TSP	Argonne National Laboratory - 2002 TSD
PM2.5	=	15 % of PM10	Argonne National Laboratory - 2002 TSD
CE	=	50 % Control Efficiency for watering	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emission Calculations for Construction Activities

Area Disturbed for CBNG Wells	Emission Estimation Basis	Disturbed Area (acre)	Avg. # of Days to Complete	Total # of Well Pads or Stations	Total Disturbed Area	Emissions					
						(lb/well pad, lb/stn, or lb/project)			(ton/project)		
						TSP	PM10	PM2.5	TSP	PM10	PM2.5
Road	per Well Pad	0.75	3	6,075	4,556	90	23	4	273	71	11
Well Pad	per Well Pad	0.25	3	6,075	1,519	30	8	1	91	24	4
Gathering Poly Pipeline (Low Pressure)	per Well Pad	1.5	1	6,075	9,113	60	16	2	182	47	7
Steel Pipeline (Low/Intermediate Pressure)	per Field Station	6.06	1	673	4,078	242	63	9	82	21	3
Sales Pipeline, 36" D x 600 miles	per Project		1		1,316	52,640	13,686	2,053	26	7	1
Electric Line	per Well Pad	0.35	1	6,075	2,126	14	4	1	43	11	2
Field Compressor Station	per Field Station	2	5	673	1,346	400	104	16	135	35	5
Sales Compressor Station	per Sales Station	1	5	67	67	200	52	8	7	2	0
Impoundment	per Impoundment	6	5	356	2,136	1,200	312	47	214	56	8
				Total	26,257				1,052	274	41

Exhaust Emissions

Emission Factors for Construction Equipment EPA, AP-42, Volume II, Section 11-7 Heavy-Duty Construction Equipment (9/85)

Equipment	Emission Factors (g/hp-hr)					Equipment Category in AP-42
	NOx	PM10	SO2	CO	VOCs	
Backhoe	8.81	0.81	0.86	2.71	0.97	Wheeled Loader
Dozer	7.81	0.69	0.85	2.15	0.75	Track-type Tractor
Blade	7.14	0.63	0.87	1.54	0.36	Motor Grader
Trencher	11.01	0.90	0.93	4.60	1.01	Miscellaneous
Trackhoe	9.30	0.66	0.85	2.26	1.11	Track-type Tractor

Emissions Estimation for Construction Equipment

Construction Site	Equipment Type	Capacity (hp)	# of Units	Avg. Load Factor (%)	# of Operating Hours per Day	# of Operating Days per Well Pad or per Station	# of Operating Hours per Well Pad or per Station	# of Well Pads or Stations	Emissions																			
									(lb/well pad, lb/stn, or lb/project)					(ton/equipment type)					(ton/construction site)									
									NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs					
Road	Blade	100	1	80	10	0.2	2	6,075	3	0.2	0.3	0.5	0.1	8	1	1	2	0										
	Backhoe	80	1	75	10	0.1	1	6,075	1.2	0.1	0.1	0.4	0.1	4	0	0	1	0	11	1	1	3	1					
Well Pad	Backhoe	80	1	75	10	0.5	5	6,075	6	0.5	0.6	2	0.6	18	2	2	5	2	18	2	2	5	2					
	Blade	100	1	80	10	0.25	2.5	6,075	3	0.3	0.4	0.7	0.2	10	1	1	2	0										
Gathering Poly Pipeline (Low Pressure)	Trencher	175	1	80	10	1	10	6,075	34	3	3	14	3	103	8	9	43	9										
	Backhoe	80	1	75	10	0.25	2.5	6,075	3	0.3	0.3	0.9	0.3	9	1	1	3	1	122	10	11	48	11					
Steel Pipeline (Low/Intermediate Pressure)	Blade	100	1	80	10	5	50	673	63	5.6	7.7	13.6	3.2	21	2	3	5	1										
	Trencher	175	1	80	10	5	50	673	170	13.9	14.4	71.0	15.6	57	5	5	24	5										
	Trackhoe	75	1	75	10	10	100	673	115	8.2	10.5	28.0	13.8	39	3	4	9	5	117	9	11	38	11					
	Blade	100	1	80	10	43.4	434.3	1	547	48	87	118	28	0.27	0.02	0.03	0.06	0.01										
Steel Pipeline (Sales)	Trencher	175	1	80	10	43.4	434.3	1	1,476	121	125	617	135	0.74	0.06	0.06	0.31	0.07										
	Trackhoe	75	1	75	10	65.1	651.4	1	751	53	69	183	90	0.38	0.03	0.03	0.09	0.04	1.39	0.11	0.13	0.46	0.13					
Field Compressor Station	Dozer	350	1	80	8	2	16	673	77	7	8	21	7	26.0	2.3	2.8	7.1	2.5										
	Backhoe	80	2	80	8	3	24	673	60	5	6	18	7	20.1	1.8	2.0	6.2	2.2	46.0	4.1	4.8	13.3	4.7					
Sales Compressor Station	Dozer	350	1	80	8	2	16	67	77	7	8	21	7	2.6	0.2	0.3	0.7	0.2										
	Backhoe	80	2	80	8	3	24	67	60	5	6	18	7	2.0	0.2	0.2	0.6	0.2	4.6	0.4	0.5	1.3	0.5					
Impoundment	Dozer	350	1	80	8	0.4	3.2	358	15	1	2	4	1	2.7	0.2	0.3	0.8	0.3										
	Blade	100	1	80	8	0.4	3.2	358	4	0	0	1	0	0.7	0.1	0.1	0.2	0.0	3.5	0.3	0.4	0.9	0.3					
									Subtotal:	323	27	30	110	30	323	27	30	110	30									

Emission Factors for Industrial Engines

Emission Source	Fuel Type	Emission Factors					
		Unit	NOx	PM10	SOx	CO	VOCs
Industrial Engine	Diesel	lb/hp-hr	3.10E-02	2.20E-03	2.05E-03	6.68E-03	2.51E-03
Flaring	Natural Gas	lb/MMCF	69	7.6	0.6	377	64

EPA, AP-42, Volume I, Section 3.3 Gasoline and Industrial Engines
EPA, AP-42, Volume I, Section 13.5 Industrial Flares & Section 1.4 Natural Gas Combustion

Emissions Estimation for Industrial Engines

Construction Site Activity	Equipment Type	Capacity (hp)	# of Units	Avg. Load Factor (%)	# of Operating Hours per Day	# of Operating Days per Well	# of Operating Hours per Well	# of Wells	Emissions																			
									(lb/well)					(ton/equipment type)					(ton/project activity)									
									NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs					
Rig-up, Drilling, and Rig-down	Main Deck	400	1	60	11	3	33	18,225	248	17	16	53	20	2,237	159	148	482	181	3,254	231	215	701	263					
	Auxiliary Pump	200	1	90	10	2	20	18,225	112	8	7	24	9	1,017	72	67	219	82										
Well Completion & Testing	Main Deck	400	1	60	10	1	10	18,225	74	5	5	16	6	678	48	45	146	55	13,716	975	905	3,154	1,143					
	Auxiliary Pump	125	1	90	6	1	6	18,225	21	1	1	5	2	191	14	13	41	15										
	Field Generators for Pumps & Lighting	125	8	75	24	120	380	18,225	1403	100	93	302	114	12,810	909	847	2,760	1,037										
	Emission Source	Average Volume Flared (MCFD/well)			Average # Days of Continuous Flaring			# of Wells																				
	Flaring of Natural Gas	60			1			18,225	4	0.5	0.0	23	4	38	4	0	207	35										
									Subtotal:	16,971	1,206	1,120	3,855	1,406	16,971	1,206	1,120	3,855	1,406									
									Total:	17,294	1,233	1,151	3,965	1,436	17,294	1,233	1,151	3,965	1,436									

PM2.5 is assumed to be same as PM10

Supplemental Air Quality Analysis

Commuting Vehicles

Road Dust Emissions

Emission Factors for Road Traffic

$$E \text{ (lb/VMT)} = \frac{k(s/12)^a(W/3)^b}{(M/0.2)^c}$$

Parameter	PM10	PM2.5
k	2.6	0.38
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source: EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Function/Variable Description

E = size-specific emission factor (lb/VMT)

s = surface material silt content (%)

W = mean vehicle weight (tons)

M = surface material moisture content (%)

CE = control efficiency for watering (%)

Assumed Value

5.1

listed in table below

0.2

50

Reference

EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Default value in EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emissions Estimation for Road Traffic

Construction Site Destination	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions			Controlled Em. Factor (lb/VMT)	Emissions		
								(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)		(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)
Road	Semi Trucks	60,000	6	2.6	16	6,075	1.65	26	78	78	0.24	4	11	11
Well Pad	Haul Trucks	45,000	6	2	12	6,075	1.47	18	54		0.21	3	8	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	79	0.10	1	4	12
Poly Pipeline, < 3"	Haul Trucks	45,000	6	4	24	6,075	1.47	35	107		0.21	5	16	
	Pickup Trucks	7,000	6	4	24	6,075	0.70	17	51	158	0.10	2	7	23
Steel Pipeline	Semi Trucks	60,000	6	4	24	673	1.65	40	13		0.24	6	2	
	Haul Trucks	45,000	6	40	240	673	1.47	352	119		0.21	51	17	
	Pickup Trucks	7,000	6	160	960	673	0.70	669	225	357	0.10	98	33	52
	Semi Trucks	60,000	35	94	3,290	1	1.65	5418	3		0.24	792	0	
Sales Pipeline, 36" D, 600 mi	Haul Trucks	45,000	35	94	3,290	1	1.47	4829	2		0.21	706	0	
	Pickup Trucks	7,000	50	94	4,700	1	0.70	3277	2	7	0.10	479	0	1
Electric Line	Haul Trucks	45,000	6	1	6	6,075	1.47	9	27		0.21	1	4	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	52	0.10	1	4	8
Field Compressor Station	Semi Trucks	60,000	10	15	150	673	1.65	247	83		0.24	36	12	
	Haul Trucks	45,000	10	48	480	673	1.47	705	237		0.21	103	35	
	Pickup Trucks	7,000	10	192	1,920	673	0.70	1339	451	771	0.10	196	66	113
Sales Compressor Station	Semi Trucks	60,000	10	18.5	185	67	1.65	305	10		0.24	45	1	
	Haul Trucks	45,000	10	48	480	67	1.47	705	24		0.21	103	3	
	Pickup Trucks	7,000	10	192	1,920	67	0.70	1339	45	79	0.10	196	7	11
Impoundment	Semi Trucks	60,000	6	0.02	0.12	356	1.65	0	0		0.24	0	0	
	Haul Trucks	45,000	6	0.02	0.12	356	1.47	0	0		0.21	0	0	
	Pickup Trucks	7,000	6	0.02	0.12	356	0.70	0	0	0	0.10	0	0	0
							Subtotal:		1,580	1,580			231	231

Emissions Estimation for Road Traffic Continued

Construction Site Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well)	(ton/veh. type)		(ton/proj. activity)	(lb/well)	(ton/veh. type)	(ton/const. site)
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	80,000	6	1	6	18,225	1.85	11	101	1,587	0.27	2	15	232
	Fuel Haul Truck	45,000	6	2	12	18,225	1.47	18	161		0.21	3	23	
	Mud Haul Truck, Water Hauling	60,000	6	7	42	18,225	1.65	69	630		0.24	10	92	
	Rig Crew	7,000	6	3	18	18,225	0.70	13	114		0.10	2	17	
	Co. Supervisor	7,000	6	8	48	18,225	0.70	33	305		0.10	5	45	
	Tool Pusher	7,000	6	6	36	18,225	0.70	25	229		0.10	4	33	
	Logger, Engr. Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
Well Completion & Testing	Semi Casing	45,000	6	1	6	18,225	1.47	9	80	1,663	0.21	1	12	243
	Semi Completion, Unit Rig	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Tubing Truck	45,000	6	1	6	18,225	1.47	9	80		0.21	1	12	
	Haul Cementer, Pump Truck	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Haul Cementer, Cement Truck	60,000	6	1	6	18,225	1.65	10	90		0.24	1	13	
	Haul Completion, Equip. Truck	20,000	6	1	6	18,225	1.06	6	58		0.16	1	8	
	Haul Preforators, Logging Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Welders	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Water Truck	60,000	6	9	54	18,225	1.65	89	810		0.24	13	118	
	Pickup Cementor, Engineer	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Co. Supervisor	7,000	6	2	12	18,225	0.70	8	76		0.10	1	11	
	Pickup Miscellaneous Supplies	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Roustabout Crew	12,000	6	2	12	18,225	0.87	10	95		0.13	2	14	
Subtotal:									3,250	3,250			475	475
Total:									4,830	4,830			706	706

Supplemental Air Quality Analysis

Exhaust Emissions

Emission Factors for Road Traffic

$$E \text{ (lb/VMT)} = \frac{k (s/12)^a (W/3)^b}{(M/0.2)^c}$$

Parameter	PM10	PM2.5
k	2.6	0.38
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source: EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Function/Variable Description	Assumed Value	Reference
E = size-specific emission factor (lb/VMT)		
s = surface material silt content (%)	5.1	EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)
W = mean vehicle weight (tons)	listed in table below	
M = surface material moisture content (%)	0.2	Default value in EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)
CE = control efficiency for watering (%)	50	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emissions Estimation for Road Traffic

Construction Site Destination	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)		(ton/const. site)	(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)
Road	Semi Trucks	60,000	6	2.6	16	6,075	1.65	26	78	78	0.24	4	11	11
Well Pad	Haul Trucks	45,000	6	2	12	6,075	1.47	18	54		0.21	3	8	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	79	0.10	1	4	12
Poly Pipeline, < 3"	Haul Trucks	45,000	6	4	24	6,075	1.47	35	107		0.21	5	16	
	Pickup Trucks	7,000	6	4	24	6,075	0.70	17	51	158	0.10	2	7	23
Steel Pipeline	Semi Trucks	60,000	6	4	24	673	1.65	40	13		0.24	6	2	
	Haul Trucks	45,000	6	40	240	673	1.47	352	119		0.21	51	17	
	Pickup Trucks	7,000	6	160	960	673	0.70	669	225	357	0.10	98	33	52
Sales Pipeline, 36" D, 600 mi	Semi Trucks	60,000	35	94	3,290	1	1.65	5418	3		0.24	792	0	
	Haul Trucks	45,000	35	94	3,290	1	1.47	4829	2		0.21	706	0	
	Pickup Trucks	7,000	50	94	4,700	1	0.70	3277	2	7	0.10	479	0	1
Electric Line	Haul Trucks	45,000	6	1	6	6,075	1.47	9	27		0.21	1	4	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	52	0.10	1	4	8
Field Compressor Station	Semi Trucks	60,000	10	15	150	673	1.65	247	83		0.24	36	12	
	Haul Trucks	45,000	10	48	480	673	1.47	705	237		0.21	103	35	
	Pickup Trucks	7,000	10	192	1,920	673	0.70	1339	451	771	0.10	196	66	113
Sales Compressor Station	Semi Trucks	60,000	10	18.5	185	67	1.65	305	10		0.24	45	1	
	Haul Trucks	45,000	10	48	480	67	1.47	705	24		0.21	103	3	
	Pickup Trucks	7,000	10	192	1,920	67	0.70	1339	45	79	0.10	196	7	11
Impoundment	Semi Trucks	60,000	6	0.02	0.12	356	1.65	0	0		0.24	0	0	
	Haul Trucks	45,000	6	0.02	0.12	356	1.47	0	0		0.21	0	0	
	Pickup Trucks	7,000	6	0.02	0.12	356	0.70	0	0	0	0.10	0	0	0
							Subtotal:		1,580	1,580			231	231

Emissions Estimation for Road Traffic Continued

Construction Site Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well)	(ton/veh. type)		(ton/proj. activity)	(lb/well)	(ton/veh. type)	(ton/const. site)
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	80,000	6	1	6	18,225	1.85	11	101	1,587	0.27	2	15	232
	Fuel Haul Truck	45,000	6	2	12	18,225	1.47	18	161		0.21	3	23	
	Mud Haul Truck, Water Hauling	60,000	6	7	42	18,225	1.65	69	630		0.24	10	92	
	Rig Crew	7,000	6	3	18	18,225	0.70	13	114		0.10	2	17	
	Co. Supervisor	7,000	6	8	48	18,225	0.70	33	305		0.10	5	45	
	Tool Pusher	7,000	6	6	36	18,225	0.70	25	229		0.10	4	33	
	Logger, Engr. Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
Well Completion & Testing	Semi Casing	45,000	6	1	6	18,225	1.47	9	80	1,663	0.21	1	12	243
	Semi Completion, Unit Rig	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Tubing Truck	45,000	6	1	6	18,225	1.47	9	80		0.21	1	12	
	Haul Cementer, Pump Truck	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Haul Cementer, Cement Truck	60,000	6	1	6	18,225	1.65	10	90		0.24	1	13	
	Haul Completion, Equip. Truck	20,000	6	1	6	18,225	1.06	6	58		0.16	1	8	
	Haul Preforators, Logging Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Welders	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Water Truck	60,000	6	9	54	18,225	1.65	89	810		0.24	13	118	
	Pickup Cementor, Engineer	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Co. Supervisor	7,000	6	2	12	18,225	0.70	8	76		0.10	1	11	
	Pickup Miscellaneous Supplies	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Roustabout Crew	12,000	6	2	12	18,225	0.87	10	95		0.13	2	14	
Subtotal:									3,250	3,250			475	475
Total:									4,830	4,830			706	706

A.1.1.2 Emission Calculations for the Montana CBM Project Operational Activities – Alternative H Revised

Compressors – Natural Gas Fired

Emission Factors for Compressors:

Compressor			Make	Model	Capacity (hp)	Emission Factors (g/hp-hr)					
						NOx	PM10	SO2	CO	VOCs	HCHO
Field	Rich Burn	50%	Caterpillar	G3408	400	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	50%	Waukesha	F18GL	400	1.50	6.60E-02	2.00E-03	1.50	0.50	0.20
Sales	Rich Burn	50%	Waukesha	7044GSI	1680	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	25%	Caterpillar	G3516LE	1340	1.50	3.40E-02	2.00E-03	0.50	1.00	0.07
		25%	Caterpillar	G3608	2225	1.50	3.40E-02	2.00E-03	0.30	1.00	0.07

Emissions Estimation for Compressors:

Type of Compressors	Total # of Operating Station-Year	Operating Hours per Year	Total Emissions (ton/project)				
			NOx	PM10	SO2	CO	VOCs
Field	7,299	8,760	42,289	1,861	56	49,337	21,144
Sales	730	8,760	18,306	604	24	14,200	12,204
Total			60,594	2,465	81	63,536	33,348

Assume PM2.5 is same as PM10

Dehydrators

Emission Factors for Dehydrators

Unit	NOx	PM10	SO2	CO	VOCs
lb/MMscf	100	7.6	0.6	84	5.5
lb/MMBtu	9.80E-02	7.45E-03	5.88E-04	8.24E-02	5.39E-03

Emissions Estimations for Dehydrators

Compressor Station	Total Gas Production Rate (MMCFD-yr)	Firing Rate (Btu/hr/MMCFD)	Operating Hours per Year	Total Emissions (ton/project)				
				NOx	PM10	SO2	CO	VOCs
Sales	44,944	25,000	8,760	482	37	3	406	27

Supplemental Air Quality Analysis

Road Dust Emissions

Emissions Estimates for Road Traffic:

Activity	Compressor Station	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	PM10		PM2.5			
									Em. Factor (lb/VMT)	Emissions		Em. Factor (lb/VMT)	Emissions	
										(lb/ station-yr)	(ton/ project)		(lb/ station-yr)	(ton/project)
Inspection Visits for Compressor Stations	Field	Pickup Truck	7,000	20	15	12	16	7,299	1.03	16.5	60	0.15	2.4	9
	Sales	Pickup Truck	7,000	20	15	52	69	730	1.03	71.4	26	0.15	10.4	4
Total:											86			13

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Compressor Station	Vehicle		Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	Emissions												
		Type	Class						(lb/station-yr)						(ton/project)						
									NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	
Inspection Visits for Compressor Stations	Field	Pickup Truck	LDGT2	20	15	12	16	7,299	0.04	0.00	0.00	0.00	0.41	0.03	0.1	0.0	0.0	0.0	1.5	0.1	
	Sales	Pickup Truck	LDGT2	20	15	52	69	730	0.15	0.02	0.01	0.02	1.78	0.11	0.1	0.0	0.0	0.0	0.6	0.0	
Totals:															0.2	0.0	0.0	0.0	0.0	2.1	0.1

Well Workover

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	PM10 Emissions			PM2.5 Emissions		
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
								(lb/well)	(ton/project)		(lb/well)	(ton/project)
Well Workover	Bobtail Truck	40,000	50	1	50	18,225	2.06	103	939	0.30	15	138

Exhaust Emissions – On-site

Emissions Estimation for Industrial Engines:

Activity	Equipment	Capacity (hp)	Operating Hours per Day	Total # of Wells Drilled	Emissions									
					(lb/well)					(ton/project)				
					NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Well Workover	Truck-Mounted Unit	400	10	18,225	124	9	8	27	10	1,130	80	75	243	91

Exhaust Emissions – On-site

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	Emissions											
	Type	Class					(lb/station-yr)					(ton/project)						
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Well Workover	Bobtail Truck	HDDV	50	1	50	18,225	0.9	0.2	0.2	0.2	1.9	0.5	8	2	2	2	17	5

Supplemental Air Quality Analysis

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	PM10 Emissions			PM2.5 Emissions		
								Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
									(lb/well)	(ton/project)		(lb/well)	(ton/project)
Visits for Inspection and Repair	200-hp Pickup	7,000	75	120	12	7.5	175,181	1.03	7.7	677	0.15	1.1	99

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	Emissions											
	Type	Class						(lb/station-yr)					(ton/project)						
								NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Visits for Inspection and Repair	200-hp Pickup	LDGT2	75	120	12	7.5	175,181	0.017	0.002	0.001	0.002	0.192	0.012	1.5	0.1	0.1	0.2	16.9	1.1

A.1.1.3 Emission Calculations for the Montana CBM Project Maintenance Activities – Alternative H Revised**Road Maintenance – Heavy Equipment****Given Data:**

Maintenance	Equipment/Vehicle			Road Length Worked On per Day (mi)	# of Operating Hours per Day
	Type	Fuel	Capacity (hp)		
Summer	Heavy Equipment	Diesel	135	6	10
	Commuting Vehicle	Gasoline	225	6	1
Winter	Heavy Equipment	Diesel	135	5	10
	Commuting Vehicle	Gasoline	225	6	1.5

Estimation of Total and Cumulative Length of Roads:

Total Length of Roads to be Built (mi)	6,224
Cumulative Length of Roads Maintained (mi-yr)	59,826

Estimation of Total Operation Days and Hours:

Season	# of Operation per Year	Cumulative Length of Roads (mi-yr)	Road Length Worked On (mi/day)	# of Operating Hours per Day	Total # of Operating Days	Total # of Operating Hours
Summer	2	59,826	6	10	19,942	199,420
Winter	1	59,826	5	10	11,965	119,652
Totals:					31,907	319,071

Fugitive Dust Emissions

Emissions Factor for Grader - Road Dust

Pollutant	Emission Factor Equation (lb/VMT)	S (mph)	Emission Factor (lb/VMT)
PM10	$E = (0.6)(0.051)(S^2)$	5	0.765
PM2.5	$E = (0.031)(0.051)(S^{2.5})$	5	0.069

Emissions Estimation for Grader - Road Dust:

