

ATMYS

Study of Refinery Fugitive Emissions from Equipment Leaks

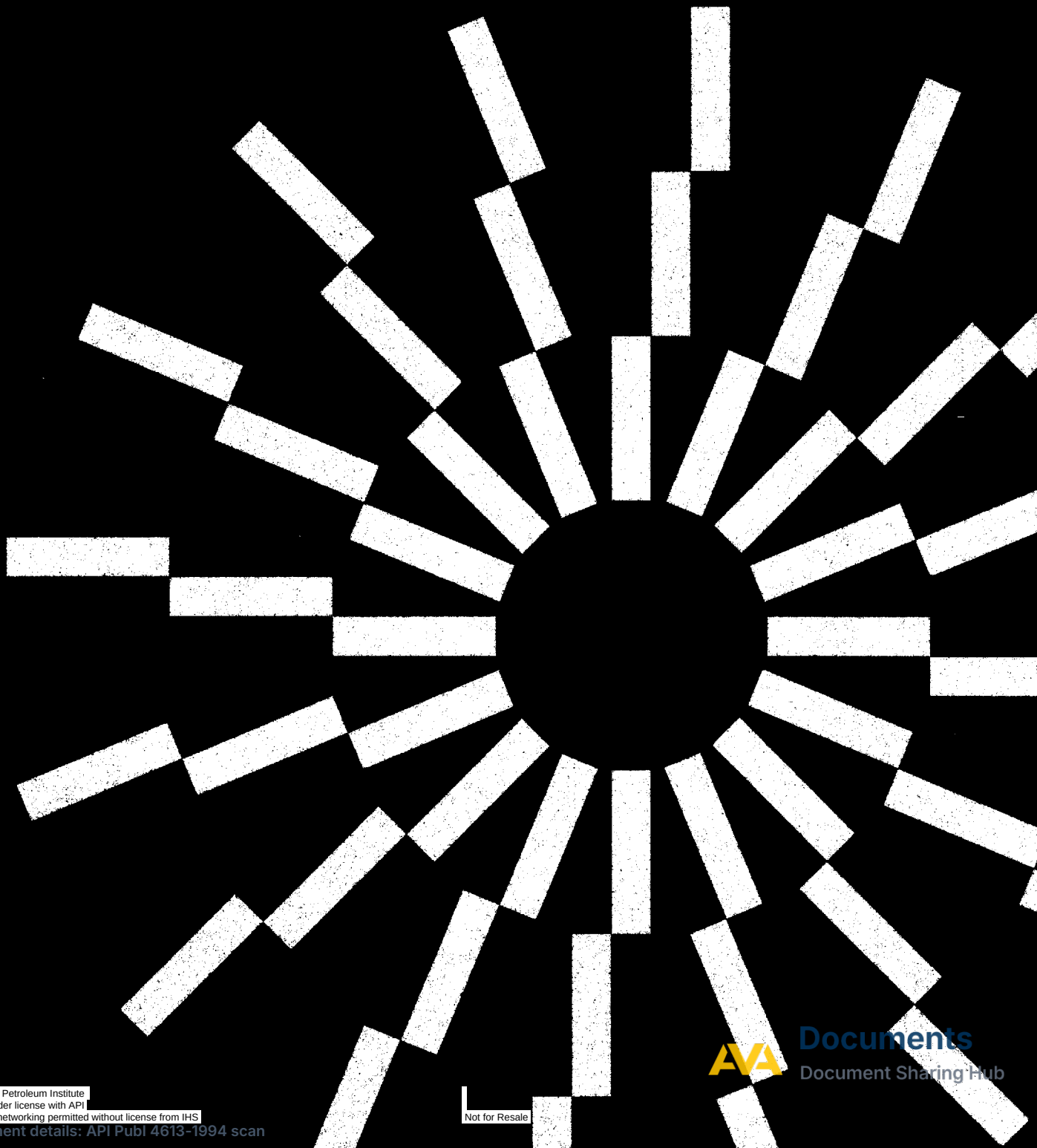


Appendices

Air Toxics Multi-Year Study

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Volume III: Appendices

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NOTE: This is to advise the reader that these studies are now under review by the U.S. Environmental Protection Agency. The Agency's review may be complete by summer 1994.