Activity	Equipment	Total # of Operating Hours	Mean Vehicle Speed (mph)	Total Miles Maintained	PM10		PM2.5	
					Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Grader	191,443	5	957,214	0.765	366	0.069	33

Exhaust Emissions

Emissions Factor for Grader - Exhaust:

Equipment	Emission Factors (g/hp-hr)				
	NOx	PM10	SO2	CO	VOCs
Grader	7.14	0.63	0.87	1.54	0.36

Emissions Estimation for Grader - Road Dust:

Activity	Vehicle Type	Capacity (hp)	Total # of Operating Hours	Emissions									
				(lb/well)					(ton/project)				
				NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Road Maintenance	Grader	135	191,443	2.13	0.19	0.26	0.46	0.11	203	18	25	44	10

Road Maintenance – Commuting VehiclesRoad Dust EmissionsEmissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	PM10		PM2.5	
						Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Pickup Truck	7,000	6	31,907	191,443	1.03	99	0.15	14

Exhaust EmissionsEmissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	Emissions					
	Type	Class				(ton/project)					
						NOx	PM10	PM2.5	SO2	CO	VOCs
Road Maintenance	Pickup Truck	LDGT2	6	31,907	191,443	0.21	0.02	0.02	0.02	2.46	0.16

Supplemental Air Quality Analysis

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight	Compressor Station	# of Stations	Cumulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	PM10		PM2.5	
										Em. Factor	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Maintenance Visits to Compressor Stations	Pickup Truck	7,000	Field	673	7,299	2	14,598	20	291,976	1.03	150	0.15	22
	Pickup Truck	7,000	Sales	67	730	2	1,460	20	29,202	1.03	15	0.15	2
Totals:											165		24

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Compressor Station	# of Stations	Cumulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	Emissions (ton/project)					
	Type	Class													
										NOx	PM10	PM2.5	SO2	CO	VOCs
Inspection Visits for	Pickup Truck	LDGT2	Field	673	7,299	2	14,598	20	291,976	0.33	0.03	0.03	0.04	3.75	0.24
	Pickup Truck	LDGT2	Sales	67	730	2	1,460	20	29,202	0.03	0.00	0.00	0.00	0.37	0.02
Totals:										0.36	0.04	0.03	0.04	4.12	0.27

A.1.4 ADY 20 Alt H Rev CBNG

Wells Field Sales
 Ratio: 240 10 1

Year	Wells		Compressors					
	Drilled	Operating	Field	Sales	# Well Pads	# Operating Well Years	# Operating FC Years	# Operating SC Years
1	607	546	23	2	202	546	23	2
2	910	1,365	57	6	485	1,912	80	8
3	1,075	2,333	97	10	813	4,244	177	18
4	1,175	3,390	141	14	1,169	7,635	318	32
5	1,075	4,358	182	18	1,488	11,993	500	50
6	950	5,213	217	22	1,769	17,205	717	72
7	910	6,032	251	25	2,041	23,237	968	97
8	910	6,851	285	29	2,314	30,088	1,254	125
9	910	7,670	320	32	2,587	37,758	1,573	157
10	910	8,489	354	35	2,860	46,247	1,927	193
11	910	9,308	388	39	3,133	55,554	2,315	231
12	910	10,127	422	42	3,406	65,681	2,737	274
13	910	10,946	456	46	3,679	76,627	3,193	319
14	910	11,765	490	49	3,952	88,392	3,683	368
15	910	12,584	524	52	4,225	100,976	4,207	421
16	910	13,403	558	56	4,498	114,378	4,766	477
17	860	14,177	591	59	4,754	128,555	5,356	536
18	800	14,897	621	62	4,992	143,452	5,977	598
19	750	15,572	649	65	5,216	159,024	6,626	663
20	650	16,157	673	67	5,407	175,181	7,299	730
21	273	15,856	661	66	5,477	191,037	7,960	796
22	0	15,038	627	63	5,285	206,074	8,586	859
23	0	14,070	586	59	5,013	220,145	9,173	917
24	0	13,013	542	54	4,690	233,157	9,715	971
25	0	12,045	502	50	4,338	245,203	10,217	1,022
26	0	11,190	466	47	4,015	256,393	10,683	1,068
27	0	10,371	432	43	3,730	266,764	11,115	1,112
28	0	9,552	398	40	3,457	276,316	11,513	1,151
29	0	8,733	364	36	3,184	285,049	11,877	1,188
30	0	7,914	330	33	2,911	292,964	12,207	1,221
31	0	7,095	296	30	2,638	300,059	12,502	1,250
32	0	6,276	262	26	2,365	306,335	12,764	1,276
33	0	5,457	227	23	2,092	311,792	12,991	1,299
34	0	4,638	193	19	1,819	316,430	13,185	1,318
35	0	3,819	159	16	1,546	320,250	13,344	1,334
36	0	3,000	125	13	1,273	323,250	13,469	1,347
37	0	2,226	93	9	1,000	325,476	13,561	1,356
38	0	1,506	63	6	742	326,982	13,624	1,362
39	0	831	35	3	502	327,813	13,659	1,366
40	0	246	10	1	277	328,060	13,669	1,367

18,225

Supplemental Air Quality Analysis

ADY 20 Alt H Rev CBNG

	Operation and Maintenance						Construction					
	Emissions						Emissions					
	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
1	194.02	13.37	8.83	0.50	200.27	104.38	577.62	211.43	66.28	38.63	136.95	48.93
2	484.89	33.41	22.08	1.25	500.52	260.87	865.96	316.96	99.36	57.92	205.32	73.35
3	828.50	57.08	37.72	2.13	855.21	445.72	1,022.98	374.44	117.38	68.42	242.55	86.65
4	1,204.07	82.96	54.82	3.10	1,242.89	647.78	1,118.14	409.27	128.30	74.79	265.11	94.71
5	1,547.68	106.63	70.46	3.99	1,597.57	832.64	1,022.98	374.44	117.38	68.42	242.55	86.65
6	1,851.33	127.55	84.29	4.77	1,911.02	996.00	904.02	330.90	103.73	60.47	214.34	76.57
7	2,142.20	147.59	97.53	5.52	2,211.26	1,152.49	865.96	316.96	99.36	57.92	205.32	73.35
8	2,433.07	167.63	110.77	6.27	2,511.51	1,308.97	865.96	316.96	99.36	57.92	205.32	73.35
9	2,723.94	187.67	124.02	7.01	2,811.75	1,465.45	865.96	316.96	99.36	57.92	205.32	73.35
10	3,014.81	207.71	137.26	7.76	3,112.00	1,621.94	865.96	316.96	99.36	57.92	205.32	73.35
11	3,305.67	227.75	150.50	8.51	3,412.25	1,778.42	865.96	316.96	99.36	57.92	205.32	73.35
12	3,596.54	247.79	163.75	9.26	3,712.49	1,934.91	865.96	316.96	99.36	57.92	205.32	73.35
13	3,887.41	267.83	176.99	10.01	4,012.74	2,091.39	865.96	316.96	99.36	57.92	205.32	73.35
14	4,178.28	287.87	190.23	10.76	4,312.99	2,247.88	865.96	316.96	99.36	57.92	205.32	73.35
15	4,469.15	307.91	203.47	11.51	4,613.23	2,404.36	865.96	316.96	99.36	57.92	205.32	73.35
16	4,760.02	327.95	216.72	12.26	4,913.48	2,560.85	865.96	316.96	99.36	57.92	205.32	73.35
17	5,034.90	346.89	229.23	12.97	5,197.23	2,708.74	818.38	299.55	93.90	54.74	194.04	69.32
18	5,290.61	364.50	240.87	13.62	5,461.18	2,846.30	761.28	278.65	87.35	50.92	180.50	64.48
19	5,530.34	381.02	251.79	14.24	5,708.63	2,975.28	713.70	261.23	81.89	47.74	169.22	60.45
20	5,738.10	395.33	261.25	14.78	5,923.10	3,087.05	618.54	226.40	70.97	41.37	146.66	52.39
21							259.79	95.09	29.81	17.38	61.60	22.00
22							0.00	0.00	0.00	0.00	0.00	0.00
23							0.00	0.00	0.00	0.00	0.00	0.00
24							0.00	0.00	0.00	0.00	0.00	0.00
25							0.00	0.00	0.00	0.00	0.00	0.00
26							0.00	0.00	0.00	0.00	0.00	0.00
27							0.00	0.00	0.00	0.00	0.00	0.00
28							0.00	0.00	0.00	0.00	0.00	0.00
29							0.00	0.00	0.00	0.00	0.00	0.00
30							0.00	0.00	0.00	0.00	0.00	0.00
31							0.00	0.00	0.00	0.00	0.00	0.00
32							0.00	0.00	0.00	0.00	0.00	0.00
33							0.00	0.00	0.00	0.00	0.00	0.00
34							0.00	0.00	0.00	0.00	0.00	0.00
35							0.00	0.00	0.00	0.00	0.00	0.00
36							0.00	0.00	0.00	0.00	0.00	0.00
37							0.00	0.00	0.00	0.00	0.00	0.00
38							0.00	0.00	0.00	0.00	0.00	0.00
39							0.00	0.00	0.00	0.00	0.00	0.00
40							0.00	0.00	0.00	0.00	0.00	0.00
	62,216	4,286	2,833	160	64,221	33,471	17,343	6,348	1,990	1,160	4,112	1,469

Combined Construction & Operation and Maintenance						
Emissions						
	NOx	PM10	PM2.5	SO2	CO	VOCs
1	771.64	224.79	75.11	39.13	337.23	153.31
2	1,350.85	350.37	121.44	59.17	705.84	334.21
3	1,851.47	431.52	155.10	70.56	1,097.75	532.37
4	2,322.20	492.22	183.12	77.89	1,508.00	742.49
5	2,570.65	481.07	187.84	72.41	1,840.12	919.29
6	2,755.36	458.45	188.02	65.23	2,125.36	1,072.57
7	3,008.16	464.55	196.89	63.44	2,416.58	1,225.83
8	3,299.03	484.59	210.14	64.19	2,716.83	1,382.32
9	3,589.90	504.63	223.38	64.94	3,017.07	1,538.80
10	3,880.77	524.67	236.62	65.68	3,317.32	1,695.29
11	4,171.63	544.71	249.87	66.43	3,617.56	1,851.77
12	4,462.50	564.75	263.11	67.18	3,917.81	2,008.26
13	4,753.37	584.79	276.35	67.93	4,218.06	2,164.74
14	5,044.24	604.83	289.59	68.68	4,518.30	2,321.23
15	5,335.11	624.87	302.84	69.43	4,818.55	2,477.71
16	5,625.98	644.91	316.08	70.18	5,118.80	2,634.20
17	5,853.28	646.44	323.14	67.70	5,391.26	2,778.05
18	6,051.90	643.15	328.23	64.54	5,641.68	2,910.79
19	6,244.04	642.25	333.68	61.98	5,877.85	3,035.73
20	6,356.65	621.74	332.22	56.15	6,069.75	3,139.44
21	259.79	95.09	29.81	17.38	61.60	22.00
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00
	79,559	10,634	4,823	1,320	68,333	34,940

Emission Factors per Well						
	NOx	PM10	PM2.5	SO2	CO	VOCs
Op	0.355147	0.024468	0.016169	0.000915	0.366596	0.191066
Con	0.951605	0.348313	0.109191	0.063649	0.225624	0.080604

Supplemental Air Quality Analysis

A.1.5 Emission Points Alt H Rev. CBNG

1	A	B	C		D	E	G	H	I	J	K	L
	SEIS RFD Emission Points by Watershed					Construction Emissions per Point (tons)						
2	Longitude	Latitude	Watershed	County	Construction Wells represented by point	NOx	PM10	PM2.5	SO2	CO	VOCs	
3	-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
4	-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
5	-108.0888984	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
6	-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
7	-105.5441521	45.01011284	LITTLE POWDER	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
8	-105.4367862	45.14408638	LITTLE POWDER	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
9	-107.6163493	46.03435575	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
10	-107.2566985	45.82981624	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
11	-107.2689192	45.9319004	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
12	-107.2371025	45.91155283	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
13	-107.2876139	45.87320735	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
14	-107.3704664	45.9433915	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
15	-107.3833798	45.81986854	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
16	-107.2206782	45.78953449	LOWER BIGHORN	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
17	-105.8950719	45.32372874	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
18	-106.1906473	45.04845919	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
19	-106.127224	45.0482058	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
20	-106.0662494	45.0463265	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
21	-106.0192953	45.08316794	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
22	-106.0850023	45.08521834	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
23	-106.150915	45.08390454	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
24	-106.2145762	45.08081906	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
25	-105.9627608	45.12005428	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
26	-106.1962674	45.11191919	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
27	-106.1351194	45.11174049	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
28	-106.0714183	45.11478024	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
29	-106.0125111	45.11626908	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
30	-105.8058573	45.39278421	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
31	-106.000915	45.15089418	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
32	-106.0575099	45.14932839	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
33	-106.1091992	45.15092488	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
34	-106.1658912	45.14765111	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
35	-106.2270788	45.14781278	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
36	-105.957088	45.15485509	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
37	-105.8427057	45.47897521	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
38	-105.7670751	45.58143586	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
39	-105.7724857	45.67659425	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
40	-105.7939829	45.78061951	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
41	-105.7968544	45.87902714	LOWER TONGUE	Custer	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
42	-105.8384004	45.56452059	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
43	-106.2169993	45.59975321	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
44	-106.1245521	45.72872913	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
45	-106.1463546	45.51800756	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
46	-105.9185893	45.75201292	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
47	-105.9469395	45.84556398	LOWER TONGUE	Custer	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
48	-106.1199013	45.82426101	LOWER TONGUE	Custer	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
49	-106.1862006	45.74380863	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
50	-106.1732814	45.41523309	LOWER TONGUE	Powder River	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
51	-107.1353247	45.7765741	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
52	-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
53	-107.1159868	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
54	-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
55	-106.9102423	45.80233965	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
56	-106.9500425	45.73349506	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
57	-107.1777591	45.90447616	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
58	-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
59	-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
60	-106.9834606	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
61	-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
62	-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
63	-106.9852558	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
64	-106.9950453	45.71463439	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
65	-106.8791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
66	-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	
67	-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787	

1	A	B	C	D	E	G	H	I	J	K	L	
	SEIS RFD Emission Points by Watershed					Construction Emissions per Point (tons)						
2	Longitude	Latitude	Watershed	County	Construction Wells represented by point	NOx	PM10	PM2.5	SO2	CO	VOCs	
68	-108.1869611	46.42502531	MIDDLE MUSSEL SHELL	Musselshell		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
69	-106.1538128	45.00373939	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
70	-106.0026151	45.00435919	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
71	-105.8748974	45.01191736	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
72	-105.7462246	45.01080066	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
73	-105.6336909	45.01434879	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
74	-105.5669066	45.06934218	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
75	-105.6792641	45.07010005	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
76	-105.6128423	45.3589134	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
77	-105.9277779	45.07416887	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
78	-105.8887584	45.1440493	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
79	-105.7869424	45.14067783	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
80	-105.6775808	45.13801376	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
81	-105.5802048	45.13566681	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
82	-105.5168432	45.22913207	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
83	-105.4800443	45.18955626	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
84	-105.5666423	45.17873365	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
85	-105.6981156	45.1896391	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
86	-105.4738774	45.26675596	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
87	-105.7368235	45.26935109	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
88	-105.784381	45.31966458	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
89	-105.7030688	45.33537987	MIDDLE POWDER	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
90	-105.7215527	45.46134361	MIZPAH	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
91	-106.9962867	45.33689316	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
92	-106.9325316	45.33710215	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
93	-106.9621328	45.30947587	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
94	-106.994136	45.28023186	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
95	-106.9375915	45.27893984	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
96	-106.9579691	45.24610718	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
97	-106.881452	45.71725511	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
98	-106.757723	45.71928418	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
99	-106.6220247	45.72253455	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
100	-106.4959005	45.72421274	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
101	-106.3998157	45.78322101	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
102	-106.5306526	45.78510384	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
103	-106.6638756	45.78689404	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
104	-106.8020263	45.78531354	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
105	-106.3524423	45.8618565	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
106	-106.4549907	45.86135873	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
107	-106.5429837	45.86538099	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
108	-106.5608358	45.93247641	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
109	-106.4728256	45.92680484	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
110	-106.3890316	45.93117554	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
111	-106.324293	45.93602503	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
112	-106.2782499	45.98802101	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
113	-106.3614704	45.99537505	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
114	-106.4453652	45.99102485	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
115	-106.5432926	45.99197974	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
116	-106.5908348	46.04152496	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
117	-106.4639721	46.04316764	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
118	-106.37054	46.045603	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
119	-106.3032753	46.05037398	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
120	-106.3718811	46.10561053	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
121	-106.4461942	46.10431984	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
122	-106.5325503	46.10163267	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
123	-106.6275848	46.11575769	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
124	-106.5439175	46.15699001	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
125	-106.9475016	45.69484378	ROSEBUD	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
126	-106.4571953	46.18458578	ROSEBUD	Rosebud		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
127	-109.7578172	45.44657007	STILLWATER	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
128	-108.6823126	46.32003994	UPPER MUSSEL SHELL	Musselshell		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787

Supplemental Air Quality Analysis

1	SEIS RFD Emission Points by Watershed				Construction Emissions per Point (tons)							
2	Longitude	Latitude	Watershed	County	Construction Wells represented by point	NOx	PM10	PM2.5	SO2	CO	VOCs	
129	-106.8323923	45.00783238	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
130	-106.7903307	45.00602084	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
131	-106.9091138	45.05136249	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
132	-106.7465796	45.01595443	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
133	-106.7077379	45.03418601	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
134	-106.7475796	45.13008114	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
135	-106.6493939	45.093755	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
136	-106.6734747	45.07500148	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
137	-106.7245767	45.07472301	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
138	-106.8865526	45.05802281	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
139	-106.594975	45.04699579	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
140	-106.8194467	45.02325601	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
141	-106.5316421	45.01038326	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
142	-106.4704863	45.05358034	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
143	-106.4096151	45.01018167	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
144	-106.8651889	45.25178775	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
145	-106.8654241	45.22344433	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
146	-106.8622866	45.19582781	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
147	-106.7995346	45.25018769	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
148	-106.7985761	45.22419531	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
149	-106.7965835	45.19660405	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
150	-106.8644485	45.0093902	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
151	-106.9821692	45.00774532	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
152	-106.9790408	45.02701546	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
153	-106.6726239	45.00857642	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
154	-106.6092737	45.01086998	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
155	-106.6399265	45.03636498	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
156	-106.747682	45.09523907	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
157	-106.3608313	45.00959182	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
158	-106.3042044	45.01032764	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
159	-106.2121315	45.00998408	UPPER TONGUE	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
160	-106.245271	45.03143069	UPPER TONGUE	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
161	-106.3293535	45.03623872	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
162	-106.3869384	45.03868439	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
163	-106.5377821	45.04123955	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
164	-106.4660257	45.01332086	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
165	-106.5617171	45.0709975	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
166	-106.2852399	45.06959453	UPPER TONGUE	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
167	-106.2467164	45.05477978	UPPER TONGUE	Powder River		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
168	-109.0890249	45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
169	-109.0254773	45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
170	-109.0528827	45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
171	-109.0026382	45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
172	-109.1067798	45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
173	-109.0037776	45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
174	-109.0537864	45.72626256	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
175	-109.0900954	45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
176	-108.3574854	46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
177	-107.8845271	46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
178	-107.222593	45.425538	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
179	-107.278421	45.33934	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
180	-107.251687	45.280535	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
181	-107.17026	45.250393	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
182	-107.159928	45.205637	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
183	-107.234891	45.209166	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
184	-107.195872	45.13131	LITTLE BIGHORN	Big Horn		3.57	3.398589065	1.243974	0.389967	0.227317	0.805801	0.28787
185			Totals			650	619	226	71	41	147	52

	A	B	C	D	F	M	N	O	P	Q	R
1	SEIS RFD Emission Points by Watershed				Operational Wells represented by point	Operation Emissions per Point (tons)					
2	Longitude	Latitude	Watershed	County		NOx	PM10	PM2.5	SO2	CO	VOCs
3	-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	99.45	35.31874	2.433331	1.608015	0.090957	36.45739	19.00118
4	-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	100.35	35.63837	2.455353	1.622567	0.09178	36.78733	19.17314
5	-109.0888964	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	99.45	35.31874	2.433331	1.608015	0.090957	36.45739	19.00118
6	-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	100.35	35.63837	2.455353	1.622567	0.09178	36.78733	19.17314
7	-105.5441521	45.01011264	LITTLE POWDER	Powder River	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
8	-105.4367862	45.14408638	LITTLE POWDER	Powder River	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
9	-107.6163493	48.03435575	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
10	-107.2566985	45.82981624	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
11	-107.2689192	45.9319004	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
12	-107.2371025	45.91155283	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
13	-107.2876139	45.87320735	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
14	-107.3704664	45.9433915	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
15	-107.3833798	45.91986854	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
16	-107.2206782	45.78953449	LOWER BIGHORN	Big Horn	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
17	-105.8950719	45.32372874	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
18	-106.1906473	45.04845919	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
19	-106.127224	45.0482058	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
20	-106.0662494	45.0463265	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
21	-106.0192953	45.08316794	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
22	-106.0850023	45.08521834	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
23	-106.150915	45.08390454	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
24	-106.2145762	45.08081906	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
25	-105.9627608	45.12005428	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
26	-106.1962674	45.11191918	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
27	-106.1351194	45.11174049	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
28	-106.0714183	45.11478024	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
29	-106.0125111	45.11628908	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
30	-105.8058573	45.39278421	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
31	-106.000915	45.15088418	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
32	-106.0575099	45.14932839	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
33	-106.1091992	45.15092488	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
34	-106.1658912	45.1476511	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
35	-106.2270788	45.14781278	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
36	-105.957088	45.15485509	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
37	-105.8427057	45.47897521	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
38	-105.7670751	45.58143586	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
39	-105.7724857	45.67659425	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
40	-105.7939829	45.78061951	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
41	-105.7968544	45.87902714	LOWER TONGUE	Custer	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
42	-105.8384004	45.56452059	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
43	-106.2169993	45.59975321	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
44	-106.1245521	45.72872913	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
45	-106.1463546	45.51900756	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
46	-105.9185693	45.75201292	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
47	-105.9469395	45.84556398	LOWER TONGUE	Custer	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
48	-106.1199013	45.82426101	LOWER TONGUE	Custer	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
49	-106.1862006	45.74380863	LOWER TONGUE	Powder River	90.45	32.12242	2.213117	1.462491	0.082725	33.15803	17.28159
50	-106.1732814	45.41523309	LOWER TONGUE	Powder River	89.55	31.80279	2.191095	1.447938	0.081902	32.82809	17.10963
51	-107.1353247	45.7765741	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
52	-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
53	-107.1159668	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
54	-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
55	-106.9102423	45.80233865	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
56	-106.9500425	45.73349506	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
57	-107.1777591	45.90447816	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
58	-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	32.76168	2.25716	1.491596	0.084371	33.8179	17.62551
59	-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
60	-106.9834806	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	32.76168	2.25716	1.491596	0.084371	33.8179	17.62551
61	-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
62	-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	32.76168	2.25716	1.491596	0.084371	33.8179	17.62551
63	-106.985258	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
64	-106.9950453	45.7146349	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	32.76168	2.25716	1.491596	0.084371	33.8179	17.62551
65	-106.9791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	21.15	7.510764	0.517464	0.341955	0.019343	7.752907	4.040727
66	-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	33.08131	2.279181	1.506148	0.085195	34.14784	17.79747
67	-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	32.76168	2.25716	1.491596	0.084371	33.8179	17.62551

Supplemental Air Quality Analysis

1	A	B	C	D	F	M	N	O	P	Q	R	
	SEIS RFD Emission Points by Watershed					Operation Emissions per Point (tons)						
2	Longitude	Latitude	Watershed	County	Operational Wells represented by point	NOx	PM10	PM2.5	SO2	CO	VOCs	
68	-108.1869611	46.42502531	MIDDLE MUSSELSHELL	Musselshell		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
69	-106.1538128	45.00373939	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
70	-106.0026151	45.00435919	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
71	-105.8748974	45.01191736	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
72	-105.7462246	45.01080066	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
73	-105.6336909	45.01434879	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
74	-105.5669066	45.06934218	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
75	-105.6792641	45.07010005	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
76	-105.6128423	45.3589134	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
77	-105.9277779	45.07416887	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
78	-105.8887584	45.1440493	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
79	-105.7869424	45.14067783	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
80	-105.6775808	45.13801376	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
81	-105.5802048	45.13566681	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
82	-105.5168432	45.22913207	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
83	-105.4800443	45.18955626	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
84	-105.5666423	45.17873365	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
85	-105.6981156	45.1886391	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
86	-105.4738774	45.26675596	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
87	-105.7368235	45.26935109	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
88	-105.784381	45.31966458	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
89	-105.703068	45.33537987	MIDDLE POWDER	Powder River		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
90	-105.7215527	45.46134361	MIZPAH	Powder River		111.15	39.47395	2.71961	1.797196	0.101658	40.74657	21.23665
91	-106.9962867	45.33689316	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
92	-106.9325316	45.33710215	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
93	-106.9621328	45.30947587	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
94	-106.994136	45.28023186	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
95	-106.9375915	45.27893984	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
96	-106.9579691	45.24610718	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
97	-106.881452	45.71725511	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
98	-106.757723	45.71928418	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
99	-106.6220247	45.72253455	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
100	-106.4959005	45.72421274	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
101	-106.3998157	45.78322101	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
102	-106.5306526	45.78510384	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
103	-106.6638756	45.78689404	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
104	-106.8020263	45.78531354	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
105	-106.3524423	45.8618565	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
106	-106.4549907	45.86135873	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
107	-106.5429837	45.86538099	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
108	-106.5608358	45.93247641	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
109	-106.4728256	45.92680484	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
110	-106.3890316	45.93117554	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
111	-106.324293	45.93602503	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
112	-106.2782499	45.98802101	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
113	-106.3614704	45.99537505	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
114	-106.4453652	45.99102485	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
115	-106.5432926	45.99197974	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
116	-106.5908348	46.04152496	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
117	-106.4639721	46.04316784	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
118	-106.37054	46.045603	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
119	-106.3032753	46.05037398	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
120	-106.3718811	46.10561053	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
121	-106.4461942	46.10431984	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
122	-106.5325503	46.10163267	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
123	-106.6275848	46.11575769	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
124	-106.5439175	46.1569001	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
125	-106.9475016	45.69484378	ROSEBUD	Big Horn		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
126	-106.4571953	46.16458578	ROSEBUD	Rosebud		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
127	-109.7578172	45.44657007	STILLWATER	Stillwater		88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767
128	-108.6823126	46.32003994	UPPER MUSSELSHELL	Musselshell		66.15	23.49236	1.618537	1.069576	0.0605	24.24974	12.63869

	A	B	C	D	F	M	N	O	P	Q	R	
1	SEIS RFD Emission Points by Watershed					Operation Emissions per Point (tons)						
2	Longitude	Latitude	Watershed	County	Operational Wells represented by point	NOx	PM10	PM2.5	SO2	CO	VOCs	
129	-106.8323923	45.00783236	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
130	-106.7903307	45.00602084	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
131	-106.9091138	45.05136249	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
132	-106.7465796	45.01595443	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
133	-106.7077379	45.03416601	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
134	-106.7475796	45.13008114	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
135	-106.6493939	45.093755	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
136	-106.6734747	45.07500148	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
137	-106.7245767	45.07472301	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
138	-106.6865526	45.05802281	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
139	-106.594975	45.04699579	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
140	-106.8194467	45.02325601	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
141	-106.5316421	45.01038326	UPPER TONGUE	Big Horn	86.12	30.58573	2.107244	1.392527	0.078768	31.57179	16.45486	
142	-106.4704863	45.05358034	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
143	-106.4096151	45.01018167	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
144	-106.8651889	45.25176775	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
145	-106.8654241	45.22344433	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
146	-106.8622866	45.19582781	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
147	-106.7995346	45.25018769	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
148	-106.7985761	45.22419531	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
149	-106.7965835	45.19660405	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
150	-106.864485	45.0093902	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
151	-106.9621692	45.00774532	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
152	-106.9790408	45.02701546	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
153	-106.6726239	45.00857642	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
154	-106.6092737	45.01086998	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
155	-106.6399265	45.03636498	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
156	-106.747682	45.09523907	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
157	-106.3608313	45.00959182	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
158	-106.3042044	45.01032764	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
159	-106.2121315	45.00998408	UPPER TONGUE	Powder River	87.02	30.90536	2.129266	1.40708	0.079591	31.90173	16.62682	
160	-106.245271	45.03143069	UPPER TONGUE	Powder River	87.02	30.90536	2.129266	1.40708	0.079591	31.90173	16.62682	
161	-106.3293535	45.03623872	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
162	-106.3869384	45.03866439	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
163	-106.5377621	45.04123955	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
164	-106.4660257	45.01332086	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
165	-106.5617171	45.0709975	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
166	-106.2852399	45.06959453	UPPER TONGUE	Big Horn	85.22	30.2661	2.085223	1.377975	0.077945	31.24186	16.2829	
167	-106.2467164	45.05477978	UPPER TONGUE	Powder River	87.02	30.90536	2.129266	1.40708	0.079591	31.90173	16.62682	
168	-109.0890249	45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
169	-109.0254773	45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
170	-109.0528827	45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
171	-109.0026382	45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
172	-109.1067798	45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
173	-109.0037776	45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
174	-109.0537864	45.72626256	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
175	-109.0900954	45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
176	-108.3574854	46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
177	-107.8845271	46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	31.48315	2.169074	1.433386	0.081079	32.49815	16.93767	
178	-107.222593	45.425538	LITTLE BIGHORN	Big Horn	97.71	34.70289	2.390902	1.579976	0.089371	35.82169	18.66986	
179	-107.278421	45.33934	LITTLE BIGHORN	Big Horn	95.91	34.06363	2.346859	1.550871	0.087724	35.16182	18.32594	
180	-107.251687	45.280535	LITTLE BIGHORN	Big Horn	95.91	34.06363	2.346859	1.550871	0.087724	35.16182	18.32594	
181	-107.17026	45.250393	LITTLE BIGHORN	Big Horn	95.91	34.06363	2.346859	1.550871	0.087724	35.16182	18.32594	
182	-107.159928	45.205637	LITTLE BIGHORN	Big Horn	95.91	34.06363	2.346859	1.550871	0.087724	35.16182	18.32594	
183	-107.234891	45.209166	LITTLE BIGHORN	Big Horn	95.91	34.06363	2.346859	1.550871	0.087724	35.16182	18.32594	
184	-107.195872	45.13131	LITTLE BIGHORN	Big Horn	97.71	34.70289	2.390902	1.579976	0.089371	35.82169	18.66986	
185				Totals		16,157	6,738	396	261	15	5,923	3,087

Supplemental Air Quality Analysis

A.2.1 Emission Calculations for the Montana Conventional O&G Project Construction Activities – Alternative H Revised

Fugitive Dust Emissions

Emission Factors for Construction Activities

			Reference
E	=	1.2 Tons of TSP/acre/month	EPA, AP-42, Volume I, Section 13.2.3 Heavy Construction Operations (1/95)
PM10	=	26 % of TSP	Argonne National Laboratory - 2002 TSD
PM2.5	=	15 % of PM10	Argonne National Laboratory - 2002 TSD
CE	=	50 % Control Efficiency for watering	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emission Calculations for Construction Activities

Area Disturbed for CBNG Wells	Emission Estimation Basis	Disturbed Area (acre)	Avg. # of Days to Complete	Total # of Well Pads or Stations	Total Disturbed Area	Emissions					
						(lb/well)			(ton/project)		
						TSP	PM10	PM2.5	TSP	PM10	PM2.5
Bladed Road	per Well Pad	0.5	3	1,730	865	60	16	2	52	13	2
Well Pad	per Well Pad	0.5	3	1,730	865	60	16	2	52	13	2
				Total	1,730				104	27	4

Supplemental Air Quality Analysis

Road Dust Emissions

Emission Factors for Road Traffic

$$E \text{ (lb/VMT)} = \frac{k (s/12)^a (W/3)^b}{(M/0.2)^c}$$

Parameter	PM10	PM2.5
k	2.6	0.38
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source: EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Function/Variable Description

E = size-specific emission factor (lb/VMT)

s = surface material silt content (%)

W = mean vehicle weight (tons)

M = surface material moisture content (%)

CE = control efficiency for watering (%)

Assumed Value

5.1

listed in table below

0.2

50

Reference

EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Default value in EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emissions Estimation for Road Traffic

Construction Site Destination	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells	PM10 Emissions			PM2.5 Emissions			
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions		
								(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)		(ton/const. site)	(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)
Road	Semi Trucks	65,000	2	47	94	1,730	1.70	160	138		0.25	23	20
	Pickup Trucks	7,000	2	3	6	1,730	0.70	4	4	142	0.10	0.6	0.5
Well Pad	Semi Trucks	65,000	2	5	10	1,730	1.70	17	15		0.25	2	2
	Pickup Trucks	7,000	2	4	8	1,730	0.70	6	5	20	0.10	1	1
Other Construction Activities	Semi Trucks	80,000	2	2	4	1,730	1.85	7	6		0.27	1	1
	Haul Trucks	45,000	2	2	4	1,730	1.47	6	5		0.21	1	1
	Pickup Trucks	7,000	2	1	2	1,730	0.70	1	1	13	0.10	0	0
Subtotal:									174	174		25	25

Road Dust Emissions (Continued)

Emissions Estimation for Road Traffic Continued

Construction Site Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well)	(ton/veh. type)		(ton/proj. activity)	(lb/well)	(ton/veh. type)	(ton/const. site)
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	60,000	2	44	88	1,730	1.65	145	125	281	0.24	21	18	41
	Fuel Haul Truck	50,000	2	6	12	1,730	1.53	18	16		0.22	3	2	
	Mud Haul Truck, Water Hauling	60,000	2	4	8	1,730	1.65	13	11		0.24	2	2	
	Rig Crew	7,000	2	51	102	1,730	0.70	71	62		0.10	10	9	
	Rig Mechanics	12,000	2	2	4	1,730	0.87	3	3		0.13	1	0	
	Co. Supervisor	7,000	2	20	40	1,730	0.70	28	24		0.10	4	4	
	Tool Pusher	7,000	2	8	16	1,730	0.70	11	10		0.10	2	1	
	Mud Logger	7,000	2	6	12	1,730	0.70	8	7		0.10	1	1	
	Mud Engineer	7,000	2	15	30	1,730	0.70	21	18		0.10	3	3	
	Logger, Engr. Truck	45,000	2	1	2	1,730	1.47	3	3		0.21	0	0	
	Drill Bit Delivery	7,000	2	2	4	1,730	0.70	3	2		0.10	0	0	
Well Completion & Testing	Semi Casing Haulers	60,000	2	6	12	1,730	1.65	20	17	556	0.24	3	2	81
	Semi Completion, Unit Rig	120,000	2	1	2	1,730	2.17	4	4		0.32	1	1	
	Semi Pumping/Tank Battery	80,000	2	6	12	1,730	1.85	22	19		0.27	3	3	
	Tubing Truck	60,000	2	2	4	1,730	1.65	7	6		0.24	1	1	
	Haul Cementer, Pump Truck	85,000	2	2	4	1,730	1.89	8	7		0.28	1	1	
	Haul Cementer, Cement Truck	60,000	2	3	6	1,730	1.65	10	9		0.24	1	1	
	Haul Completion, Equip. Truck	45,000	2	3	6	1,730	1.47	9	8		0.21	1	1	
	Haul Service Tools	7,000	2	2	4	1,730	0.70	3	2		0.10	0	0	
	Haul Preforators, Logging Truck	45,000	2	1	2	1,730	1.47	3	3		0.21	0	0	
	Haul Anchor, Installation	40,000	2	1	2	1,730	1.40	3	2		0.20	0	0	
	Haul Anchor, Testing	12,000	2	1	2	1,730	0.87	2	1		0.13	0	0	
	Haul Welders	12,000	2	6	12	1,730	0.87	10	9		0.13	2	1	
	Haul Water Truck	60,000	2	150	300	1,730	1.65	494	427		0.24	72	62	
	Pickup Cementor, Engineer	7,000	2	2	4	1,730	0.70	3	2		0.10	0	0	
	Pickup Casing Crew	10,000	2	2	4	1,730	0.80	3	3		0.12	0	0	
	Pickup Completion Crew	10,000	2	5	10	1,730	0.80	8	7		0.12	1	1	
	Pickup Completion, Pusher	7,000	2	5	10	1,730	0.70	7	6		0.10	1	1	
	Pickup Perforators, Engineer	7,000	2	2	4	1,730	0.70	3	2		0.10	0	0	
	Pickup Co. Supervisor	7,000	2	10	20	1,730	0.70	14	12		0.10	2	2	
	Pickup Miscellaneous Supplies	7,000	2	3	6	1,730	0.70	4	4		0.10	1	1	
Pickup Roustabout Crew	12,000	2	4	8	1,730	0.87	7	6	0.13	1	1			
Subtotal:									837	837			122	122
Total:									1,011	1,011			148	148

Supplemental Air Quality Analysis

Exhaust Emissions

Vehicle		Emission Factors (g/mi)					
Type	Class	NOx	PM10	PM2.5	SO2	CO	VOCs
Light-Duty Gasoline Truck	LDGT2	1.01	0.10	0.08	0.11	11.64	0.75
Heavy-Duty Diesel Truck	HDDV	8.13	1.96	1.81	1.63	17.09	4.83

PM10 and PM2.5 were estimated using the EPA PARTS model (1995) and include tire and break wear emissions.

Source: EPA, AP-42, Volume II, Appendix H-117, Table 3.1A.2 Light-Duty Gasoline Powered Trucks and Appendix H-259, Table 7.1.2 Heavy-Duty Diesel Powered Vehicles (High Altitude; Model Year 1991-1997; 50,000 mileage) (6/30/95)

Emissions Estimation for Road Traffic Exhaust

Construction Site Destination	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells	Emissions																	
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)					
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Bladed road	Semi Trucks	HDDV	2	47	94	1,730	1.68	0.41	0.38	0.34	3.54	1.00	1.5	0.4	0.3	0.3	3.1	0.9	1.46	0.35	0.32	0.29	3.06	0.87
	Pickup Trucks	LDGT2	2	3	6	1,730	0.01	0.00	0.00	0.00	0.15	0.01	0.0	0.0	0.0	0.0	0.1	0.0						
Well Pad	Semi Trucks	HDDV	2	5	10	1,730	0.18	0.04	0.04	0.04	0.38	0.11	0.2	0.0	0.0	0.0	0.3	0.1	0.17	0.04	0.04	0.03	0.50	0.10
	Pickup Trucks	LDGT2	2	4	8	1,730	0.02	0.00	0.00	0.00	0.21	0.01	0.0	0.0	0.0	0.0	0.2	0.0						
Other Construction Activities	Semi Trucks	HDDV	2	2	4	1,730	0.07	0.02	0.02	0.01	0.15	0.04	0.1	0.0	0.0	0.0	0.1	0.0	0.13	0.03	0.03	0.03	0.31	0.08
	Haul Trucks	HDDV	2	2	4	1,730	0.07	0.02	0.02	0.01	0.15	0.04	0.1	0.0	0.0	0.0	0.1	0.0						
	Pickup Trucks	LDGT2	2	1	2	1,730	0.00	0.00	0.00	0.00	0.05	0.00	0.0	0.0	0.0	0.0	0.0	0.0						
Subtotal							0	0	0	0	1	0	1.8	0.4	0.4	0.4	3.9	1.0						

Exhaust Emissions (continued)

Construction Site Activity	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	Emissions																		
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)						
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	18.0	4.1	3.8	3.5	50.5	10.9	
	Fuel Haul Truck	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2							
	Mud Haul Truck, Water Hauling	HDDV	6	7	42	18,225	0.75	0.18	0.17	0.15	1.58	0.45	6.9	1.7	1.5	1.4	14.4	4.1							
	Rig Crew	LDGT2	6	3	18	18,225	0.04	0.00	0.00	0.00	0.46	0.03	0.4	0.0	0.0	0.0	4.2	0.3							
	Co. Supervisor	LDGT2	6	8	48	18,225	0.11	0.01	0.01	0.01	1.23	0.08	1.0	0.1	0.1	0.1	11.2	0.7							
	Tool Pusher	HDDV	6	6	36	18,225	0.65	0.16	0.14	0.13	1.36	0.38	5.9	1.4	1.3	1.2	12.4	3.5							
	Logger, Engr. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
Well Completion & Testing	Semi Casing	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	20.1	4.8	4.4	4.0	46.8	12.0	
	Semi Completion, Unit Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Tubing Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Cementer, Pump Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Cementer, Cement Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Completion, Equip. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Prefrators, Logging Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Welders	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Water Truck	HDDV	6	10	60	18,225	1.08	0.26	0.24	0.22	2.26	0.64	9.8	2.4	2.2	2.0	20.6	5.8							
	Pickup Cementor, Engineer	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1							
	Pickup Co. Supervisor	LDGT2	6	2	12	18,225	0.03	0.00	0.00	0.00	0.31	0.02	0.2	0.0	0.0	0.0	2.8	0.2							
	Pickup Miscellaneous Supplies	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1							
	Pickup Roustabout Crew	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2							
Subtotal:							38	9	8	7	97	23	38	9	8	7	97	23							
Total:							50	11	10	10	146	30	50	11	10	10	146	30							

A.2.2 Emission Calculations for the Montana Conventional O&G Project Operational Activities – Alternative H Revised

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	PM10 Emissions			PM2.5 Emissions			
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions		
								(lb/well)	(ton/project)		(lb/well)	(ton/project)	
Well Workover	WO Rig	120,000	2	1	2	1,730	3.20	6	6	0.47	1	1	
	Haul Truck	60,000	2	1	2	1,730	2.43	5	4	0.35	1	1	
	Pickup Truck	7,000	2	3	6	1,730	1.03	6	5	0.15	1	1	
									15				2

Exhaust Emissions – On-site

Emissions Estimation for Industrial Engines:

Activity	Equipment	Capacity (hp)	Operating Hours per Day	# Operating Days per Well	# Operating Hours per Well	Total # of Wells Drilled	Emissions									
							(lb/well)					(ton/project)				
							NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Well Workover	Truck-Mounted Unit	600	10	3	30	1,730	558	40	37	120	45	483	34	32	104	39

Exhaust Emissions – On-road

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	Emissions											
	Type	Class					(lb/station-yr)						(ton/project)					
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Well Workover	WO Rig	HDDV	2	1	2	1,730	4.E-02	9.E-03	8.E-03	7.E-03	8.E-02	2.E-02	3.E-02	7.E-03	7.E-03	6.E-03	7.E-02	2.E-02
	Haul Truck	HDDV	2	1	2	1,730	4.E-02	9.E-03	8.E-03	7.E-03	8.E-02	2.E-02	3.E-02	7.E-03	7.E-03	6.E-03	7.E-02	2.E-02
	Pickup Truck	LDGT2	2	3	6	1,730	1.E-02	1.E-03	1.E-03	1.E-03	2.E-01	1.E-02	1.E-02	1.E-03	9.E-04	1.E-03	1.E-01	9.E-03
							7.E-02	2.E-02	1.E-02	1.E-02	3.E-01	5.E-02						

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	PM10 Emissions			PM2.5 Emissions		
								Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
									(lb/well)	(ton/project)		(lb/well)	(ton/project)
Visits for Inspection and Repair	200-hp Pickup	7,000	2	1	12	24.0	19,644	1.03	24.7	243	0.15	3.6	35

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	Emissions											
	Type	Class						(lb/station-yr)					(ton/project)						
								NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Visits for Inspection and Repair	200-hp Pickup	LDGT2	2	1	12	24.0	19,644	0.053	0.005	0.004	0.006	0.616	0.040	0.5	0.1	0.0	0.1	6.0	0.4

A.2.3 Emission Calculations for the Montana Conservation O&G Project Maintenance Activities – Alternative H Revised

Road Maintenance – Heavy Equipment

Given Data:

Maintenance	Equipment/Vehicle			Road Length Worked On per Day (mi)	# of Operating Hours per Day
	Type	Fuel	Capacity (hp)		
Summer	Heavy Equipment	Diesel	135	6	10
	Commuting Vehicle	Gasoline	225	6	1
Winter	Heavy Equipment	Diesel	135	5	10
	Commuting Vehicle	Gasoline	225	6	1.5

Estimation of Total and Cumulative Length of Roads:

Length of Bladed Roads per Well (mi)	1
Total Length of Roads to be Built (mi)	1,730
Cummulative Length of Roads Maintained (mi-yr)	19,644

Estimation of Total Operation Days and Hours:

Season	# of Operation per Year	Cummulative Length of Roads (mi-yr)	Road Length Worked On (mi/day)	# of Operating Hours per Day	Total # of Operating Days	Total # of Operating Hours
Summer	2	19,644	6	10	6,548	65,480
Winter	1	19,644	5	10	3,929	39,288
Totals:					10,477	104,768

Fugitive Dust Emissions

Emissions Factor for Grader - Road Dust:

Pollutant	Emission Factor Equation (lb/VMT)	S (mph)	Emission Factor (lb/VMT)
PM10	$E = (0.6)(0.051)(S^2)$	5	0.765
PM2.5	$E = (0.031)(0.051)(S^{2.5})$	5	0.069

Emissions Estimation for Grader - Road Dust:

Activity	Equipment	Total # of Operating Hours	Mean Vehicle Speed (mph)	Total Miles Maintained	PM10		PM2.5	
					Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Grader	62,861	5	314,304	0.765	120	0.069	11

Exhaust Emissions

Emissions Factor for Grader - Exhaust:

Equipment	Emission Factors (g/hp-hr)				
	NOx	PM10	SO2	CO	VOCs
Grader	7.14	0.63	0.87	1.54	0.36

Emissions Estimation for Grader - Road Dust:

Activity	Vehicle Type	Capacity (hp)	Total # of Operating Hours	Emissions									
				(lb/well)					(ton/project)				
				NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Road Maintenance	Grader	135	62,861	2.13	0.19	0.26	0.46	0.11	67	6	8	14	3

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	PM10		PM2.5	
						Em. Factor (lb/VMT)	Emissions (ton/ project)	Em. Factor (lb/VMT)	Emissions (ton/ project)
Road Maintenance	Pickup Truck	7,000	6	10,477	62,861	1.03	32	0.15	5

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	Emissions					
	Type	Class				(ton/project)					
						NOx	PM10	PM2.5	SO2	CO	VOCs
Road Maintenance	Pickup Truck	LDGT2	6	10,477	62,861	0.07	0.01	0.01	0.01	0.81	0.05