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INTRODUCTION

This volume, Volume III of the *1993 Study of Refinery Fugitive Emissions from Equipment Leaks*, contains the appendices related to the data calculations and independent audit results. Specifically:

- Appendix A contains raw data from field and emissions calculations;
- Appendix B documents the comparison of vapor leak composition to liquid stream composition data and calculations;
- Appendix C contains statistical evaluations and correlation details;
- Appendix D discusses the development of emission correlation equations using the Measurement Error Method (MEM) statistical analysis method;
- Appendix E contains independent audit results; and
- Appendix F reprints the Response to Regulatory Agency Comments on the Final Draft of the 1993 Refinery Study.

APPENDIX A

**RAW DATA FROM FIELD AND
EMISSIONS CALCULATIONS**

A.1

WSPA EMISSION RATE CALCULATION SPREADSHEET

KEY**CODES:**

ACCY	=	Accuracy check
AUDTC	=	Audit gas directly to canister
AUDTD	=	Audit duplicate
AUDTT	=	Audit gas through tent
BL	=	Blank sample
DINV	=	Determined to be invalid after review
DUP	=	Sample duplicate
DZ	=	Default zero
INV	=	Invalid
L	=	Liquid sample
N2-#	=	Nitrogen flow test
PEG	=	Pegged source
PEGF	=	Final screening value pegged but not initial
PEGI	=	Initial screening value pegged but not final
PGAC	=	Pure gas accuracy check
SINV	=	Screening values invalid (ie, initial and final screening values varied by more than a factor of 2)
*DRIP	=	Component dripping; liquids collected and liquid concentration added to emission rates

ACTUATION:

C	=	Control
M	=	Manual

SERVICE:

HL	=	Heavy liquid
LL	=	Light liquid

UNIT:

SRU	=	Sulfur recovery unit
VRU	=	Vapor recovery unit

COMPONENT CATEGORY:

C	=	Connector
OEL	=	Open-ended line
PRV	=	Pressure relief valve

***Note:** In the calculation of emission rates for dripping components a density of .75 * lbs/g (0.0022) was assumed.

KEY**COMPONENT TYPE:**

BTFY	=	Butterfly valve
C	=	Connector
CENT	=	Centrifugal
COUP	=	Coupler
DIA	=	Diaphragm valve
FL	=	Flange
HC	=	Horizontal centrifugal
MC	=	Motor control
NEDL	=	Needle
OEL	=	Open-ended line
PRV	=	Pressure relief valve
TH	=	Threaded connector
U	=	Union connector
VC	=	Vertical centrifugal
VERT	=	Vertical

PRODUCT:

DB	=	Debutinized bottoms
HCO	=	Heavy cycle oil
HTGO	=	Hydrotreated gas oil
LCO	=	Light cycle oil
LPG	=	Liquified petroleum gas
LVGO	=	Light vacuum gas oil
OVHG gas	=	Overhead gas
Pa B	=	Pa bottoms
R Diesel	=	Recycled diesel
Reg UL	=	Regular unleaded gasoline

LABORATORY DATA:

NA	=	Not analyzed
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WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		AMBIENT CONDITIONS				COMPONENT DATA				STREAM CHARACTERISTICS		
ID	Code	Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product	
V-1	ACCY	2.5	72	33.50	VALVE	0.50	GATE		Y	H2O	Water	
V-2		2.5	80	33.50	VALVE	4.00	GATE		Y	LL	Butane	
V-3		2.5	82	33.50	VALVE	1.50	GLOBE		Y	LL	Butane	
V-4	SINV	7.5	82	33.50	VALVE	3.00	GATE		Y	LL	Butane	
V-5		7.5	80	33.50	VALVE	4.00	GATE		Y	LL	Butane	
V-6		2.5	73	30.24	PUMP		HC		Y	LL	Butane	
V-7	INV	2.5	71	30.24	VALVE	1.00	MC		Y	LL	Butane	
V-8		2.5	76	30.24	VALVE	1.00	MC		Y	LL	Butane	
V-9		2.5	80	30.24	VALVE	1.00	MC		Y	LL	Butane	
V-10	SINV	2.5	85	30.24	VALVE	4.00	MC		Y	LL	H Naptha	
V-11		2.5	85	30.24	VALVE	3.00	GATE		Y	LL	H Naptha	
V-12		2.5	84	30.24	OEL	0.50	OEL		Y	GAS	Fuel Gas	
V-13	PEG	2.5	85	30.24	VALVE	0.75	GATE		Y	LL	Butane reformat	
V-14		2.5	75	30.16	VALVE	1.00	MC		Y	LL	H2 H Naptha	
V-15		2.5	75	30.16	VALVE	0.75	GATE		Y	LL	Reformate	
V-16	INV	2.5	79		VALVE	2.00	GATE		Y	LL	Butane	
V-17		2.5	82	30.15	VALVE	2.00	GATE		Y	LL	Butane	
V-18		2.5	84	30.15	OEL	0.50	OEL		N	LL	Reformate	
V-19		2.5	84	30.10	OEL	0.50	OEL		N	LL	Reformate	
V-20		7.5	85	30.10	VALVE	1.00	GATE		N	GAS	H2	
V-21		7.5	85	30.10	VALVE	1.00	GATE		N	GAS	H2	
V-22	DUP	7.5	85	30.10	PRV	1.00	PRV		N	LL		
V-23	SINV	2.5	85	30.10	OEL	0.50	OEL		N	GAS	H2	
V-24		2.5	68	30.25	VALVE	4.00	MC		N	GAS	Butane	
V-25		7.5	69	30.25	C	1.00	TH		Y	GAS	H2	
V-26		2.5	70	30.25	VALVE	0.75	GLOBE		N	GAS	Fuel Gas	
V-27		2.5	72	30.15	VALVE	2.00	GATE		Y	GAS	Fuel Gas	
V-28		2.5	71	30.24	VALVE	2.00	GATE		N	GAS	Fuel Gas	
V-29	DINV	2.5	73	30.24	VALVE	1.50	GATE		Y	GAS	Fuel Gas	
V-30		2.5	78	30.24	VALVE	0.75	GATE		N	GAS	H2	
V-31		2.5	80	30.23	VALVE	1.00	MC		N	GAS	H2	
V-32	PEG	2.5	80	30.20	OEL	1.00	OEL		Y	GAS	H2	
V-33		2.5	80	30.02	C	1.00	TH		Y	GAS	H2 Purge	
V-34		7.5	82	30.04	C	1.00	U		Y	GAS	H2 Purge	
V-35		2.5	80	30.02	C	1.50	FL		Y	GAS	H2	
V-36		2.5	87	30.04	VALVE	0.75	GATE		Y	GAS	H2	