A.2.4 ADY 20 Alt H Rev O&G

Total Drilled: 1730 per Year: variable

Year	Wells		# Operating Well Years	Distribution
	Drilled	Operating		
1	52	52	52	0.03
2	69	121	173	0.04
3	87	208	381	0.05
4	112	320	701	0.065
5	121	441	1,142	0.07
6	121	562	1,704	0.07
7	121	683	2,387	0.07
8	112	796	3,183	0.065
9	112	908	4,091	0.065
10	104	1,012	5,104	0.06
11	104	1,116	6,219	0.06
12	87	1,202	7,422	0.05
13	87	1,289	8,711	0.05
14	78	1,367	10,077	0.045
15	69	1,436	11,513	0.04
16	69	1,505	13,018	0.04
17	69	1,574	14,593	0.04
18	61	1,635	16,227	0.035
19	52	1,687	17,914	0.03
20	43	1,730	19,644	0.025
21	0	1,730		
22	0	1,730		
23	0	1,730		
24	0	1,730		
25	0	1,730		
26	0	1,730		
27	0	1,730		
28	0	1,730		
29	0	1,730		
30	0	1,730		
31	0	1,730		
32	0	1,730		
33	0	1,730		
34	0	1,730		
35	0	1,730		
36	0	1,730		
37	0	1,730		
38	0	1,730		
39	0	1,730		
40	0	1,730		
	1,730			

Supplemental Air Quality Analysis

ADY 20 Alt H Rev O&G

	Operation and Maintenance						Construction					
	Emissions						Emissions					
	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
1	1.45	1.19	0.25	0.11	0.33	0.11	605.72	53.27	26.68	74.79	142.15	22.59
2	3.39	2.78	0.58	0.25	0.77	0.26	807.62	71.03	35.57	99.73	189.53	30.12
3	5.81	4.76	0.99	0.42	1.33	0.45	1,009.53	88.79	44.46	124.66	236.92	37.65
4	8.96	7.34	1.52	0.65	2.05	0.70	1,312.38	115.43	57.80	162.06	307.99	48.94
5	12.35	10.12	2.10	0.90	2.82	0.96	1,413.34	124.31	62.24	174.52	331.68	52.70
6	15.75	12.90	2.67	1.15	3.59	1.23	1,413.34	124.31	62.24	174.52	331.68	52.70
7	19.14	15.68	3.25	1.40	4.37	1.49	1,413.34	124.31	62.24	174.52	331.68	52.70
8	22.29	18.26	3.78	1.63	5.09	1.74	1,312.38	115.43	57.80	162.06	307.99	48.94
9	25.44	20.84	4.32	1.86	5.80	1.99	1,312.38	115.43	57.80	162.06	307.99	48.94
10	28.34	23.22	4.81	2.07	6.47	2.21	1,211.43	106.55	53.35	149.59	284.30	45.17
11	31.25	25.60	5.30	2.28	7.13	2.44	1,211.43	106.55	53.35	149.59	284.30	45.17
12	33.67	27.59	5.72	2.46	7.68	2.63	1,009.53	88.79	44.46	124.66	236.92	37.65
13	36.09	29.57	6.13	2.63	8.24	2.82	1,009.53	88.79	44.46	124.66	236.92	37.65
14	38.27	31.36	6.50	2.79	8.73	2.99	908.57	79.91	40.01	112.19	213.22	33.88
15	40.21	32.94	6.83	2.93	9.18	3.14	807.62	71.03	35.57	99.73	189.53	30.12
16	42.15	34.53	7.15	3.08	9.62	3.29	807.62	71.03	35.57	99.73	189.53	30.12
17	44.09	36.12	7.48	3.22	10.06	3.44	807.62	71.03	35.57	99.73	189.53	30.12
18	45.78	37.51	7.77	3.34	10.45	3.57	706.67	62.15	31.12	87.26	165.84	26.35
19	47.24	38.70	8.02	3.45	10.78	3.69	605.72	53.27	26.68	74.79	142.15	22.59
20	48.45	39.69	8.22	3.53	11.06	3.78	504.76	44.39	22.23	62.33	118.46	18.82
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
32												
33												
34												
35												
36												
37												
38												
39												
40												
	550	451	93	40	126	43	20,191	1,776	889	2,493	4,738	753

Combined Construction & Operation and Maintenance						
Emissions						
	NOx	PM10	PM2.5	SO2	CO	VOCs
1	607.17	54.46	26.92	74.90	142.48	22.70
2	811.01	73.81	36.14	99.97	190.31	30.38
3	1,015.34	93.55	45.45	125.08	238.24	38.10
4	1,321.35	122.77	59.32	162.71	310.03	49.64
5	1,425.69	134.43	64.34	175.42	334.50	53.67
6	1,429.08	137.21	64.92	175.67	335.27	53.93
7	1,432.47	139.98	65.49	175.92	336.05	54.20
8	1,334.67	133.68	61.58	163.68	313.08	50.68
9	1,337.82	136.26	62.12	163.91	313.79	50.92
10	1,239.77	129.77	58.16	151.66	290.77	47.39
11	1,242.68	132.15	58.66	151.87	291.43	47.61
12	1,043.20	116.38	50.18	127.11	244.60	40.27
13	1,045.62	118.36	50.59	127.29	245.15	40.46
14	946.85	111.27	46.51	114.98	221.96	36.87
15	847.83	103.98	42.39	102.66	198.71	33.25
16	849.77	105.56	42.72	102.80	199.15	33.41
17	851.71	107.15	43.05	102.94	199.59	33.56
18	752.45	99.66	38.89	90.60	176.29	29.93
19	652.95	91.97	34.69	78.24	152.93	26.27
20	553.21	84.09	30.45	65.86	129.51	22.60
21	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00
	20,741	2,226	983	2,533	4,864	796

Emission Factors per Well						
	NOx	PM10	PM2.5	SO2	CO	VOCs
Op	0.028005	0.022943	0.004753	0.002043	0.006390	0.002186
Con	11.738684	1.032434	0.516984	1.449514	2.754828	0.437738

Supplemental Air Quality Analysis

A.2.5 Emission Points Alt H Rev O&G

Reasonably Foreseeable Development Conventional Oil and Natural Gas Construction Emissions						Construction Emissions per Point (tons)					
Longitude	Latitude	Watershed	County	FieldName	Number of RFD Predicted Conventional O&G Wells/Point	NOx	PM10	PM2.5	SO2	CO	VOCs
-109.0236412	45.05437447	CLARKS FORK YELLOWSTONE	Carbon	Clarks Fork, North	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.9918606	45.02923114	CLARKS FORK YELLOWSTONE	Carbon	Clarks Fork, South	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.1664629	45.25069265	CLARKS FORK YELLOWSTONE	Carbon	DRY CREEK, SOUTHWEST	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.0660754	45.23437027	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.1394904	45.24439577	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek (Shallow Gas)	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.1101088	45.22432772	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek Middle	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.1657489	45.26489048	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek, West	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.925496	45.02211351	CLARKS FORK YELLOWSTONE	Carbon	Elk Basin, Northwest	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.0158689	45.23016862	CLARKS FORK YELLOWSTONE	Carbon	Golden Dome	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.738091	45.64218707	CLARKS FORK YELLOWSTONE	Yellowstone	Laurel	15	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.7303675	45.54598467	CLARKS FORK YELLOWSTONE	Yellowstone	Mosser Dome	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.1446442	45.08461797	LITTLE POWDER	Powder River	Bell Creek	130	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.0520866	45.0792822	LITTLE POWDER	Powder River	Bell Creek, Southeast	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.4394337	45.09008461	LITTLE POWDER	Powder River	Leary	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.2378378	45.15741562	LITTLE POWDER	Powder River	Wright Creek	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.4510648	45.78622887	LOWER BIGHORN	Big Hom	Snyder	6	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.7873613	45.73369099	LOWER BIGHORN	Big Hom	Toluca	50	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-106.1305727	45.84581762	LOWER TONGUE	Custer	Liscom Creek	45	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.637355	45.76245346	LOWER TONGUE	Powder River	Pumpkin Creek	155	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.7586412	46.35583022	LOWER YELLOWSTONE-SUNDAY	Yellowstone	Wolf Springs	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.6824339	46.31220043	LOWER YELLOWSTONE-SUNDAY	Yellowstone	Wolf Springs, South	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.3884717	46.62018932	MIDDLE MUSSELSHELL	Musselshell	Big Wall	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.6668238	46.7078922	MIDDLE MUSSELSHELL	Musselshell	Devils Basin	60	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.4307331	46.53951143	MIDDLE MUSSELSHELL	Musselshell	Gage	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.8392603	46.71520303	MIDDLE MUSSELSHELL	Musselshell	Ivanhoe	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.8830078	46.67482682	MIDDLE MUSSELSHELL	Musselshell	Keg Coulee	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.8849894	46.70171261	MIDDLE MUSSELSHELL	Musselshell	Keg Coulee, North	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.1341406	46.63949319	MIDDLE MUSSELSHELL	Musselshell	Kelley	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.6896771	46.50133186	MIDDLE MUSSELSHELL	Musselshell	Mason Lake	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.9789922	46.74257344	MIDDLE MUSSELSHELL	Musselshell	Ragged Point	40	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.7902265	46.73318214	MIDDLE MUSSELSHELL	Rosebud	Stensvad	100	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.601424	46.73368525	MIDDLE MUSSELSHELL	Musselshell	Winnett Junction	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.6877601	46.71062636	MIDDLE MUSSELSHELL	Rosebud	Sumatra	195	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.6007701	45.79967713	MIZPAH	Custer	Pumpkin Creek	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.5292415	45.26096039	STILLWATER	Carbon	Butcher Creek	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-105.0563446	45.05516191	UPPER LITTLE MISSOURI	Powder River	Bell Creek, Southeast	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-104.6836791	45.14149049	UPPER LITTLE MISSOURI	Carter	Hammond	85	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.9435369	46.1442151	UPPER MUSSELSHELL	Golden Valley	Broadview	2	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.020649	46.6573022	UPPER MUSSELSHELL	Golden Valley	Devils Pocket	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.5422607	46.29262688	UPPER MUSSELSHELL	Wheatland	Mud Creek	15	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-106.8666782	45.01278441	UPPER TONGUE	Big Hom	CX	60	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-106.7595891	45.15616455	UPPER TONGUE	Big Hom	Coal Creek	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569

Reasonably Foreseeable Development Conventional Oil and Natural Gas Construction Emissions						Construction Emissions per Point (tons)					
Longitude	Latitude	Watershed	County	FieldName	Number of RFD Predicted Conventional O&G Wells/Point	NOx	PM10	PM2.5	SO2	CO	VOCs
-106.633869	45.03290808	UPPER TONGUE	Big Horn	Wildcat Big Horn	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.2612885	46.06628384	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Big Coulee	5	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.0954149	45.82189619	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Lake Basin	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.109527	45.91998552	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Lake Basin, North	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.7105889	45.66226315	UPPER YELLOWSTONE-LAKE BASIN	Yellowstone	Laurel	15	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.0930362	45.99049997	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Little Basin	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.2405161	45.94602747	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Rapelje	25	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-109.4389013	46.00911669	UPPER YELLOWSTONE-LAKE BASIN	Sweet Grass	Sixshooter Dome	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-108.9355865	46.13731994	UPPER YELLOWSTONE-POMPEYS PILE	Golden Valley	Broadview	3	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.9202114	45.73742245	UPPER YELLOWSTONE-POMPEYS PILE	Big Horn	Toluca	19	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.752724	46.34044445	UPPER YELLOWSTONE-POMPEYS PILE	Yellowstone	Wolf Springs	10	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
-107.7054586	46.30492103	UPPER YELLOWSTONE-POMPEYS PILE	Yellowstone	Wolf Springs, South	20	9.347471	0.822124	0.411672	1.154242	2.193659	0.348569
					1730						

Supplemental Air Quality Analysis

Reasonably Foreseeable Development Conventional Oil and Natural Gas Operational Emissions						Operation Emissions per Point (tons)					
Longitude	Latitude	Watershed	County	FieldName	Number of RFD Predicted Conventional O&G Wells/Point	NOx	PM10	PM2.5	SO2	CO	VOCs
-109.0236412	45.05437447	CLARKS FORK YELLOWSTONE	Carbon	Clarks Fork, North	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-108.9918606	45.02923114	CLARKS FORK YELLOWSTONE	Carbon	Clarks Fork, South	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-109.1664629	45.25069265	CLARKS FORK YELLOWSTONE	Carbon	DRY CREEK, SOUTHWEST	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.0660754	45.23437027	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.1394904	45.24439577	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek (Shallow Gas)	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.1101088	45.22432772	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek Middle	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.1657489	45.26489048	CLARKS FORK YELLOWSTONE	Carbon	Dry Creek, West	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-108.925496	45.02211351	CLARKS FORK YELLOWSTONE	Carbon	Elk Basin, Northwest	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.0158689	45.23016862	CLARKS FORK YELLOWSTONE	Carbon	Golden Dome	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-108.738091	45.64218707	CLARKS FORK YELLOWSTONE	Yellowstone	Laurel	15	0.420071	0.34415	0.071299	0.030647	0.095855	0.032785
-108.7303675	45.54598467	CLARKS FORK YELLOWSTONE	Yellowstone	Mosser Dome	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-105.1446442	45.08461797	LITTLE POWDER	Powder River	Bell Creek	130	3.640618	2.982634	0.617922	0.265606	0.830745	0.284136
-105.0520866	45.0792822	LITTLE POWDER	Powder River	Bell Creek, Southeast	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-105.4394337	45.09008461	LITTLE POWDER	Powder River	Leary	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-105.2378378	45.15741562	LITTLE POWDER	Powder River	Wright Creek	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-107.4510649	45.78622887	LOWER BIGHORN	Big Horn	Snyder	6	0.168028	0.13766	0.028519	0.012258	0.038342	0.013114
-107.7873613	45.73369099	LOWER BIGHORN	Big Horn	Toluca	50	1.400238	1.147167	0.237662	0.102156	0.319517	0.109283
-106.1305727	45.84581762	LOWER TONGUE	Custer	Liscom Creek	45	1.260214	1.03245	0.213896	0.08194	0.287565	0.098355
-105.637355	45.76245346	LOWER TONGUE	Powder River	Pumpkin Creek	155	4.340736	3.556217	0.736753	0.316684	0.990503	0.338778
-107.7586412	46.35583022	LOWER YELLOWSTONE-SUNDAY	Yellowstone	Wolf Springs	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-107.6824339	46.31220043	LOWER YELLOWSTONE-SUNDAY	Yellowstone	Wolf Springs, South	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-108.3884717	46.62018932	MIDDLE MUSSEL SHELL	Musselshell	Big Wall	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-108.668239	46.7078922	MIDDLE MUSSEL SHELL	Musselshell	Devils Basin	60	1.680285	1.3766	0.285195	0.122587	0.383421	0.13114
-108.4307331	46.5395143	MIDDLE MUSSEL SHELL	Musselshell	Gage	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-107.8392603	46.71520303	MIDDLE MUSSEL SHELL	Musselshell	Ivanhoe	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-107.8830078	46.67482682	MIDDLE MUSSEL SHELL	Musselshell	Keg Coulee	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-107.8849894	46.70171261	MIDDLE MUSSEL SHELL	Musselshell	Keg Coulee, North	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-108.1341406	46.63949319	MIDDLE MUSSEL SHELL	Musselshell	Kelley	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-108.6896771	46.50133186	MIDDLE MUSSEL SHELL	Musselshell	Mason Lake	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-107.9789922	46.74257344	MIDDLE MUSSEL SHELL	Musselshell	Ragged Point	40	1.12019	0.917733	0.19013	0.081725	0.255614	0.087426
-107.7902265	46.73318214	MIDDLE MUSSEL SHELL	Rosebud	Stensvad	100	2.800475	2.294334	0.475325	0.204312	0.639034	0.218566
-108.601424	46.73368525	MIDDLE MUSSEL SHELL	Musselshell	Winnett Junction	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-107.6877601	46.71062636	MIDDLE MUSSEL SHELL	Rosebud	Sumatra	195	5.460926	4.473951	0.926883	0.398409	1.246117	0.426204
-105.6007701	45.78967713	MIZPAH	Custer	Pumpkin Creek	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-109.5292415	45.26096039	STILLWATER	Carbon	Butcher Creek	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-105.0563446	45.05516191	UPPER LITTLE MISSOURI	Powder River	Bell Creek, Southeast	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-104.6836791	45.14149049	UPPER LITTLE MISSOURI	Carter	Hammond	85	2.380404	1.950184	0.404026	0.173665	0.543179	0.185781
-108.9435369	46.1442151	UPPER MUSSEL SHELL	Golden Valley	Broadview	2	0.05601	0.045887	0.009506	0.040862	0.12781	0.004371
-109.020649	46.6573022	UPPER MUSSEL SHELL	Golden Valley	Devils Pocket	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-109.5422607	46.29282688	UPPER MUSSEL SHELL	Wheatland	Mud Creek	15	0.420071	0.34415	0.071299	0.030647	0.095855	0.032785
-106.8666782	45.01278441	UPPER TONGUE	Big Horn	CX	60	1.680285	1.3766	0.285195	0.122587	0.383421	0.13114
-106.7595891	45.15616455	UPPER TONGUE	Big Horn	Coal Creek	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-106.633969	45.03290808	UPPER TONGUE	Big Horn	Wildcat Big Horn	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-109.2612885	46.06628384	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Big Coulee	5	0.140024	0.114717	0.023766	0.010216	0.031952	0.010928
-109.0954149	45.82189619	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Lake Basin	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642

Reasonably Foreseeable Development Conventional Oil and Natural Gas Operational Emissions											
Longitude	Latitude	Watershed	County	FieldName	Number of RFD Predicted Conventional O&G Wells/Point	Operation Emissions per Point (tons)					
						NOx	PM10	PM2.5	SO2	CO	VOCs
-109.109527	45.91998552	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Lake Basin, North	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-108.7105889	45.66226315	UPPER YELLOWSTONE-LAKE BASIN	Yellowstone	Laurel	15	0.420071	0.34415	0.071299	0.030647	0.095855	0.032785
-109.0930362	45.99049997	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Little Basin	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-109.2405161	45.94602747	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	Rapelje	25	0.700119	0.573583	0.118831	0.051078	0.159759	0.054642
-109.4389013	46.00911669	UPPER YELLOWSTONE-LAKE BASIN	Sweet Grass	Sixshooter Dome	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
-108.9355865	46.13731994	UPPER YELLOWSTONE-POMPEYS PILLAR	Golden Valley	Broadview	3	0.084014	0.06883	0.01426	0.006129	0.019171	0.006557
-107.9202114	45.73742245	UPPER YELLOWSTONE-POMPEYS PILLAR	Big Horn	Toluca	19	0.53209	0.435923	0.090312	0.039819	0.121417	0.041528
-107.752724	46.34044445	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	Wolf Springs	10	0.280048	0.229433	0.047532	0.020431	0.063903	0.021857
-107.7054586	46.30492103	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	Wolf Springs, South	20	0.560095	0.458867	0.095065	0.040862	0.127807	0.043713
					1730						

Supplemental Air Quality Analysis

A.3.1 Construction Emission Calculations for the Montana CBNG Project Activities - Scenario 1

Heavy Equipment

Fugitive Dust Emissions

Emission Factors for Construction Activities

				Reference
E	=	1.2 Tons of TSP/acre/month		EPA, AP-42, Volume I, Section 13.2.3 Heavy Construction Operations (1/95)
PM10	=	26 % of TSP		Argonne National Laboratory - 2002 TSD
PM2.5	=	15 % of PM10		Argonne National Laboratory - 2002 TSD
CE	=	50 %	Control Efficiency for watering	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emission Calculations for Construction Activities

Area Disturbed for CBNG Wells	Emission Estimation Basis	Disturbed Area (acre)	Avg. # of Days to Complete	Total # of Well Pads or Stations	Total Disturbed Area	Emissions					
						(lb/well pad, lb/stn, or lb/project)			(ton/project)		
						TSP	PM10	PM2.5	TSP	PM10	PM2.5
Road	per Well Pad	0.75	3	6,075	4,556	90	23	4	273	71	11
Well Pad	per Well Pad	0.25	3	6,075	1,519	30	8	1	91	24	4
Gathering Poly Pipeline (Low Pressure)	per Well Pad	1.5	1	6,075	9,113	60	16	2	182	47	7
Steel Pipeline (Low/Intermediate Pressure)	per Field Station	6.06	1	673	4,078	242	63	9	82	21	3
Sales Pipeline, 36" D x 600 miles	per Project		1		1,316	52,640	13,686	2,053	26	7	1
Electric Line	per Well Pad	0.35	1	6,075	2,126	14	4	1	43	11	2
Field Compressor Station	per Field Station	2	5	404	808	400	104	16	81	21	3
Sales Compressor Station	per Sales Station	1	5	81	81	200	52	8	8	2	0
Impoundment	per Impoundment	6	5	356	2,136	1,200	312	47	214	56	8
				Total	25,733				1,000	260	39

Supplemental Air Quality Analysis

Emission Factors for Industrial Engines

Emission Source	Fuel Type	Emission Factors					
		Unit	NOx	PM10	SOx	CO	VOCs
Industrial Engine	Diesel	lb/hp-hr	3.10E-02	2.20E-03	2.05E-03	6.68E-03	2.51E-03
Flaring	Natural Gas	lb/MMCF	69	7.6	0.6	377	64

EPA, AP-42, Volume I, Section 3.3 Gasoline and Industrial Engines
 EPA, AP-42, Volume I, Section 13.5 Industrial Flares & Section 1.4 Natural Gas Combustion

Emissions Estimation for Industrial Engines

Construction Site Activity	Equipment Type	Capacity (hp)	# of Units	Avg. Load Factor (%)	# of Operating Hours per Day	# of Operating Days per Well	# of Operating Hours per Well	# of Wells	Emissions																			
									(lb/well)					(ton/equipment type)					(ton/project activity)									
									NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs					
Rig-up, Drilling, and Rig-down	Main Deck	400	1	60	11	3	33	18,225	246	17	16	53	20	2,237	159	148	482	181	3,254	231	215	701	263					
	Auxiliary Pump	200	1	90	10	2	20	18,225	112	8	7	24	9	1,017	72	67	219	82										
Well Completion & Testing	Main Deck	400	1	60	10	1	10	18,225	74	5	5	16	6	678	48	45	146	55	13,716	975	905	3,154	1,143					
	Auxiliary Pump	125	1	90	6	1	6	18,225	21	1	1	5	2	191	14	13	41	15										
	Equipment Type	Capacity (kw)	Avg # of Wells Served	Avg. Load Factor (%)	# of Operating Hours per Day	Avg. # of Operating Days	# of Operating Hours per Well	# of Wells																				
	Field Generators for Pumps & Lighting	125	8	75	24	120	360	18,225	1403	100	93	302	114	12,810	909	847	2,760	1,037										
	Emission Source	Average Volume Flared (MCFD/well)				Average # Days of Continuous Flaring			# of Wells																			
Flaring of Natural Gas	60				1			18,225	4	0.5	0.0	23	4	38	4	0	207	35										
Subtotal:									16,971	1,206	1,120	3,855	1,406	16,971	1,206	1,120	3,855	1,406										
Total:									17,229	1,228	1,144	3,945	1,430	17,229	1,228	1,144	3,945	1,430										

PM2.5 is assumed to be same as PM10

Commuting Vehicles

Road Dust Emissions

Emission Factors for Road Traffic

$$E \text{ (lb/VMT)} = \frac{k(s/12)^a(W/3)^b}{(M/0.2)^c}$$

Parameter	PM10	PM2.5
k	2.6	0.38
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source: EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Function/Variable Description

E = size-specific emission factor (lb/VMT)

Assumed Value

s = surface material silt content (%)

5.1

Reference

EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

W = mean vehicle weight (tons)

listed in table below

M = surface material moisture content (%)

0.2

Default value in EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

CE = control efficiency for watering (%)

50

EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emissions Estimation for Road Traffic

Construction Site Destination	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions				PM2.5 Emissions			
							Controlled Em. Factor (lb/VMT)	Emissions			Controlled Em. Factor (lb/VMT)	Emissions		
								(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)		(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)
Road	Semi Trucks	60,000	6	2.6	16	6,075	1.65	26	78	78	0.24	4	11	11
Well Pad	Haul Trucks	45,000	6	2	12	6,075	1.47	18	54		0.21	3	8	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	79	0.10	1	4	12
Poly Pipeline, < 3"	Haul Trucks	45,000	6	4	24	6,075	1.47	35	107		0.21	5	16	
	Pickup Trucks	7,000	6	4	24	6,075	0.70	17	51	158	0.10	2	7	23
Steel Pipeline	Semi Trucks	60,000	6	4	24	404	1.65	40	8		0.24	6	1	
	Haul Trucks	45,000	6	40	240	404	1.47	352	71		0.21	51	10	
	Pickup Trucks	7,000	6	160	960	404	0.70	669	135	214	0.10	98	20	31
Sales Pipeline, 36" D, 600 mi	Semi Trucks	60,000	35	94	3,290	1	1.65	5418	3		0.24	792	0	
	Haul Trucks	45,000	35	94	3,290	1	1.47	4829	2		0.21	706	0	
	Pickup Trucks	7,000	50	94	4,700	1	0.70	3277	2	7	0.10	479	0	1
Electric Line	Haul Trucks	45,000	6	1	6	6,075	1.47	9	27		0.21	1	4	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	52	0.10	1	4	8
Field Compressor Station	Semi Trucks	60,000	10	15	150	404	1.65	247	50		0.24	36	7	
	Haul Trucks	45,000	10	48	480	404	1.47	705	142		0.21	103	21	
	Pickup Trucks	7,000	10	192	1,920	404	0.70	1339	270	463	0.10	196	40	68
Sales Compressor Station	Semi Trucks	60,000	10	18.5	185	81	1.65	305	12		0.24	45	2	
	Haul Trucks	45,000	10	48	480	81	1.47	705	29		0.21	103	4	
	Pickup Trucks	7,000	10	192	1,920	81	0.70	1339	54	95	0.10	196	8	14
Impoundment	Semi Trucks	60,000	6	0.02	0.12	356	1.65	0	0		0.24	0	0	
	Haul Trucks	45,000	6	0.02	0.12	356	1.47	0	0		0.21	0	0	
	Pickup Trucks	7,000	6	0.02	0.12	356	0.70	0	0	0	0.10	0	0	0
							Subtotal:		1,146	1,146			167	167

Supplemental Air Quality Analysis

Emissions Estimation for Road Traffic Continued

Construction Site Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well)	(ton/veh. type)		(ton/proj. activity)	(lb/well)	(ton/veh. type)	(ton/const. site)
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	80,000	6	1	6	18,225	1.85	11	101	1,587	0.27	2	15	232
	Fuel Haul Truck	45,000	6	2	12	18,225	1.47	18	161		0.21	3	23	
	Mud Haul Truck, Water Hauling	60,000	6	7	42	18,225	1.65	69	630		0.24	10	92	
	Rig Crew	7,000	6	3	18	18,225	0.70	13	114		0.10	2	17	
	Co. Supervisor	7,000	6	8	48	18,225	0.70	33	305		0.10	5	45	
	Tool Pusher	7,000	6	6	36	18,225	0.70	25	229		0.10	4	33	
	Logger, Engr. Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
Well Completion & Testing	Semi Casing	45,000	6	1	6	18,225	1.47	9	80	1,663	0.21	1	12	243
	Semi Completion, Unit Rig	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Tubing Truck	45,000	6	1	6	18,225	1.47	9	80		0.21	1	12	
	Haul Cementer, Pump Truck	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Haul Cementer, Cement Truck	60,000	6	1	6	18,225	1.65	10	90		0.24	1	13	
	Haul Completion, Equip. Truck	20,000	6	1	6	18,225	1.06	6	58		0.16	1	8	
	Haul Preforators, Logging Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Welders	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Water Truck	60,000	6	9	54	18,225	1.65	89	810		0.24	13	118	
	Pickup Cementor, Engineer	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Co. Supervisor	7,000	6	2	12	18,225	0.70	8	76		0.10	1	11	
	Pickup Miscellaneous Supplies	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
Pickup Roustabout Crew	12,000	6	2	12	18,225	0.87	10	95	0.13	2	14			
								Subtotal:		3,250	3,250		475	475
								Total:		4,396	4,396		642	642

Exhaust Emissions

Vehicle		Emission Factors (g/mi)					
Type	Class	NOx	PM10	PM2.5	SO2	CO	VOCs
Light-Duty Gasoline Truck	LDGT2	1.01	0.10	0.08	0.11	11.64	0.75
Heavy-Duty Diesel Truck	HDDV	8.13	1.96	1.81	1.63	17.09	4.83

PM10 and PM2.5 were estimated using the EPA PARTS model (1995) and include tire and break wear emissions.

Source: EPA, AP-42, Volume II, Appendix H-117, Table 3.1A.2 Light-Duty Gasoline Powered Trucks and Appendix H-259, Table 7.1.2 Heavy-Duty Diesel Powered Vehicles (High Altitude; Model Year 1991-1997; 50,000 mileage) (6/30/95)

Emissions Estimation for Road Traffic Exhaust

Construction Site Destination	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	Emissions																	
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)					
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Road	Semi Trucks	HDDV	6	2.6	16	6,075	0.28	0.07	0.06	0.06	0.59	0.17	0.8	0.2	0.2	0.2	1.8	0.5	0.8	0.2	0.2	0.2	1.8	0.5
Well Pad	Haul Trucks	HDDV	6	2	12	6,075	0.22	0.05	0.05	0.04	0.45	0.13	0.7	0.2	0.1	0.1	1.4	0.4	0.7	0.2	0.2	0.1	2.3	0.4
	Pickup Trucks	LDGT2	6	2	12	6,075	0.03	0.00	0.00	0.00	0.31	0.02	0.1	0.0	0.0	0.0	0.9	0.1						
Poly Pipeline, < 3"	Haul Trucks	HDDV	6	4	24	6,075	0.43	0.10	0.10	0.09	0.90	0.26	1.3	0.3	0.3	0.3	2.7	0.8	1.5	0.3	0.3	0.3	4.6	0.9
	Pickup Trucks	LDGT2	6	4	24	6,075	0.05	0.01	0.00	0.01	0.62	0.04	0.2	0.0	0.0	0.0	1.9	0.1						
Steel Pipeline	Semi Trucks	HDDV	6	4	24	404	0.43	0.10	0.10	0.09	0.90	0.26	0.1	0.0	0.0	0.0	0.2	0.1	1.4	0.3	0.2	0.2	7.0	0.9
	Haul Trucks	HDDV	6	40	240	404	4.30	1.04	0.96	0.86	9.04	2.56	0.9	0.2	0.2	0.2	1.8	0.5						
	Pickup Trucks	LDGT2	6	160	960	404	2.14	0.21	0.17	0.23	24.64	1.59	0.4	0.0	0.0	0.0	5.0	0.3						
Sales Pipeline, 36" D, 600 mi	Semi Trucks	HDDV	35	94	3,293		59.02	14.23	13.14	11.83	124.07	35.06	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0
	Haul Trucks	HDDV	35	94	3,293		59.02	14.23	13.14	11.83	124.07	35.06	0.0	0.0	0.0	0.0	0.0	0.0						
	Pickup Trucks	LDGT2	50	94	4,700		10.47	1.04	0.83	1.14	120.61	7.77	0.0	0.0	0.0	0.0	0.0	0.0						
Electric Line	Haul Trucks	HDDV	6	1	6	6,075	0.11	0.03	0.02	0.23	0.06	0.3	0.1	0.1	0.1	0.7	0.2	0.4	0.1	0.1	0.1	0.1	1.6	0.3
	Pickup Trucks	LDGT2	6	2	12	6,075	0.03	0.00	0.00	0.00	0.31	0.02	0.1	0.0	0.0	0.0	0.9	0.1						
Field Compressor Station	Semi Trucks	HDDV	10	15	150	404	2.69	0.65	0.60	0.54	5.65	1.60	0.5	0.1	0.1	0.1	1.1	0.3	3.1	0.6	0.6	0.6	14.7	2.0
	Haul Trucks	HDDV	10	48	480	404	8.60	2.07	1.92	1.72	18.09	5.11	1.7	0.4	0.4	0.3	3.7	1.0						
	Pickup Trucks	LDGT2	10	192	1,920	404	4.28	0.42	0.34	0.47	49.27	3.17	0.9	0.1	0.1	0.1	10.0	0.6						
Sales Compressor Station	Semi Trucks	HDDV	10	18.5	185	81	3.32	0.80	0.74	0.66	6.97	1.97	0.1	0.0	0.0	0.0	0.3	0.1	0.7	0.1	0.1	0.1	3.0	0.4
	Haul Trucks	HDDV	10	48	480	81	8.60	2.07	1.92	1.72	18.09	5.11	0.3	0.1	0.1	0.1	0.7	0.2						
	Pickup Trucks	LDGT2	10	192	1,920	81	4.28	0.42	0.34	0.47	49.27	3.17	0.2	0.0	0.0	0.0	2.0	0.1						
Impoundment	Semi Trucks	HDDV	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Haul Trucks	HDDV	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0						
	Pickup Trucks	LDGT2	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0						
							Subtotal	9	2	2	2	35	5	9	2	2	2	35	5	9	2	2	35	5

Supplemental Air Quality Analysis

Construction Site Activity	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	Emissions																								
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)												
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs							
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	18.0	4.1	3.8	3.5	50.5	10.9							
	Fuel Haul Truck	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2													
	Mud Haul Truck, Water Hauling	HDDV	6	7	42	18,225	0.75	0.18	0.17	0.15	1.58	0.45	6.9	1.7	1.5	1.4	14.4	4.1													
	Rig Crew	LDGT2	6	3	18	18,225	0.04	0.00	0.00	0.00	0.46	0.03	0.4	0.0	0.0	0.0	4.2	0.3													
	Co. Supervisor	LDGT2	6	8	48	18,225	0.11	0.01	0.01	0.01	1.23	0.08	1.0	0.1	0.1	0.1	11.2	0.7													
	Tool Pusher	HDDV	6	6	36	18,225	0.65	0.16	0.14	0.13	1.36	0.38	5.9	1.4	1.3	1.2	12.4	3.5													
	Logger, Engr. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
Well Completion & Testing	Semi Casing Completion, Unit Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	20.1	4.8	4.4	4.0	46.8	12.0							
	Tubing Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Cementer, Pump Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Cementer, Cement Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Completion, Equip. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Prefrators, Logging Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Welders	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6													
	Haul Water Truck	HDDV	6	10	60	18,225	1.08	0.26	0.24	0.22	2.26	0.64	9.8	2.4	2.2	2.0	20.6	5.8													
	Pickup Cementor, Engineer	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1													
	Pickup Co. Supervisor	LDGT2	6	2	12	18,225	0.03	0.00	0.00	0.00	0.31	0.02	0.2	0.0	0.0	0.0	2.8	0.2													
	Pickup Miscellaneous Supplies	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1													
	Pickup Roustabout Crew	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2													
	Subtotal:							38	9	8	7	97	23	38	9	8	7	97							23						
	Total:							47	11	10	9	132	28	47	11	10	9	133							28						

A.3.2 Emission Calculations for the Montana CBNG Project Operational Activities - Scenario 1**Compressors – Natural Gas Fired****Emission Factors for Compressors:**

Compressor			Make	Model	Capacity (hp)	Emission Factors (g/hp-hr)					
						NOx	PM10	SO2	CO	VOCs	HCHO
Field	Rich Burn	50%	Caterpillar	G3408	400	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	50%	Waukesha	F18GL	400	1.50	6.60E-02	2.00E-03	1.50	0.50	0.20
Sales	Rich Burn	50%	Waukesha	7044GSI	1680	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	25%	Waukesha	7044GSI	1680	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05
		25%	Waukesha	7044GSI	1680	1.50	6.60E-02	2.00E-03	2.00	1.00	0.05

Emissions Estimation for Compressors:

Type of Compressors	Total # of Operating Station-Year	Operating Hours per Year	Total Emissions (ton/project)				
			NOx	PM10	SO2	CO	VOCs
Field	4,380	8,760	25,377	1,117	34	29,606	12,688
Sales	876	8,760	21,316	938	28	28,422	14,211
Total			46,693	2,055	62	58,028	26,899

Assume PM2.5 is same as PM10

Supplemental Air Quality Analysis

Dehydrators

Emission Factors for Dehydrators

Unit	NOx	PM10	SO2	CO	VOCs
Ib/MMscf	100	7.6	0.6	84	5.5
Ib/MMBtu	9.80E-02	7.45E-03	5.88E-04	8.24E-02	5.39E-03

Emissions Estimations for Dehydrators

Compressor Station	Total Gas Production Rate (MMCFD-yr)	Firing Rate (Btu/hr/MMCFD)	Operating Hours per Year	Total Emissions (ton/project)				
				NOx	PM10	SO2	CO	VOCs
Sales	44,944	25,000	8,760	482	37	3	406	27

Road Dust Emissions

Emissions Estimates for Road Traffic:

Activity	Compressor Station	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	PM10		PM2.5			
									Em. Factor (lb/VMT)	Emissions		Em. Factor (lb/VMT)	Emissions	
										(lb/station - yr)	(ton/project)		(lb/station - yr)	(ton/project)
Inspection Visits for Compressor Stations	Field	Pickup Truck	7,000	20	15	12	16	4,380	1.03	16.5	36	0.15	2.4	5
	Sales	Pickup Truck	7,000	20	15	52	69	876	1.03	71.4	31	0.15	10.4	5
Total:										67		10		

Exhaust Emissions

Activity	Compressor Station	Vehicle		Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	Emissions											
		Type	Class						(lb/station-yr)						(ton/project)					
									NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Inspection Visits for Compressor Stations	Field	Pickup Truck	LDGT2	20	15	12	16	4,380	0.04	0.00	0.00	0.00	0.41	0.03	0.1	0.0	0.0	0.0	0.9	0.1
	Sales	Pickup Truck	LDGT2	20	15	52	69	876	0.15	0.02	0.01	0.02	1.78	0.11	0.1	0.0	0.0	0.0	0.8	0.1
Totals:									0.1	0.0	0.0	0.0	1.7	0.1	0.0	0.0	0.0	1.7	0.1	

Supplemental Air Quality Analysis

Well Workover

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	PM10 Emissions			PM2.5 Emissions		
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
								(lb/well)	(ton/project)		(lb/well)	(ton/project)
Well Workover	Bobtail Truck	40,000	50	1	50	18,225	2.06	103	939	0.30	15	138

Exhaust Emissions – On-site

Emissions Estimation for Industrial Engines:

Activity	Equipment	Capacity (hp)	Operating Hours per Day	Total # of Wells Drilled	Emissions									
					(lb/well)					(ton/project)				
					NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Well Workover	Truck-Mounted Unit	400	10	18,225	124	9	8	27	10	1,130	80	75	243	91

Exhaust Emissions – On-site

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	Emissions											
	Type	Class					(lb/station-yr)					(ton/project)						
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Well Workover	Bobtail Truck	HDDV	50	1	50	18,225	0.9	0.2	0.2	0.2	1.9	0.5	8	2	2	2	17	5

Well and Pipeline Visits for Inspection and Repair

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	PM10 Emissions			PM2.5 Emissions		
								Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
									(lb/well)	(ton/project)		(lb/well)	(ton/project)
Visits for Inspection and Repair	200-hp Pickup	7,000	75	120	12	7.5	175,181	1.03	7.7	677	0.15	1.1	99

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	Emissions											
	Type	Class						(lb/station-yr)						(ton/project)					
								NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Visits for Inspection and Repair	200-hp Pickup	LDGT2	75	120	12	7.5	175,181	0.017	0.002	0.001	0.002	0.192	0.012	1.5	0.1	0.1	0.2	16.9	1.1

A.3.3 Emission Calculations for the Montana CBNG Project Maintenance Activities - Scenario 1

Road Maintenance

Given Data:

Maintenance	Equipment/Vehicle			Road Length Worked On per Day (mi)	# of Operating Hours per Day
	Type	Fuel	Capacity (hp)		
Summer	Heavy Equipment	Diesel	135	6	10
	Commuting Vehicle	Gasoline	225	6	1
Winter	Heavy Equipment	Diesel	135	5	10
	Commuting Vehicle	Gasoline	225	6	1.5

Estimation of Total and Cumulative Length of Roads:

Total Length of Roads to be Built (mi)	6,224
Cummulative Length of Roads Maintained (mi-yr)	59,826

Estimation of Total Operation Days and Hours:

Season	# of Operation per Year	Cummulative Length of Roads (mi-yr)	Road Length Worked On (mi/day)	# of Operating Hours per Day	Total # of Operating Days	Total # of Operating Hours
Summer	2	59,826	6	10	19,942	199,420
Winter	1	59,826	5	10	11,965	119,652
Totals:					31,907	319,071

Fugitive Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	PM10		PM2.5	
						Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Pickup Truck	7,000	6	31,907	191,443	1.03	99	0.15	14

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	Emissions (ton/project)					
	Type	Class									
						NOx	PM10	PM2.5	SO2	CO	VOCs
Road Maintenance	Pickup Truck	LDGT2	6	31,907	191,443	0.21	0.02	0.02	0.02	2.46	0.16

Supplemental Air Quality Analysis

Maintenance Visits to Compressor Stations
Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight	Compressor Station	# of Stations	Cummulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	PM10		PM2.5		
										Em. Factor	Emissions (ton/project)	Em. Factor	Emissions (ton/project)	
Maintenance Visits to Compressor Stations	Pickup Truck	7,000	Field	673	4,380	2	8,760	20	175,209	1.03	90	0.15	13	
	Pickup Truck	7,000	Sales	67	876	2	1,752	20	35,042	1.03	18	0.15	3	
Totals:												108		16

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight	Compressor Station	# of Stations	Cummulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	PM10		PM2.5		
										Em. Factor	Emissions (ton/project)	Em. Factor	Emissions (ton/project)	
Maintenance Visits to Compressor Stations	Pickup Truck	7,000	Field	673	4,380	2	8,760	20	175,209	1.03	90	0.15	13	
	Pickup Truck	7,000	Sales	67	876	2	1,752	20	35,042	1.03	18	0.15	3	
Totals:												108		16

A.3.4 ADY 20 – Scenario 1

Wells Field Sales
Ratio: 200 5 1

Year	Wells		Compressors		# Well Pads	# Operating Well Years	# Operating FC Years	# Operating SC Years
	Drilled	Operating	Field	Sales				
1	607	546	14	3	202	546	14	3
2	910	1,365	34	7	485	1,912	48	10
3	1,075	2,333	58	12	813	4,244	106	21
4	1,175	3,390	85	17	1,169	7,635	191	38
5	1,075	4,358	109	22	1,488	11,993	300	60
6	950	5,213	130	26	1,769	17,205	430	86
7	910	6,032	151	30	2,041	23,237	581	116
8	910	6,851	171	34	2,314	30,088	752	150
9	910	7,670	192	38	2,587	37,758	944	189
10	910	8,489	212	42	2,860	46,247	1,156	231
11	910	9,308	233	47	3,133	55,554	1,389	278
12	910	10,127	253	51	3,406	65,681	1,642	328
13	910	10,946	274	55	3,679	76,627	1,916	383
14	910	11,765	294	59	3,952	88,392	2,210	442
15	910	12,584	315	63	4,225	100,976	2,524	505
16	910	13,403	335	67	4,498	114,378	2,859	572
17	860	14,177	354	71	4,754	128,555	3,214	643
18	800	14,897	372	74	4,992	143,452	3,586	717
19	750	15,572	389	78	5,216	159,024	3,976	795
20	650	16,157	404	81	5,407	175,181	4,380	876
21	273	15,856	396	79	5,477	191,037	4,776	955
22	0	15,038	376	75	5,285	206,074	5,152	1,030
23	0	14,070	352	70	5,013	220,145	5,504	1,101
24	0	13,013	325	65	4,690	233,157	5,829	1,166
25	0	12,045	301	60	4,338	245,203	6,130	1,226
26	0	11,190	280	56	4,015	256,393	6,410	1,282
27	0	10,371	259	52	3,730	266,764	6,669	1,334
28	0	9,552	239	48	3,457	276,316	6,908	1,382
29	0	8,733	218	44	3,184	285,049	7,126	1,425
30	0	7,914	198	40	2,911	292,964	7,324	1,465
31	0	7,095	177	35	2,638	300,059	7,501	1,500
32	0	6,276	157	31	2,365	306,335	7,658	1,532
33	0	5,457	136	27	2,092	311,792	7,795	1,559
34	0	4,638	116	23	1,819	316,430	7,911	1,582
35	0	3,819	95	19	1,546	320,250	8,006	1,601
36	0	3,000	75	15	1,273	323,250	8,081	1,616
37	0	2,226	56	11	1,000	325,476	8,137	1,627
38	0	1,506	38	8	742	326,982	8,175	1,635
39	0	831	21	4	502	327,813	8,195	1,639
40	0	246	6	1	277	328,060	8,201	1,640

18,225

Supplemental Air Quality Analysis

	Operation and Maintenance						Construction					
	Emissions						Emissions					
	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
1	151.29	13.87	7.80	0.52	183.23	84.30	575.39	196.30	63.91	38.40	135.82	48.56
2	378.10	34.66	19.49	1.30	457.92	210.67	862.62	294.30	95.82	57.57	203.62	72.80
3	646.04	59.23	33.30	2.22	782.42	359.96	1,019.02	347.66	113.19	68.01	240.54	86.00
4	938.90	86.08	48.39	3.22	1,137.10	523.14	1,113.82	380.00	123.72	74.34	262.92	94.00
5	1,206.83	110.64	62.20	4.14	1,461.60	672.42	1,019.02	347.66	113.19	68.01	240.54	86.00
6	1,443.62	132.35	74.40	4.95	1,748.37	804.35	900.53	307.23	100.03	60.10	212.57	76.00
7	1,670.43	153.14	86.09	5.73	2,023.06	930.73	862.62	294.30	95.82	57.57	203.62	72.80
8	1,897.24	173.94	97.78	6.51	2,297.75	1,057.10	862.62	294.30	95.82	57.57	203.62	72.80
9	2,124.05	194.73	109.47	7.29	2,572.45	1,183.48	862.62	294.30	95.82	57.57	203.62	72.80
10	2,350.86	215.53	121.16	8.07	2,847.14	1,309.85	862.62	294.30	95.82	57.57	203.62	72.80
11	2,577.67	236.32	132.85	8.85	3,121.83	1,436.23	862.62	294.30	95.82	57.57	203.62	72.80
12	2,804.48	257.11	144.54	9.63	3,396.52	1,562.60	862.62	294.30	95.82	57.57	203.62	72.80
13	3,031.29	277.91	156.23	10.40	3,671.22	1,688.98	862.62	294.30	95.82	57.57	203.62	72.80
14	3,258.10	298.70	167.92	11.18	3,945.91	1,815.35	862.62	294.30	95.82	57.57	203.62	72.80
15	3,484.92	319.50	179.61	11.96	4,220.60	1,941.73	862.62	294.30	95.82	57.57	203.62	72.80
16	3,711.73	340.29	191.29	12.74	4,495.29	2,068.10	862.62	294.30	95.82	57.57	203.62	72.80
17	3,926.08	359.94	202.34	13.48	4,754.89	2,187.53	815.22	278.13	90.55	54.41	192.43	68.80
18	4,125.47	378.22	212.62	14.16	4,996.38	2,298.63	758.34	258.72	84.24	50.61	179.01	64.00
19	4,312.40	395.36	222.25	14.80	5,222.77	2,402.79	710.95	242.55	78.97	47.45	167.82	60.00
20	4,474.41	410.21	230.60	15.36	5,418.98	2,493.06	616.15	210.21	68.44	41.12	145.44	52.00
21							258.78	88.29	28.75	17.27	61.09	21.84
22							0.00	0.00	0.00	0.00	0.00	0.00
23							0.00	0.00	0.00	0.00	0.00	0.00
24							0.00	0.00	0.00	0.00	0.00	0.00
25							0.00	0.00	0.00	0.00	0.00	0.00
26							0.00	0.00	0.00	0.00	0.00	0.00
27							0.00	0.00	0.00	0.00	0.00	0.00
28							0.00	0.00	0.00	0.00	0.00	0.00
29							0.00	0.00	0.00	0.00	0.00	0.00
30							0.00	0.00	0.00	0.00	0.00	0.00
31							0.00	0.00	0.00	0.00	0.00	0.00
32							0.00	0.00	0.00	0.00	0.00	0.00
33							0.00	0.00	0.00	0.00	0.00	0.00
34							0.00	0.00	0.00	0.00	0.00	0.00
35							0.00	0.00	0.00	0.00	0.00	0.00
36							0.00	0.00	0.00	0.00	0.00	0.00
37							0.00	0.00	0.00	0.00	0.00	0.00
38							0.00	0.00	0.00	0.00	0.00	0.00
39							0.00	0.00	0.00	0.00	0.00	0.00
40							0.00	0.00	0.00	0.00	0.00	0.00
	48,514	4,448	2,500	167	58,755	27,031	17,276	5,894	1,919	1,153	4,078	1,458

Combined Construction & Operation and Maintenance						
Emissions						
	NOx	PM10	PM2.5	SO2	CO	VOCs
1	726.68	210.18	71.71	38.92	319.05	132.86
2	1,240.72	328.96	115.30	58.87	661.54	283.47
3	1,665.06	406.89	146.49	70.23	1,022.96	445.96
4	2,052.71	466.08	172.11	77.56	1,400.02	617.14
5	2,225.86	458.30	175.39	72.15	1,702.14	758.42
6	2,344.15	439.58	174.43	65.06	1,960.94	880.35
7	2,533.04	447.44	181.91	63.30	2,226.68	1,003.53
8	2,759.85	468.23	193.60	64.08	2,501.37	1,129.90
9	2,986.66	489.03	205.29	64.86	2,776.07	1,256.28
10	3,213.47	509.82	216.98	65.64	3,050.76	1,382.65
11	3,440.29	530.62	228.67	66.42	3,325.45	1,509.03
12	3,667.10	551.41	240.36	67.20	3,600.14	1,635.40
13	3,893.91	572.20	252.05	67.98	3,874.84	1,761.78
14	4,120.72	593.00	263.73	68.75	4,149.53	1,888.15
15	4,347.53	613.79	275.42	69.53	4,424.22	2,014.53
16	4,574.34	634.59	287.11	70.31	4,698.91	2,140.90
17	4,741.29	638.07	292.90	67.88	4,947.32	2,256.33
18	4,883.81	636.94	296.85	64.77	5,175.39	2,362.63
19	5,023.35	637.91	301.22	62.25	5,390.59	2,462.79
20	5,090.56	620.43	299.04	56.48	5,564.43	2,545.06
21	258.78	88.29	28.75	17.27	61.09	21.84
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00
	65,790	10,342	4,419	1,320	62,833	28,489

Emission Factors per Well						
	NOx	PM10	PM2.5	SO2	CO	VOCs
Op	0.276933	0.025389	0.014273	0.000951	0.335395	0.154302
Con	0.947929	0.323402	0.105295	0.063265	0.223759	0.080000

A.3.5 Emission Points - Scenario 1

Scenario 1 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.5 g NOx for Engines)										
Longitude	Latitude	Watershed	County	Construction Wells/point	Construction Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0888964	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5441521	45.01011264	LITTLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.4367862	45.14408638	LITTLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.6163493	46.03435575	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2566985	45.82981624	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2689192	45.9319004	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2371025	45.91155283	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2876139	45.87320735	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.3704664	45.9433915	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.3833798	45.91986854	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2206782	45.78953449	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8950719	45.32372874	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1906473	45.04845919	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.127224	45.0482058	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0662494	45.0463265	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0192953	45.08316794	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0850023	45.08521834	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.150915	45.08390454	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2145762	45.08081906	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9627608	45.12005428	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1962674	45.11191918	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1351194	45.11174049	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0714183	45.11478024	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0125111	45.11626908	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8058573	45.39278421	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.000915	45.15088418	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0575099	45.14932839	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1091992	45.15092488	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1658912	45.14765111	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2270788	45.14781278	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.957088	45.15485509	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8427057	45.47897521	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7670751	45.58143586	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7724857	45.67659425	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7939829	45.78061951	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7968544	45.87902714	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8384004	45.56452059	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2169993	45.59975321	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1245521	45.72872913	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1463546	45.51900756	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9185693	45.75201292	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9469395	45.84556398	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1199013	45.82426101	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1862006	45.74380863	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1732814	45.41523309	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1353247	45.7765741	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1159668	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9102423	45.80233865	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9500425	45.73349508	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1777591	45.90447616	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9834606	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.985258	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9950453	45.7146349	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714

Scenario 1 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.5 g NOx for Engines)					Construction Emissions per Point (tons)						
Longitude	Latitude	Watershed	County	Construction Wells/point	NOx	PM10	PM2.5	SO2	CO	VOCs	
-108.1869611	46.42502531	MIDDLE MUSSEL SHELL	Musselshell		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1538128	45.00373939	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0026151	45.00435919	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8748974	45.01191736	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7462246	45.01080066	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.6336909	45.01434879	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5669066	45.06934218	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.6792641	45.07010005	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.6128423	45.3589134	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9277779	45.07416887	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8887584	45.1440493	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7869424	45.14067783	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.6775808	45.13801376	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5802048	45.13566681	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5168432	45.22913207	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.4800443	45.18955626	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5666423	45.17873365	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.6981156	45.1886391	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.4738774	45.26675596	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7368235	45.26935109	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.784381	45.31966458	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.703068	45.33537987	MIDDLE POWDER	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7215527	45.46134361	MIZPAH	Powder River		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9962867	45.33689316	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9325316	45.33710215	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9621328	45.30947587	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.994136	45.28023186	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9375915	45.27893984	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9579691	45.24610718	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.881452	45.71725511	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.757723	45.71928418	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6220247	45.72253455	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4959005	45.72421274	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3998157	45.78322101	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5306526	45.78510384	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6638756	45.78689404	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8020263	45.78531354	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3524423	45.8618565	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4549907	45.86135873	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5429837	45.86538099	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5608358	45.93247641	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4728256	45.92680484	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3890316	45.93117554	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.324293	45.93602503	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2782499	45.98802101	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3614704	45.99537505	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4453652	45.99102485	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5432926	45.99197974	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5908348	46.04152496	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4639721	46.04316764	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.37054	46.045603	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3032753	46.05037398	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3718811	46.10561053	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4461942	46.10431984	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5325503	46.10163267	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6275848	46.11575769	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5439175	46.1569001	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9475016	45.69484378	ROSEBUD	Big Horn		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4571953	46.16458578	ROSEBUD	Rosebud		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.7578172	45.44657007	STILLWATER	Stillwater		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-108.6823126	46.32003994	UPPER MUSSEL SHELL	Musselshell		3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714

Supplemental Air Quality Analysis

Scenario 1 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.5 g NOx for Engines)										
Longitude	Latitude	Watershed	County	Construction Wells/point	Construction Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-106.8323923	45.00783236	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7903307	45.00602084	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9091138	45.05136249	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7465796	45.01595443	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7077379	45.03416601	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7475796	45.13008114	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6493939	45.0937355	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6734747	45.07500148	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7245767	45.07472301	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6865526	45.05802281	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.594975	45.04699579	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8194467	45.02325601	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5316421	45.01038326	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4704863	45.05358034	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4096151	45.01018167	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8651889	45.25176775	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8654241	45.22344433	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8622866	45.19582781	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7995346	45.25018769	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7985761	45.22419531	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7965835	45.19660405	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.864485	45.0093902	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9621692	45.00774532	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9790408	45.02701546	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6726239	45.00857642	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6092737	45.01086998	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6399265	45.03636498	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.747682	45.09523907	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3608313	45.00959182	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3042044	45.01032764	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2121315	45.00998408	UPPER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.245271	45.03143069	UPPER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3293535	45.03623872	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3869384	45.03866439	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5377621	45.04123955	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4660257	45.01332086	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5617171	45.0709975	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2852399	45.06959453	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2467164	45.05477978	UPPER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0890249	45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0254773	45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0528827	45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0026382	45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.1067798	45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0037776	45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0537864	45.72626256	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0900954	45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-108.3574854	46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.8845271	46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.222593	45.425538	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.278421	45.33934	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.251687	45.280535	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.17026	45.250393	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.159928	45.205637	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.234891	45.209166	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.195872	45.13131	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
Totals				650	616	210	68	41	145	52

Scenario 1 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.5 g NOx for Engines)						Operation Emissions per Point (tons)					
Longitude	Latitude	Watershed	County	Operational Wells/point	NOx	PM10	PM2.5	SO2	CO	VOCs	
-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	99.45	27.54055	2.524917	1.419384	0.094527	33.35451	15.34507	
-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	100.35	27.78979	2.547768	1.432229	0.095382	33.65637	15.48394	
-109.0888964	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	99.45	27.54055	2.524917	1.419384	0.094527	33.35451	15.34507	
-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	100.35	27.78979	2.547768	1.432229	0.095382	33.65637	15.48394	
-105.5441521	45.01011264	LITTLE POWDER	Powder River	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-105.4367862	45.14408638	LITTLE POWDER	Powder River	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.6163493	46.03435575	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.2566985	45.82981624	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.2689192	45.9319004	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.2371025	45.91155283	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.2876139	45.87320735	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.3704664	45.9433915	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.3833798	45.91986854	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-107.2206782	45.78953449	LOWER BIGHORN	Big Horn	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-105.8950719	45.32372874	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.1906473	45.04845919	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.127224	45.04820558	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.0662494	45.0463265	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.0192953	45.08316794	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.0850023	45.08521834	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.150915	45.08390454	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.2145762	45.08081906	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-105.9627608	45.12005428	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.1962674	45.11191918	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.1351194	45.11174049	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.0714183	45.11478024	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.0125111	45.11626908	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-105.8058573	45.39278421	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.000915	45.15088418	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.0575099	45.14932839	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.1091992	45.15092488	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.1658912	45.14765111	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.2270788	45.14781278	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-105.957088	45.15485509	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-105.8427057	45.47897521	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-105.7670751	45.58143586	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-105.7724857	45.67659425	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-105.7939829	45.78061951	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-105.7968544	45.87902714	LOWER TONGUE	Custer	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-105.8384004	45.56452059	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.2169993	45.59975321	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-106.1245521	45.72872913	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.1463546	45.51900756	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-105.9185693	45.75201292	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-105.9469395	45.84556398	LOWER TONGUE	Custer	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-106.1199013	45.82426101	LOWER TONGUE	Custer	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786	
-106.1862006	45.74380863	LOWER TONGUE	Powder River	90.45	25.04815	2.296414	1.290931	0.085972	30.33595	13.95635	
-106.1732814	45.41523309	LOWER TONGUE	Powder River	89.55	24.79891	2.273564	1.278085	0.085117	30.0341	13.81748	
-107.1353247	45.77657411	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-107.1159668	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9102423	45.80233865	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9500425	45.73349506	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-107.1777591	45.90447616	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	25.54663	2.342115	1.316621	0.087683	30.93966	14.23409	
-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9834606	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	25.54663	2.342115	1.316621	0.087683	30.93966	14.23409	
-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	25.54663	2.342115	1.316621	0.087683	30.93966	14.23409	
-106.985258	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-106.9950453	45.7146349	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	25.54663	2.342115	1.316621	0.087683	30.93966	14.23409	
-106.9791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	21.15	5.856681	0.53694	0.301841	0.020102	7.093058	3.26323	
-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Horn	93.15	25.79587	2.364965	1.329467	0.088539	31.24152	14.37296	
-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Horn	92.25	25.54663	2.342115	1.316621	0.087683	30.93966	14.23409	

Supplemental Air Quality Analysis

Scenario 1 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.5 g NOx for Engines)											
Longitude	Latitude	Watershed	County	Operational Wells/point	Operation Emissions per Point (tons)						
					NOx	PM10	PM2.5	SO2	CO	VOCs	
-108.1869611	46.42502531	MIDDLE MUSSEL SHELL	Musselshell		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.1538128	45.00373939	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.0026151	45.00435919	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8748974	45.01191736	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7462246	45.01080066	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6336909	45.01434879	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5669066	45.06934218	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6792641	45.07010005	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6128423	45.3589134	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.9277779	45.07416887	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8887584	45.1440493	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7869424	45.14067783	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6775808	45.13801376	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5802048	45.13566681	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5168432	45.22913207	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.4800443	45.18955626	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5666423	45.17873365	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6981156	45.1886391	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.4738774	45.26675596	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7368235	45.26935109	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.784381	45.31966458	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.703068	45.33537987	MIDDLE POWDER	Powder River		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7215527	45.46134361	MIZPAH	Powder River		111.15	30.78067	8.21971	1.586373	0.105648	37.22864	17.1504
-106.9962867	45.33689316	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9325316	45.33710215	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9621328	45.30947587	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.994136	45.28023186	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9375915	45.27893984	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9579691	45.24610718	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.881452	45.71725511	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.757723	45.71928418	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6220247	45.72253455	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4959005	45.72421274	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3998157	45.78322101	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5306526	45.78510384	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6638756	45.78689404	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.8020263	45.78531354	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3524423	45.8618565	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4549907	45.86135873	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5429837	45.86538099	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5608358	45.93247641	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4728256	45.92680484	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3890316	45.93117554	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.324293	45.93602503	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.2782499	45.98802101	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3614704	45.99537505	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4453652	45.99102485	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5432926	45.99197974	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5908348	46.04152496	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4639721	46.04316764	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.37054	46.045603	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3032753	46.05037398	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3718811	46.10561053	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4461942	46.10431984	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5325503	46.10163267	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6275848	46.11575769	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5439175	46.1569001	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9475016	45.69484378	ROSEBUD	Big Horn		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4571953	46.16458578	ROSEBUD	Rosebud		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.7578172	45.44657007	STILLWATER	Stillwater		88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-108.6823126	46.32003994	UPPER MUSSEL SHELL	Musselshell		66.15	18.31867	1.679456	0.944107	0.062875	22.18585	10.20681

Scenario 1 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.5 g NOx for Engines)										
Longitude	Latitude	Watershed	County	Operational Wells/point	Operation Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOcs
-106.8323923	45.00783236	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7903307	45.00602084	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9091138	45.05136249	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7465796	45.01595443	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7077379	45.03416601	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7475796	45.13008114	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6493939	45.093755	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.6734747	45.07500148	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7245767	45.07472301	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.6865526	45.05802281	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.594975	45.04699579	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.8194467	45.02325601	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5316421	45.01038326	UPPER TONGUE	Big Horn	86.12	23.84988	2.186557	1.229174	0.08186	28.88472	13.2887
-106.4704863	45.05358034	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.4096151	45.01018167	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8651889	45.25176775	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8654241	45.22344433	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8622866	45.19582781	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7995346	45.25018769	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7985761	45.22419531	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7965835	45.19660405	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.864485	45.0093902	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9621692	45.00774532	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9790408	45.02701546	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6726239	45.00857642	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6092737	45.01086998	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6399265	45.03636498	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.747682	45.09523907	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3608313	45.00959182	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3042044	45.01032764	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2121315	45.00998408	UPPER TONGUE	Powder River	87.02	24.09912	2.209407	1.24202	0.082715	29.18658	13.42757
-106.245271	45.03143069	UPPER TONGUE	Powder River	87.02	24.09912	2.209407	1.24202	0.082715	29.18658	13.42757
-106.3293535	45.03623872	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3869384	45.03866439	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5377621	45.04123955	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.4660257	45.01332086	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5617171	45.0709975	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2852399	45.06959453	UPPER TONGUE	Big Horn	85.22	23.60064	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2467164	45.05477978	UPPER TONGUE	Powder River	87.02	24.09912	2.209407	1.24202	0.082715	29.18658	13.42757
-109.0890249	45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0254773	45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0528827	45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0026382	45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.1067798	45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0037776	45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0537864	45.72626256	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0900954	45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-108.3574854	46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-107.8845271	46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	24.54967	2.250713	1.26524	0.084261	29.73224	13.6786
-107.222593	45.425538	LITTLE BIGHORN	Big Horn	97.71	27.06033	2.480891	1.394634	0.092879	32.77291	15.0775
-107.278421	45.33934	LITTLE BIGHORN	Big Horn	95.91	26.56185	2.43519	1.368944	0.091168	32.1692	14.79975
-107.251687	45.280535	LITTLE BIGHORN	Big Horn	95.91	26.56185	2.43519	1.368944	0.091168	32.1692	14.79975
-107.17026	45.250393	LITTLE BIGHORN	Big Horn	95.91	26.56185	2.43519	1.368944	0.091168	32.1692	14.79975
-107.159928	45.205637	LITTLE BIGHORN	Big Horn	95.91	26.56185	2.43519	1.368944	0.091168	32.1692	14.79975
-107.234891	45.209166	LITTLE BIGHORN	Big Horn	95.91	26.56185	2.43519	1.368944	0.091168	32.1692	14.79975
-107.195872	45.13131	LITTLE BIGHORN	Big Horn	97.71	27.06033	2.480891	1.394634	0.092879	32.77291	15.0775
Totals				16,157	4,474	410	231	15	5,419	2,493

Supplemental Air Quality Analysis

A.4.1 Emission Calculations for the Montana CBNG Project Construction Activities - Scenario 2

Heavy Equipment

Fugitive Dust Emissions

Emission Factors for Construction Activities

			Reference
E	=	1.2 Tons of TSP/acre/month	EPA, AP-42, Volume I, Section 13.2.3 Heavy Construction Operations (1/95)
PM10	=	26 % of TSP	Argonne National Laboratory - 2002 TSD
PM2.5	=	15 % of PM10	Argonne National Laboratory - 2002 TSD
CE	=	50 % Control Efficiency for watering	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emission Calculations for Construction Activities

Area Disturbed for CBNG Wells	Emission Estimation Basis	Disturbed Area (acre)	Avg. # of Days to Complete	Total # of Well Pads or Stations	Total Disturbed Area	Emissions					
						(lb/well pad, lb/stn, or lb/project)			(ton/project)		
						TSP	PM10	PM2.5	TSP	PM10	PM2.5
Road	per Well Pad	0.75	3	6,075	4,556	90	23	4	273	71	11
Well Pad	per Well Pad	0.25	3	6,075	1,519	30	8	1	91	24	4
Gathering Poly Pipeline (Low Pressure)	per Well Pad	1.5	1	6,075	9,113	60	16	2	182	47	7
Steel Pipeline (Low/Intermediate Pressure)	per Field Station	6.06	1	673	4,078	242	63	9	82	21	3
Sales Pipeline, 36" D x 600 miles	per Project		1		1,316	52,640	13,686	2,053	26	7	1
Electric Line	per Well Pad	0.35	1	6,075	2,126	14	4	1	43	11	2
Field Compressor Station	per Field Station	2	5	404	808	400	104	16	81	21	3
Sales Compressor Station	per Sales Station	1	5	81	81	200	52	8	8	2	0
Impoundment	per Impoundment	6	5	356	2,136	1,200	312	47	214	56	8
				Total	25,733				1,000	260	39

Supplemental Air Quality Analysis

Emissions Estimation for Industrial Engines

Construction Site Activity	Equipment Type	Capacity (hp)	# of Units	Avg. Load Factor (%)	# of Operating Hours per Day	# of Operating Days per Well	# of Operating Hours per Well	# of Wells	Emissions																			
									(lb/well)					(ton/equipment type)					(ton/project activity)									
									NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs					
Rig-up, Drilling, and Rig-down	Main Deck	400	1	60	11	3	33	18,225	246	17	16	53	20	2,237	159	148	482	181	3,254	231	215	701	263					
	Auxiliary Pump	200	1	90	10	2	20	18,225	112	8	7	24	9	1,017	72	67	219	82										
Well Completion & Testing	Main Deck	400	1	60	10	1	10	18,225	74	5	5	16	6	678	48	45	146	55	13,716	975	905	3,154	1,143					
	Auxiliary Pump	125	1	90	6	1	6	18,225	21	1	1	5	2	191	14	13	41	15										
	Equipment Type	Capacity (kw)	Avg # of Wells Served	Avg. Load Factor (%)	# of Operating Hours per Day	Avg. # of Operating Days	# of Operating Hours per Well	# of Wells																				
	Field Generators for Pumps & Lighting	125	8	75	24	120	360	18,225	1403	100	93	302	114	12,810	909	847	2,760	1,037										
	Emission Source	Average Volume Flared (MCFD/well)		Average # Days of Continuous Flaring			# of Wells																					
	Flaring of Natural Gas	60		1			18,225	4	0.5	0.0	23	4	38	4	0	207	35											
									Subtotal:	16,971	1,206	1,120	3,855	1,406	16,971	1,206	1,120	3,855	1,406									
									Total:	17,229	1,228	1,144	3,945	1,430	17,229	1,228	1,144	3,945	1,430									

PM2.5 is assumed to be same as PM10

Commuting Vehicles

Road Dust Emissions

Emission Factors for Road Traffic

$$E \text{ (lb/VMT)} = \frac{k (s/12)^a (W/3)^b}{(M/0.2)^c}$$

Parameter	PM10	PM2.5
k	2.6	0.38
a	0.8	0.8
b	0.4	0.4
c	0.3	0.3

Source: EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)

Function/Variable Description	Assumed Value	Reference
E = size-specific emission factor (lb/VMT)		
s = surface material silt content (%)	5.1	EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)
W = mean vehicle weight (tons)	listed in table below	
M = surface material moisture content (%)	0.2	Default value in EPA, AP-42, Volume I, Section 13.2.2 Unpaved Roads (9/98)
CE = control efficiency for watering (%)	50	EPA, Control of Open Fugitive Dust Sources, Section 5.3.1 Watering of Unpaved Surfaces (1988)

Emissions Estimation for Road Traffic

Construction Site Destination	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions			Controlled Em. Factor (lb/VMT)	Emissions		
								(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)		(lb/well pad, lb/stn, or lb/project)	(ton/veh. type)	(ton/const. site)
Road	Semi Trucks	60,000	6	2.6	16	6,075	1.65	26	78	78	0.24	4	11	11
Well Pad	Haul Trucks	45,000	6	2	12	6,075	1.47	18	54		0.21	3	8	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	79	0.10	1	4	12
Poly Pipeline, < 3"	Haul Trucks	45,000	6	4	24	6,075	1.47	35	107		0.21	5	16	
	Pickup Trucks	7,000	6	4	24	6,075	0.70	17	51	158	0.10	2	7	23
Steel Pipeline	Semi Trucks	60,000	6	4	24	404	1.65	40	8		0.24	6	1	
	Haul Trucks	45,000	6	40	240	404	1.47	352	71		0.21	51	10	
	Pickup Trucks	7,000	6	160	960	404	0.70	669	135	214	0.10	98	20	31
Sales Pipeline, 36" D, 600 mi	Semi Trucks	60,000	35	94	3,290	1	1.65	5418	3		0.24	792	0	
	Haul Trucks	45,000	35	94	3,290	1	1.47	4829	2		0.21	706	0	
	Pickup Trucks	7,000	50	94	4,700	1	0.70	3277	2	7	0.10	479	0	1
Electric Line	Haul Trucks	45,000	6	1	6	6,075	1.47	9	27		0.21	1	4	
	Pickup Trucks	7,000	6	2	12	6,075	0.70	8	25	52	0.10	1	4	8
Field Compressor Station	Semi Trucks	60,000	10	15	150	404	1.65	247	50		0.24	36	7	
	Haul Trucks	45,000	10	48	480	404	1.47	705	142		0.21	103	21	
	Pickup Trucks	7,000	10	192	1,920	404	0.70	1339	270	463	0.10	196	40	68
Sales Compressor Station	Semi Trucks	60,000	10	18.5	185	81	1.65	305	12		0.24	45	2	
	Haul Trucks	45,000	10	48	480	81	1.47	705	29		0.21	103	4	
	Pickup Trucks	7,000	10	192	1,920	81	0.70	1339	54	95	0.10	196	8	14
Impoundment	Semi Trucks	60,000	6	0.02	0.12	356	1.65	0	0		0.24	0	0	
	Haul Trucks	45,000	6	0.02	0.12	356	1.47	0	0		0.21	0	0	
	Pickup Trucks	7,000	6	0.02	0.12	356	0.70	0	0	0	0.10	0	0	0
							Subtotal:		1,146	1,146			167	167

Supplemental Air Quality Analysis

Emissions Estimation for Road Traffic Continued

Construction Site Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	PM10 Emissions			PM2.5 Emissions				
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions			
								(lb/well)	(ton/veh. type)		(ton/proj. activity)	(lb/well)	(ton/veh. h. type)	(ton/c onst. site)
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	80,000	6	1	6	18,225	1.85	11	101	1,587	0.27	2	15	232
	Fuel Haul Truck	45,000	6	2	12	18,225	1.47	18	161		0.21	3	23	
	Mud Haul Truck, Water Hauling	60,000	6	7	42	18,225	1.65	69	630		0.24	10	92	
	Rig Crew	7,000	6	3	18	18,225	0.70	13	114		0.10	2	17	
	Co. Supervisor	7,000	6	8	48	18,225	0.70	33	305		0.10	5	45	
	Tool Pusher	7,000	6	6	36	18,225	0.70	25	229		0.10	4	33	
	Logger, Engr. Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
Well Completion & Testing	Semi Casing	45,000	6	1	6	18,225	1.47	9	80	1,663	0.21	1	12	243
	Semi Completion, Unit Rig	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Tubing Truck	45,000	6	1	6	18,225	1.47	9	80		0.21	1	12	
	Haul Cementer, Pump Truck	80,000	6	1	6	18,225	1.85	11	101		0.27	2	15	
	Haul Cementer, Cement Truck	60,000	6	1	6	18,225	1.65	10	90		0.24	1	13	
	Haul Completion, Equip. Truck	20,000	6	1	6	18,225	1.06	6	58		0.16	1	8	
	Haul Preforators, Logging Truck	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Welders	12,000	6	1	6	18,225	0.87	5	47		0.13	1	7	
	Haul Water Truck	60,000	6	9	54	18,225	1.65	89	810		0.24	13	118	
	Pickup Cementor, Engineer	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Co. Supervisor	7,000	6	2	12	18,225	0.70	8	76		0.10	1	11	
	Pickup Miscellaneous Supplies	7,000	6	1	6	18,225	0.70	4	38		0.10	1	6	
	Pickup Roustabout Crew	12,000	6	2	12	18,225	0.87	10	95		0.13	2	14	
								Subtotal:	3,250	3,250			475	475
								Total:	4,396	4,396			642	642

Vehicle		Emission Factors (g/mi)					
Type	Class	NOx	PM10	PM2.5	SO2	CO	VOCs
Light-Duty Gasoline Truck	LDGT2	1.01	0.10	0.08	0.11	11.64	0.75
Heavy-Duty Diesel Truck	HDDV	8.13	1.96	1.81	1.63	17.09	4.83

PM10 and PM2.5 were estimated using the EPA PARTS model (1995) and include tire and break wear emissions.

Source: EPA, AP-42, Volume II, Appendix H-117, Table 3.1A.2 Light-Duty Gasoline Powered Trucks and Appendix H-259, Table 7.1.2 Heavy-Duty Diesel Powered Vehicles (High Altitude; Model Year 1991-1997; 50,000 mileage) (6/30/95)

Vehicle		Emission Factors (g/mi)					
Type	Class	NOx	PM10	PM2.5	SO2	CO	VOCs
Light-Duty Gasoline Truck	LDGT2	1.01	0.10	0.08	0.11	11.64	0.75
Heavy-Duty Diesel Truck	HDDV	8.13	1.96	1.81	1.63	17.09	4.83

PM10 and PM2.5 were estimated using the EPA PARTS model (1995) and include tire and break wear emissions.

Source: EPA, AP-42, Volume II, Appendix H-117, Table 3.1A.2 Light-Duty Gasoline Powered Trucks and Appendix H-259, Table 7.1.2 Heavy-Duty Diesel Powered Vehicles (High Altitude; Model Year 1991-1997; 50,000 mileage) (6/30/95)

Exhaust Emissions

Emissions Estimation for Road Traffic Exhaust

Construction Site Destination	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	Emissions																	
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)					
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Road	Semi Trucks	HDDV	6	2.6	16	6,075	0.28	0.07	0.06	0.06	0.59	0.17	0.8	0.2	0.2	0.2	1.8	0.5	0.8	0.2	0.2	0.2	1.8	0.5
Well Pad	Haul Trucks	HDDV	6	2	12	6,075	0.22	0.05	0.05	0.04	0.45	0.13	0.7	0.2	0.1	0.1	1.4	0.4	0.7	0.2	0.2	0.1	2.3	0.4
	Pickup Trucks	LDGT2	6	2	12	6,075	0.03	0.00	0.00	0.00	0.31	0.02	0.1	0.0	0.0	0.0	0.9	0.1						
Poly Pipeline, < 3"	Haul Trucks	HDDV	6	4	24	6,075	0.43	0.10	0.10	0.09	0.90	0.26	1.3	0.3	0.3	0.3	2.7	0.8	1.5	0.3	0.3	0.3	4.6	0.9
	Pickup Trucks	LDGT2	6	4	24	6,075	0.05	0.01	0.00	0.01	0.62	0.04	0.2	0.0	0.0	0.0	1.9	0.1						
Steel Pipeline	Semi Trucks	HDDV	6	4	24	404	0.43	0.10	0.10	0.09	0.90	0.26	0.1	0.0	0.0	0.0	0.2	0.1						
	Haul Trucks	HDDV	6	40	240	404	4.30	1.04	0.96	0.86	9.04	2.56	0.9	0.2	0.2	0.2	1.8	0.5	1.4	0.3	0.2	0.2	7.0	0.9
	Pickup Trucks	LDGT2	6	160	960	404	2.14	0.21	0.17	0.23	24.64	1.59	0.4	0.0	0.0	0.0	5.0	0.3						
Sales Pipeline, 36" D, 600 mi	Semi Trucks	HDDV	35	94	3,293		59.02	14.23	13.14	11.83	124.07	35.06	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0
	Haul Trucks	HDDV	35	94	3,293		59.02	14.23	13.14	11.83	124.07	35.06	0.0	0.0	0.0	0.0	0.0	0.0						
	Pickup Trucks	LDGT2	50	94	4,700		10.47	1.04	0.83	1.14	120.61	7.77	0.0	0.0	0.0	0.0	0.0	0.0						
Electric Line	Haul Trucks	HDDV	6	1	6	6,075	0.11	0.03	0.02	0.02	0.23	0.06	0.3	0.1	0.1	0.1	0.7	0.2	0.4	0.1	0.1	0.1	1.6	0.3
	Pickup Trucks	LDGT2	6	2	12	6,075	0.03	0.00	0.00	0.00	0.31	0.02	0.1	0.0	0.0	0.0	0.9	0.1						
Field Compressor Station	Semi Trucks	HDDV	10	15	150	404	2.69	0.65	0.60	0.54	5.65	1.60	0.5	0.1	0.1	0.1	1.1	0.3						
	Haul Trucks	HDDV	10	48	480	404	8.60	2.07	1.92	1.72	18.09	5.11	1.7	0.4	0.4	0.3	3.7	1.0	3.1	0.6	0.6	0.6	14.7	2.0
	Pickup Trucks	LDGT2	10	192	1,920	404	4.28	0.42	0.34	0.47	49.27	3.17	0.9	0.1	0.1	0.1	10.0	0.6						
Sales Compressor Station	Semi Trucks	HDDV	10	18.5	185	81	3.32	0.80	0.74	0.66	6.97	1.97	0.1	0.0	0.0	0.0	0.3	0.1						
	Haul Trucks	HDDV	10	48	480	81	8.60	2.07	1.92	1.72	18.09	5.11	0.3	0.1	0.1	0.1	0.7	0.2	0.7	0.1	0.1	0.1	3.0	0.4
	Pickup Trucks	LDGT2	10	192	1,920	81	4.28	0.42	0.34	0.47	49.27	3.17	0.2	0.0	0.0	0.0	2.0	0.1						
Impoundment	Semi Trucks	HDDV	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Haul Trucks	HDDV	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pickup Trucks	LDGT2	6	0.02	0.12	356	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							Subtotal						9	2	2	2	35	5	9	2	2	2	35	5

Supplemental Air Quality Analysis

Construction Site Activity	Vehicle		Round Trip Distance (mi)	# of Round Trips per Well Pad or per Station	Miles Traveled per Well Pad or per Station	Total # of Well Pads or Stations	Emissions																		
	Type	Class					(lb/well pad, lb/station, or lb/project)						(ton/equipment type)						(ton/construction site)						
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs	
Rig-up, Drilling, and Rig-down	Semi Rig Transport, Drill Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	18.0	4.1	3.8	3.5	50.5	10.9	
	Fuel Haul Truck	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2							
	Mud Haul Truck, Water Hauling	HDDV	6	7	42	18,225	0.75	0.18	0.17	0.15	1.58	0.45	6.9	1.7	1.5	1.4	14.4	4.1							
	Rig Crew	LDGT2	6	3	18	18,225	0.04	0.00	0.00	0.00	0.46	0.03	0.4	0.0	0.0	0.0	4.2	0.3							
	Co. Supervisor	LDGT2	6	8	48	18,225	0.11	0.01	0.01	0.01	1.23	0.08	1.0	0.1	0.1	0.1	11.2	0.7							
	Tool Pusher	HDDV	6	6	36	18,225	0.65	0.16	0.14	0.13	1.36	0.38	5.9	1.4	1.3	1.2	12.4	3.5							
	Logger, Engr. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
Well Completion & Testing	Semi Casing	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6	20.1	4.8	4.4	4.0	46.8	12.0	
	Semi Completion, Unit Rig	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Tubing Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Cementer, Pump Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Cementer, Cement Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Completion, Equip. Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Preforators, Logging Truck	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Welders	HDDV	6	1	6	18,225	0.11	0.03	0.02	0.02	0.23	0.06	1.0	0.2	0.2	0.2	2.1	0.6							
	Haul Water Truck	HDDV	6	10	60	18,225	1.08	0.26	0.24	0.22	2.26	0.64	9.8	2.4	2.2	2.0	20.6	5.8							
	Pickup Cementor, Engineer	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1							
	Pickup Co. Supervisor	LDGT2	6	2	12	18,225	0.03	0.00	0.00	0.00	0.31	0.02	0.2	0.0	0.0	0.0	2.8	0.2							
	Pickup Miscellaneous Supplies	LDGT2	6	1	6	18,225	0.01	0.00	0.00	0.00	0.15	0.01	0.1	0.0	0.0	0.0	1.4	0.1							
	Pickup Roustabout Crew	HDDV	6	2	12	18,225	0.22	0.05	0.05	0.04	0.45	0.13	2.0	0.5	0.4	0.4	4.1	1.2							
Subtotal:							38	9	8	7	97	23	38	9	8	7	97	23							
Total:							47	11	10	9	132	28	47	11	10	9	133	28							

A.4.2 Emission Calculations for the Montana CBNG Project Operational Activities - Scenario 2**Compressors – Natural Gas Fired****Emission Factors for Compressors:**

Compressor			Make	Model	Capacity (hp)	Emission Factors (g/hp-hr)					
						NOx	PM10	SO2	CO	VOCs	HCHO
Field	Rich Burn	50%	Caterpillar	G3408	400	1.00	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	50%	Waukesha	F18GL	400	1.00	6.60E-02	2.00E-03	1.50	0.50	0.20
Sales	Rich Burn	50%	Waukesha	7044GSI	1680	1.00	6.60E-02	2.00E-03	2.00	1.00	0.05
	Lean Burn	25%	Waukesha	7044GSI	1680	1.00	6.60E-02	2.00E-03	2.00	1.00	0.05
		25%	Waukesha	7044GSI	1680	1.00	6.60E-02	2.00E-03	2.00	1.00	0.05

Emissions Estimation for Compressors:

Type of Compressors	Total # of Operating Station-Year	Operating Hours per Year	Total Emissions (ton/project)				
			NOx	PM10	SO2	CO	VOCs
Field	4,380	8,760	16,918	1,117	34	29,606	12,688
Sales	876	8,760	14,211	938	28	28,422	14,211
		Total	31,129	2,055	62	58,028	26,899

Assume PM2.5 is same as PM10

Dehydrators

Emission Factors for Dehydrators

Unit	NOx	PM10	SO2	CO	VOCs
lb/MMscf	100	7.6	0.6	84	5.5
lb/MMBtu	9.80E-02	7.45E-03	5.88E-04	8.24E-02	5.39E-03

Emissions Estimations for Dehydrators

Compressor Station	Total Gas Production Rate (MMCFD-yr)	Firing Rate (Btu/hr/MMCFD)	Operating Hours per Year	Total Emissions (ton/project)				
				NOx	PM10	SO2	CO	VOCs
Sales	44,944	25,000	8,760	482	37	3	406	27

Compressor Station Visits for Inspection and Repair

Road Dust Emissions

Emissions Estimates for Road Traffic:

Activity	Compressor Station	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	PM10			PM2.5		
									Em. Factor (lb/VMT)	Emissions		Em. Factor (lb/VMT)	Emissions	
										(lb/ station-yr)	(ton/ project)		(lb/ station-yr)	(ton/ project)
Inspection Visits for Compressor Stations	Field	Pickup Truck	7,000	20	15	12	16	4,380	1.03	16.5	36	0.15	2.4	5
	Sales	Pickup Truck	7,000	20	15	52	69	876	1.03	71.4	31	0.15	10.4	5
									Total:		67			10

Exhaust Emissions

Activity	Compressor Station	Vehicle		Round Trip Distance (mi/day)	# of Stations Visited per Day	# of Visits per Station per Year	Miles Traveled per Station per Year	Total # of Operating Station-Yr	Emissions											
		Type	Class						(lb/station-yr)					(ton/project)						
									NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Inspection Visits for Compressor Stations	Field	Pickup Truck	LDGT2	20	15	12	16	4,380	0.04	0.00	0.00	0.00	0.41	0.03	0.1	0.0	0.0	0.0	0.9	0.1
	Sales	Pickup Truck	LDGT2	20	15	52	69	876	0.15	0.02	0.01	0.02	1.78	0.11	0.1	0.0	0.0	0.0	0.8	0.1
									Totals:	0.1	0.0	0.0	0.0	1.7	0.1	0.0	0.0	0.0	1.7	0.1

Supplemental Air Quality Analysis

Well Workover

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	PM10 Emissions			PM2.5 Emissions		
							Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
								(lb/well)	(ton/project)		(lb/well)	(ton/project)
Well Workover	Bobtail Truck	40,000	50	1	50	18,225	2.06	103	939	0.30	15	138

Exhaust Emissions – On-site

Emissions Estimation for Industrial Engines:

Activity	Equipment	Capacity (hp)	Operating Hours per Day	Total # of Wells Drilled	Emissions									
					(lb/well)					(ton/project)				
					NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Well Workover	Truck-Mounted Unit	400	10	18,225	124	9	8	27	10	1,130	80	75	243	91

Exhaust Emissions – On-site

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Round Trips per Well	Miles Traveled per Well	Total # of Wells Drilled	Emissions											
	Type	Class					(lb/station-yr)						(ton/project)					
							NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Well Workover	Bobtail Truck	HDDV	50	1	50	18,225	0.9	0.2	0.2	0.2	1.9	0.5	8	2	2	2	17	5

Well and Pipeline Visits for Inspection and Repair

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	PM10 Emissions			PM2.5 Emissions		
								Controlled Em. Factor (lb/VMT)	Emissions		Controlled Em. Factor (lb/VMT)	Emissions	
									(lb/well)	(ton/project)		(lb/well)	(ton/project)
Visits for Inspection and Repair	200-hp Pickup	7,000	75	120	12	7.5	175,181	1.03	7.7	677	0.15	1.1	99

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	# of Wells Visited per Day	# of Visits per Well per Year	Miles Traveled per Well per Year	Total # of Operating Well-Yr	Emissions											
	Type	Class						(lb/station-yr)						(ton/project)					
								NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
Visits for Inspection and Repair	200-hp Pickup	LDGT2	75	120	12	7.5	175,181	0.017	0.002	0.001	0.002	0.192	0.012	1.5	0.1	0.1	0.2	16.9	1.1

A.4.3 Emission Calculations for the Montana CBNG Maintenance Activities - Scenario 2

Road Maintenance – Heavy Equipment

Given Data:

Maintenance	Equipment/Vehicle			Road Length Worked On per Day (mi)	# of Operating Hours per Day
	Type	Fuel	Capacity (hp)		
Summer	Heavy Equipment	Diesel	135	6	10
	Commuting Vehicle	Gasoline	225	6	1
Winter	Heavy Equipment	Diesel	135	5	10
	Commuting Vehicle	Gasoline	225	6	1.5

Estimation of Total and Cumulative Length of Roads:

Total Length of Roads to be Built (mi)	6,224
Cummulative Length of Roads Maintained (mi-yr)	59,826

Estimation of Total Operation Days and Hours:

Season	# of Operation per Year	Cummulative Length of Roads (mi-yr)	Road Length Worked On (mi/day)	# of Operating Hours per Day	Total # of Operating Days	Total # of Operating Hours
Summer	2	59,826	6	10	19,942	199,420
Winter	1	59,826	5	10	11,965	119,652
Totals:					31,907	319,071

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight (lb)	Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	PM10		PM2.5	
						Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Pickup Truck	7,000	6	31,907	191,443	1.03	99	0.15	14

Emissions Estimation for Road Traffic:

Activity	Vehicle		Round Trip Distance (mi/day)	Total # of Operating Days	Total Miles Traveled	Emissions (ton/project)					
	Type	Class				NOx	PM10	PM2.5	SO2	CO	VOCs
	Road Maintenance	Pickup Truck				LDGT2	6	31,907	191,443	0.21	0.02

Fugitive Dust Emissions

Emissions Factor for Grader - Road Dust:

Pollutant	Emission Factor Equation (lb/VMT)	S (mph)	Emission Factor (lb/VMT)
PM10	$E = (0.6)(0.051)(S^2)$	5	0.765
PM2.5	$E = (0.031)(0.051)(S^{2.5})$	5	0.069

Emissions Estimation for Grader - Road Dust:

Activity	Equipment	Total # of Operating Hours	Mean Vehicle Speed (mph)	Total Miles Maintained	PM10		PM2.5	
					Em. Factor (lb/VMT)	Emissions (ton/project)	Em. Factor (lb/VMT)	Emissions (ton/project)
Road Maintenance	Grader	191,443	5	957,214	0.765	366	0.069	33

Supplemental Air Quality Analysis

Exhaust Emissions

Emissions Factor for Grader - Exhaust:

Equipment	Emission Factors (g/hp-hr)				
	NOx	PM10	SO2	CO	VOCs
Grader	7.14	0.63	0.87	1.54	0.36

Emissions Estimation for Grader - Road Dust:

Activity	Vehicle Type	Capacity (hp)	Total # of Operating Hours	Emissions									
				(lb/well)					(ton/project)				
				NOx	PM10	SO2	CO	VOCs	NOx	PM10	SO2	CO	VOCs
Road Maintenance	Grader	135	191,443	2.13	0.19	0.26	0.46	0.11	203	18	25	44	10

Maintenance Visits to Compressor Stations

Road Dust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle Type	Avg. Vehicle Weight	Compressor Station	# of Stations	Cumulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	PM10		PM2.5		
										Em. Factor	Emissions (ton/project)	Em. Factor	Emissions (ton/project)	
Maintenance Visits to Compressor Stations	Pickup Truck	7,000	Field	673	4,380	2	8,760	20	175,209	1.03	90	0.15	13	
	Pickup Truck	7,000	Sales	67	876	2	1,752	20	35,042	1.03	18	0.15	3	
Totals:												108		16

Exhaust Emissions

Emissions Estimation for Road Traffic:

Activity	Vehicle		Compressor Station	# of Stations	Cumulative # of Station-Yr	# of Visits per Year	Total # of Round Trips	Round Trip Distance	Total Miles Traveled	Emissions (ton/project)					
	Type	Class								NOx	PM10	PM2.5	SO2	CO	VOCs
Inspection Visits for	Pickup Truck	LDGT2	Field	673	4,380	2	8,760	20	175,209	0.20	0.02	0.02	0.02	2.25	0.14
	Pickup Truck	LDGT2	Sales	67	876	2	1,752	20	35,042	0.04	0.00	0.00	0.00	0.45	0.03
Totals:										0.23	0.02	0.02	0.03	2.70	0.17

A.4.4 ADY20 - Scenario 2

Wells Field Sales
 Ratio: 200 5 1

Year	Wells		Compressors		# Well Pads	# Operating Well Years	# Operating FC Years	# Operating SC Years
	Drilled	Operating	Field	Sales				
1	607	546	14	3	202	546	14	3
2	910	1,365	34	7	485	1,912	48	10
3	1,075	2,333	58	12	813	4,244	106	21
4	1,175	3,390	85	17	1,169	7,635	191	38
5	1,075	4,358	109	22	1,488	11,993	300	60
6	950	5,213	130	26	1,769	17,205	430	86
7	910	6,032	151	30	2,041	23,237	581	116
8	910	6,851	171	34	2,314	30,088	752	150
9	910	7,670	192	38	2,587	37,758	944	189
10	910	8,489	212	42	2,860	46,247	1,156	231
11	910	9,308	233	47	3,133	55,554	1,389	278
12	910	10,127	253	51	3,406	65,681	1,642	328
13	910	10,946	274	55	3,679	76,627	1,916	383
14	910	11,765	294	59	3,952	88,392	2,210	442
15	910	12,584	315	63	4,225	100,976	2,524	505
16	910	13,403	335	67	4,498	114,378	2,859	572
17	860	14,177	354	71	4,754	128,555	3,214	643
18	800	14,897	372	74	4,992	143,452	3,586	717
19	750	15,572	389	78	5,216	159,024	3,976	795
20	650	16,157	404	81	5,407	175,181	4,380	876
21	273	15,856	396	79	5,477	191,037	4,776	955
22	0	15,038	376	75	5,285	206,074	5,152	1,030
23	0	14,070	352	70	5,013	220,145	5,504	1,101
24	0	13,013	325	65	4,690	233,157	5,829	1,166
25	0	12,045	301	60	4,338	245,203	6,130	1,226
26	0	11,190	280	56	4,015	256,393	6,410	1,282
27	0	10,371	259	52	3,730	266,764	6,669	1,334
28	0	9,552	239	48	3,457	276,316	6,908	1,382
29	0	8,733	218	44	3,184	285,049	7,126	1,425
30	0	7,914	198	40	2,911	292,964	7,324	1,465
31	0	7,095	177	35	2,638	300,059	7,501	1,500
32	0	6,276	157	31	2,365	306,335	7,658	1,532
33	0	5,457	136	27	2,092	311,792	7,795	1,559
34	0	4,638	116	23	1,819	316,430	7,911	1,582
35	0	3,819	95	19	1,546	320,250	8,006	1,601
36	0	3,000	75	15	1,273	323,250	8,081	1,616
37	0	2,226	56	11	1,000	325,476	8,137	1,627
38	0	1,506	38	8	742	326,982	8,175	1,635
39	0	831	21	4	502	327,813	8,195	1,639
40	0	246	6	1	277	328,060	8,201	1,640

18,225

	Operation and Maintenance						Construction					
	Emissions						Emissions					
	NOx	PM10	PM2.5	SO2	CO	VOCs	NOx	PM10	PM2.5	SO2	CO	VOCs
1	102.76	13.87	7.80	0.52	183.23	84.30	575.39	196.30	63.91	38.40	135.82	48.56
2	256.81	34.66	19.49	1.30	457.92	210.67	862.62	294.30	95.82	57.57	203.62	72.80
3	438.80	59.23	33.30	2.22	782.42	359.96	1,019.02	347.66	113.19	68.01	240.54	86.00
4	637.71	86.08	48.39	3.22	1,137.10	523.14	1,113.82	380.00	123.72	74.34	262.92	94.00
5	819.70	110.64	62.20	4.14	1,461.60	672.42	1,019.02	347.66	113.19	68.01	240.54	86.00
6	980.52	132.35	74.40	4.95	1,748.37	804.35	900.53	307.23	100.03	60.10	212.57	76.00
7	1,134.57	153.14	86.09	5.73	2,023.06	930.73	862.62	294.30	95.82	57.57	203.62	72.80
8	1,288.63	173.94	97.78	6.51	2,297.75	1,057.10	862.62	294.30	95.82	57.57	203.62	72.80
9	1,442.68	194.73	109.47	7.29	2,572.45	1,183.48	862.62	294.30	95.82	57.57	203.62	72.80
10	1,596.73	215.53	121.16	8.07	2,847.14	1,309.85	862.62	294.30	95.82	57.57	203.62	72.80
11	1,750.78	236.32	132.85	8.85	3,121.83	1,436.23	862.62	294.30	95.82	57.57	203.62	72.80
12	1,904.84	257.11	144.54	9.63	3,396.52	1,562.60	862.62	294.30	95.82	57.57	203.62	72.80
13	2,058.89	277.91	156.23	10.40	3,671.22	1,688.98	862.62	294.30	95.82	57.57	203.62	72.80
14	2,212.94	298.70	167.92	11.18	3,945.91	1,815.35	862.62	294.30	95.82	57.57	203.62	72.80
15	2,367.00	319.50	179.61	11.96	4,220.60	1,941.73	862.62	294.30	95.82	57.57	203.62	72.80
16	2,521.05	340.29	191.29	12.74	4,495.29	2,068.10	862.62	294.30	95.82	57.57	203.62	72.80
17	2,666.64	359.94	202.34	13.48	4,754.89	2,187.53	815.22	278.13	90.55	54.41	192.43	68.80
18	2,802.07	378.22	212.62	14.16	4,996.38	2,298.63	758.34	258.72	84.24	50.61	179.01	64.00
19	2,929.04	395.36	222.25	14.80	5,222.77	2,402.79	710.95	242.55	78.97	47.45	167.82	60.00
20	3,039.07	410.21	230.60	15.36	5,418.98	2,493.06	616.15	210.21	68.44	41.12	145.44	52.00
21							258.78	88.29	28.75	17.27	61.09	21.84
22							0.00	0.00	0.00	0.00	0.00	0.00
23							0.00	0.00	0.00	0.00	0.00	0.00
24							0.00	0.00	0.00	0.00	0.00	0.00
25							0.00	0.00	0.00	0.00	0.00	0.00
26							0.00	0.00	0.00	0.00	0.00	0.00
27							0.00	0.00	0.00	0.00	0.00	0.00
28							0.00	0.00	0.00	0.00	0.00	0.00
29							0.00	0.00	0.00	0.00	0.00	0.00
30							0.00	0.00	0.00	0.00	0.00	0.00
31							0.00	0.00	0.00	0.00	0.00	0.00
32							0.00	0.00	0.00	0.00	0.00	0.00
33							0.00	0.00	0.00	0.00	0.00	0.00
34							0.00	0.00	0.00	0.00	0.00	0.00
35							0.00	0.00	0.00	0.00	0.00	0.00
36							0.00	0.00	0.00	0.00	0.00	0.00
37							0.00	0.00	0.00	0.00	0.00	0.00
38							0.00	0.00	0.00	0.00	0.00	0.00
39							0.00	0.00	0.00	0.00	0.00	0.00
40							0.00	0.00	0.00	0.00	0.00	0.00
	32,951	4,448	2,500	167	58,755	27,031	17,276	5,894	1,919	1,153	4,078	1,458

Supplemental Air Quality Analysis

Combined Construction & Operation and Maintenance Emissions						
	NOx	PM10	PM2.5	SO2	CO	VOCs
1	678.15	210.18	71.71	38.92	319.05	132.86
2	1,119.43	328.96	115.30	58.87	661.54	283.47
3	1,457.82	406.89	146.49	70.23	1,022.96	445.96
4	1,751.53	466.08	172.11	77.56	1,400.02	617.14
5	1,838.72	458.30	175.39	72.15	1,702.14	758.42
6	1,881.05	439.58	174.43	65.06	1,960.94	880.35
7	1,997.19	447.44	181.91	63.30	2,226.68	1,003.53
8	2,151.24	468.23	193.60	64.08	2,501.37	1,129.90
9	2,305.29	489.03	205.29	64.86	2,776.07	1,256.28
10	2,459.35	509.82	216.98	65.64	3,050.76	1,382.65
11	2,613.40	530.62	228.67	66.42	3,325.45	1,509.03
12	2,767.45	551.41	240.36	67.20	3,600.14	1,635.40
13	2,921.51	572.20	252.05	67.98	3,874.84	1,761.78
14	3,075.56	593.00	263.73	68.75	4,149.53	1,888.15
15	3,229.61	613.79	275.42	69.53	4,424.22	2,014.53
16	3,383.66	634.59	287.11	70.31	4,698.91	2,140.90
17	3,481.86	638.07	292.90	67.88	4,947.32	2,256.33
18	3,560.41	636.94	296.85	64.77	5,175.39	2,362.63
19	3,639.98	637.91	301.22	62.25	5,390.59	2,462.79
20	3,655.23	620.43	299.04	56.48	5,564.43	2,545.06
21	258.78	88.29	28.75	17.27	61.09	21.84
22	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00	0.00	0.00
37	0.00	0.00	0.00	0.00	0.00	0.00
38	0.00	0.00	0.00	0.00	0.00	0.00
39	0.00	0.00	0.00	0.00	0.00	0.00
40	0.00	0.00	0.00	0.00	0.00	0.00
	50,227	10,342	4,419	1,320	62,833	28,489

Emission Factors per Well						
	NOx	PM10	PM2.5	SO2	CO	VOCs
Op	0.188096	0.025389	0.014273	0.000951	0.335395	0.154302
Con	0.947929	0.323402	0.105295	0.063265	0.223759	0.080000

A.4.5 Emission Points - Scenario 2

Scenario 2 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.0 g NOx from Engines)										
Longitude	Latitude	Watershed	County	Construction Wells/point	Construction Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0888964	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.5441521	45.01011264	LITTLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.4367862	45.14408638	LITTLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.6163493	46.03435575	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2566985	45.82981624	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2689192	45.93190004	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2371025	45.91155283	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2876139	45.87320735	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.3704664	45.9433915	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.3833798	45.91986854	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.2206782	45.78953449	LOWER BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8950719	45.32372874	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1906473	45.04845919	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.127224	45.0482058	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0662494	45.0463265	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0192953	45.08316794	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0850023	45.08521834	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.150915	45.08390454	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2145762	45.08081906	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9627608	45.12005428	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1962674	45.11191918	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1351194	45.11174049	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0714183	45.11478024	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0125111	45.11628908	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8058573	45.39278421	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.000915	45.15088418	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.0575099	45.14932839	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1091992	45.15092488	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1658912	45.1476511	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2270788	45.14781278	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.957088	45.15485509	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8427057	45.47897521	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7670751	45.58143586	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7724857	45.67659425	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7939829	45.78061951	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.7968544	45.87902714	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.8384004	45.56452059	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2169993	45.59975321	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1245521	45.72872913	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1463546	45.51900756	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9185693	45.75201292	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-105.9469395	45.84556398	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1199013	45.82426101	LOWER TONGUE	Custer	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1862006	45.74380863	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.1732814	45.41523309	LOWER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1353247	45.7765741	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1159668	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9102423	45.80233865	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9500425	45.73349506	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1777591	45.90447616	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9834606	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.985258	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9950453	45.7146349	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714

Supplemental Air Quality Analysis

Scenario 2 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.0 g NOx from Engines)											
Longitude	Latitude	Watershed	County	Construction Wells/point	Construction Emissions per Point (tons)						
					NOx	PM10	PM2.5	SO2	CO	VOCs	
-108.1869611	46.42502531	MIDDLE MUSSELSHELL	Musselshell	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.1538128	45.00373939	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.0026151	45.00435919	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.8748974	45.01191736	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.7462246	45.01080066	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.6336909	45.01434879	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.5669066	45.06934218	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.6792641	45.07010005	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.6128423	45.3589134	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.9277779	45.07416887	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.8887584	45.1440493	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.7869424	45.14067783	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.6775808	45.13801376	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.5802048	45.13566681	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.5168432	45.22913207	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.4800443	45.18955626	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.5666423	45.17873365	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.6981156	45.1886391	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.4738774	45.26675596	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.7368235	45.26935109	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.784381	45.31966458	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.703068	45.33537987	MIDDLE POWDER	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-105.7215527	45.46134361	MIZPAH	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9962867	45.33689316	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9325316	45.33710215	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9621328	45.30947587	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.994136	45.28023186	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9375915	45.27893984	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9579691	45.24610718	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.881452	45.71725511	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.757723	45.71928418	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.6220247	45.72253455	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4959005	45.72421274	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3998157	45.78322101	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5306526	45.78510384	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.6638756	45.78689404	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.8020263	45.78531354	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3524423	45.8618565	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4549907	45.86135873	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5429837	45.86538099	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5608358	45.93247641	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4728256	45.92680484	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3890316	45.93117554	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.324293	45.93602503	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.2782499	45.98802101	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3614704	45.99537505	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4453652	45.99102485	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5432926	45.99197974	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5908348	46.04152496	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4639721	46.04316764	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.37054	46.045603	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3032753	46.05037398	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.3718811	46.10561053	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4461942	46.10431984	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5325503	46.10163267	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.6275848	46.11575769	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.5439175	46.1569001	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.9475016	45.69484378	ROSEBUD	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-106.4571953	46.16458578	ROSEBUD	Rosebud	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-109.7578172	45.44657007	STILLWATER	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	
-108.6823126	46.32003994	UPPER MUSSEL SHELL	Musselshell	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714	

Scenario 2 - SEIS RFD Emission Points by Watershed for Construction Emissions (1.0 g NOx from Engines)										
Longitude	Latitude	Watershed	County	Construction Wells/point	Construction Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-106.8323923	-45.00783236	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7903307	-45.00602084	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9091138	-45.05136249	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7465796	-45.01595443	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7077379	-45.03416601	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7475796	-45.13008114	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6493939	-45.093755	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6734747	-45.07500148	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7245767	-45.07472301	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6865526	-45.05802281	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.594975	-45.04699579	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8194467	-45.02325601	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5316421	-45.01038326	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4704863	-45.05358034	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4096151	-45.01018167	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8651889	-45.25176775	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8654241	-45.22344433	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.8622866	-45.19582781	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7995346	-45.25018769	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7985761	-45.22419531	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.7965835	-45.19660405	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.864485	-45.0093902	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9621692	-45.00774532	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.9790408	-45.02701546	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6726239	-45.00857642	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6092737	-45.01086998	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.6399265	-45.03636498	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.747682	-45.09523907	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3608313	-45.00959182	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3042044	-45.01032764	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2121315	-45.00998408	UPPER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.245271	-45.03143069	UPPER TONGUE	Powder River	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3293535	-45.03623872	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.3869384	-45.03866439	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5377621	-45.04123955	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.4660257	-45.01332086	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.5617171	-45.0709975	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2852399	-45.06959453	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-106.2467164	-45.05477978	UPPER TONGUE	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0890249	-45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0254773	-45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0528827	-45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0026382	-45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.1067798	-45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0037776	-45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0537864	-45.72626258	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-109.0900954	-45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-108.3574854	-46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.8845271	-46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.222593	-45.425538	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.278421	-45.33934	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.251687	-45.280535	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.17026	-45.250393	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.159928	-45.205637	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.234891	-45.209166	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
-107.195872	-45.13131	LITTLE BIGHORN	Big Horn	3.57	3.385459534	1.155007	0.376053	0.225946	0.799138	0.285714
Totals				650	616	210	68	41	145	52

Supplemental Air Quality Analysis

Scenario 2 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.0 g NOx from Engines)										
Longitude	Latitude	Watershed	County	Operational Well/point	Operation Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-108.9441365	45.17350559	CLARKS FORK YELLOWSTONE	Carbon	99.45	18.70587	2.524917	1.419384	0.094527	33.35451	15.34507
-108.9547988	45.02511074	CLARKS FORK YELLOWSTONE	Carbon	100.35	18.87516	2.547768	1.432229	0.095382	33.85637	15.48394
-109.0888964	45.29528577	CLARKS FORK YELLOWSTONE	Carbon	99.45	18.70587	2.524917	1.419384	0.094527	33.35451	15.34507
-109.0499645	45.44325647	CLARKS FORK YELLOWSTONE	Carbon	100.35	18.87516	2.547768	1.432229	0.095382	33.85637	15.48394
-105.5441521	45.01011264	LITTLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.4367862	45.14408638	LITTLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.6163493	46.03435575	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.2566985	45.82981624	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.2689192	45.9319004	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.2371025	45.91155283	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.2876139	45.87320735	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.3704664	45.9433915	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.3833798	45.91986854	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.2206782	45.78953449	LOWER BIGHORN	Big Hom	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8950719	45.32372874	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.1906473	45.04845919	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.127224	45.0482058	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.0662494	45.0463265	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.0192953	45.08316794	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.0850023	45.08521834	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.150915	45.08390454	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.2145762	45.08081906	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-105.9627608	45.12005428	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.1962674	45.11191918	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.1351194	45.11174049	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.0714183	45.11478024	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.0125111	45.11826908	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-105.8058573	45.39278421	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.000915	45.15088418	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.0575099	45.14932839	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.1091992	45.15092488	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.1658912	45.14765111	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.2270788	45.14781278	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-105.957088	45.15485509	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-105.8427057	45.47897521	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-105.7670751	45.58143586	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-105.7724857	45.67659425	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-105.7939829	45.78061951	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-105.7988544	45.87902714	LOWER TONGUE	Custer	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8384004	45.56452059	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.2189993	45.59975321	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-106.1245521	45.72872913	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.1463546	45.51900756	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-105.9185693	45.75201292	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-105.9469395	45.84556398	LOWER TONGUE	Custer	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.1199013	45.82426101	LOWER TONGUE	Custer	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.1862006	45.74380863	LOWER TONGUE	Powder River	90.45	17.01301	2.296414	1.290931	0.085972	30.33595	13.95635
-106.1732814	45.41523309	LOWER TONGUE	Powder River	89.55	16.84372	2.273564	1.278085	0.085117	30.0341	13.81748
-107.1353247	45.7765741	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-107.1853627	45.84829915	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-107.1159668	45.83910419	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9493448	45.79823964	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9102423	45.80233865	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9500425	45.73349506	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-107.1777591	45.90447616	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9564803	45.82575858	LOWER YELLOWSTONE-SUNDAY	Big Hom	92.25	17.35158	2.342115	1.316621	0.087683	30.93966	14.23409
-106.9837523	45.77697522	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9834606	45.81344396	LOWER YELLOWSTONE-SUNDAY	Big Hom	92.25	17.35158	2.342115	1.316621	0.087683	30.93966	14.23409
-106.9801085	45.85184712	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-107.0672212	45.87672105	LOWER YELLOWSTONE-SUNDAY	Big Hom	92.25	17.35158	2.342115	1.316621	0.087683	30.93966	14.23409
-106.985258	45.73936775	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-106.9950453	45.7146349	LOWER YELLOWSTONE-SUNDAY	Big Hom	92.25	17.35158	2.342115	1.316621	0.087683	30.93966	14.23409
-106.9791728	45.89239879	LOWER YELLOWSTONE-SUNDAY	Treasure	21.15	3.977928	0.53694	0.301841	0.020102	7.093058	3.26323
-106.9482033	45.76730492	LOWER YELLOWSTONE-SUNDAY	Big Hom	93.15	17.52087	2.364965	1.329467	0.088539	31.24152	14.37296
-107.1261029	45.89324815	LOWER YELLOWSTONE-SUNDAY	Big Hom	92.25	17.35158	2.342115	1.316621	0.087683	30.93966	14.23409

Scenario 2 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.0 g NOx from Engines)										
Longitude	Latitude	Watershed	County	Operational Well/point	Operation Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-108.1869611	46.42502531	MIDDLE MUSSELHELL	Musselshell	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.1538128	45.00373939	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.0026151	45.00435919	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8748974	45.01191736	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7462246	45.01080066	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6336909	45.01434879	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5669066	45.06934218	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6792641	45.07010005	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6128423	45.3589134	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.9277779	45.07416887	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.8887584	45.1440493	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7869424	45.14067783	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6775808	45.13801376	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5802048	45.13566681	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5168432	45.22913207	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.4800443	45.18955626	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.5666423	45.17873365	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.6981156	45.1886391	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.4738774	45.26675596	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7368235	45.26935109	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.784381	45.31966458	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.703068	45.33537987	MIDDLE POWDER	Powder River	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-105.7215527	45.48134361	MIZPAH	Powder River	111.15	20.9066	2.821971	1.586373	0.105648	37.27864	17.1504
-106.9962867	45.33689316	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9325316	45.33710215	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9621328	45.30947587	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.994136	45.28023186	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9375916	45.27893984	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9579691	45.24610718	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.881452	45.71725511	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.757723	45.71928418	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6220247	45.72253455	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4959005	45.72421274	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3998157	45.78322101	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5306526	45.78510384	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6638756	45.78689404	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.8020263	45.78531354	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3524423	45.8618565	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4549907	45.86135873	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5429837	45.86538099	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5608358	45.93247641	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4728256	45.92680484	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3890316	45.93117554	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.324293	45.93602503	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.2782499	45.98802101	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3614704	45.99537505	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4453652	45.99102485	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5432926	45.99197974	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5908348	46.04152496	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4639721	46.04316764	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.37054	46.045603	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3032753	46.05037398	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.3718811	46.10561053	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4461942	46.10431984	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5325503	46.10163267	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.6275848	46.11575769	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.5439175	46.1569001	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.9475016	45.69484378	ROSEBUD	Big Horn	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-106.4571953	46.16458578	ROSEBUD	Rosebud	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.7578172	45.44657007	STILLWATER	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-108.6823126	46.32003994	UPPER MUSSELHELL	Musselshell	66.15	12.44226	1.679456	0.944107	0.062875	22.18585	10.20681

Supplemental Air Quality Analysis

Scenario 2 - SEIS RFD Emission Points by Watershed for Operational Emissions (1.0 g NOx from Engines)										
Longitude	Latitude	Watershed	County	Operational Well/point	Operation Emissions per Point (tons)					
					NOx	PM10	PM2.5	SO2	CO	VOCs
-106.8323923	45.00783236	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7903307	45.00602084	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9091138	45.05136249	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7465796	45.01595443	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7077379	45.03416601	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.7475796	45.13008114	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6493939	45.093755	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.6734747	45.07500148	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7245767	45.07472301	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.6865526	45.05802281	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.594975	45.04699579	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.8194467	45.02325601	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5316421	45.01036326	UPPER TONGUE	Big Hom	86.12	16.19913	2.186557	1.229174	0.08186	28.88472	13.2887
-106.4704863	45.05358034	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.4096151	45.01018167	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8651889	45.25176775	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8654241	45.22344433	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.8622866	45.19582781	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7995346	45.25018769	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7985761	45.22419531	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.7965835	45.19660405	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.864485	45.0093902	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9621692	45.00774532	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.9790408	45.02701546	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6726239	45.00857642	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6092737	45.01086998	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.6399265	45.03636498	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.747682	45.09523907	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3608313	45.00959182	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3042044	45.01032764	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2121315	45.00998408	UPPER TONGUE	Powder River	87.02	16.36841	2.209407	1.24202	0.082715	29.18658	13.42757
-106.245271	45.03143069	UPPER TONGUE	Powder River	87.02	16.36841	2.209407	1.24202	0.082715	29.18658	13.42757
-106.3293535	45.03623872	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.3869384	45.03866439	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5377621	45.04123955	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.4660257	45.01332086	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.5617171	45.0709975	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2852399	45.06959453	UPPER TONGUE	Big Hom	85.22	16.02984	2.163707	1.216329	0.081004	28.58287	13.14982
-106.2467164	45.05477978	UPPER TONGUE	Powder River	87.02	16.36841	2.209407	1.24202	0.082715	29.18658	13.42757
-109.0890249	45.61690984	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0254773	45.5413516	UPPER YELLOWSTONE-LAKE BASIN	Carbon	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0528827	45.65712391	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0026382	45.62533653	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.1067798	45.69927346	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0037776	45.69442736	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0537864	45.72626256	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-109.0900954	45.76963276	UPPER YELLOWSTONE-LAKE BASIN	Stillwater	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-108.3574854	46.19133291	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.8845271	46.21765128	UPPER YELLOWSTONE-POMPEYS PILLAR	Yellowstone	88.65	16.67443	2.250713	1.26524	0.084261	29.73224	13.6786
-107.222593	45.425538	LITTLE BIGHORN	Big Hom	97.71	18.3797	2.480891	1.394634	0.092879	32.77291	15.0775
-107.278421	45.33934	LITTLE BIGHORN	Big Hom	95.91	18.04113	2.43519	1.368944	0.091168	32.1692	14.79975
-107.251687	45.280535	LITTLE BIGHORN	Big Hom	95.91	18.04113	2.43519	1.368944	0.091168	32.1692	14.79975
-107.17026	45.250393	LITTLE BIGHORN	Big Hom	95.91	18.04113	2.43519	1.368944	0.091168	32.1692	14.79975
-107.159928	45.205637	LITTLE BIGHORN	Big Hom	95.91	18.04113	2.43519	1.368944	0.091168	32.1692	14.79975
-107.234891	45.209166	LITTLE BIGHORN	Big Hom	95.91	18.04113	2.43519	1.368944	0.091168	32.1692	14.79975
-107.195872	45.13131	LITTLE BIGHORN	Big Hom	97.71	18.3797	2.480891	1.394634	0.092879	32.77291	15.0775
Totals				16,157	3,039	410	231	15	5,419	2,493