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			SCREENING DATA										
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
V-1	ACCY	500	2,000	3			3				3	3	0
V-2		1,000	1,200				4,000				3,000	8	2,992
V-3							1,500				1,350	2	1,348
V-4	SINV	2,000	700				2,000				1,350	5	1,345
V-5		500	8,000				9,000				8,500	10	8,490
V-6	INV	1,000	2,000				2,000				2,000	3	1,998
V-7	INV												
V-8		300	700				900				800	4	796
V-9		3,000	4,000				4,000				4,000	4	3,996
V-10		10,050	6,700				6,700				6,700	10	6,690
V-11	SINV	3,000	584				1,460				1,022	18	1,004
V-12	PEG	100,000	89,000				89,000				89,000	5	88,995
V-13		30	2,000				3,000				2,500	4	2,496
V-14	PEG	100,000	67,000				67,000				67,000	12	66,988
V-15		100	100				120				110	10	100
V-16	INV	100	150				0				75	7	68
V-17		100	180				180				180	7	173
V-18			1,500				1,500				1,500	7	1,493
V-19			200				300				250	3	247
V-20		200	50				90				70	4	66
V-21	DUP	200	50				90				70	4	66
V-22	SINV		10				4				7	3	4
V-23				15				30				23	2
V-24		100,000	8,000				8,000				8,000	2	7,998
V-25			200				350				275	4	271
V-26		1,500	1,500				1,500				1,500	5	1,495
V-27		100	60				80				70	2	69
V-28		2,000	700				750				725	1	724
V-29	DINV	700	600				600				600	3	598
V-30		200	800				700				750	15	735
V-31	PEG	3,000	120,000				120,000				120,000	4	119,996
V-32		50	50,000				40,000				45,000	2	44,998
V-33	DINV		200				200				200	3	197
V-34				15				15				15	2
V-35			100				100				100	3	97
V-36		200	300				300				300	3	297

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg (ppm)	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
V-1	ACCY	1,140	1,080	1,110	956	925	941	0.94	3.20	4.10	3.65	0.07
V-2		2,475	2,475	2,475	2,818	2,818	2,818	2.82	4.80	5.20	5.00	0.22
V-3		750	500	625	2,563	2,563	2,563	2.56	3.50	2.90	3.20	0.18
V-4	SINV	945	945	945	2,891	3,279	3,085	3.09	4.00	1.50	2.75	0.21
V-5		1,575	1,680	1,628	3,028	3,091	3,060	3.06	4.50	2.50	3.50	0.22
V-6	INV	4,150	4,150	4,150	8,384	8,384	8,384	8.38	7.50	7.50	7.50	0.78
V-7	INV											
V-8		825	818	822	5,243	5,243	5,243	5.24	3.00	4.00	3.50	0.38
V-9		2,010	2,680	2,345	3,139	3,193	3,166	3.17	0.20	0.50	0.35	0.19
V-10		1,943	6,700	4,322	2,959	2,917	2,938	2.94	2.30	4.50	3.40	0.21
V-11	SINV	1,533	2,336	1,935	3,057	3,095	3,076	3.08	4.00	2.30	3.15	0.22
V-12	PEG	89,000	89,000	89,000	1,153	850	1,002	1.00	1.50	2.40	1.95	0.07
V-13		623	490	557	2,525	2,501	2,513	2.51	1.30	0.30	0.80	0.16
V-14	PEG	67,000	67,000	67,000	2,146	2,113	2,130	2.13	0.50	0.40	0.45	0.13
V-15		400	450	425	2,071	2,071	2,071	2.07	0.60	0.20	0.40	0.13
V-16	INV	94		94	2,875		2,875	2.88	4.00		4.00	0.21
V-17		120	120	120	3,657	3,657	3,657	3.66	1.30	2.40	1.85	0.24
V-18		243	320	282	942	812	877	0.88	1.50	2.00	1.75	0.06
V-19		166	149	158	868	869	869	0.87	1.70	3.80	2.75	0.06
V-20		117	117	117	2,266	2,252	2,259	2.26	0.30	0.20	0.25	0.14
V-21	DUP	117	117	117	2,266	2,252	2,259	2.26	0.30	0.20	0.25	0.14
V-22	SINV	22	18	20	2,194	2,206	2,200	2.20	2.80	2.00	2.40	0.15
V-23		20	24	22	978	983	981	0.98	1.50	1.50	1.50	0.06
V-24		6,400	6,400	6,400	2,858	2,873	2,866	2.87	3.00	3.20	3.10	0.20
V-25		1,296	792	1,044	877	879	878	0.88	4.00	4.00	4.00	0.07
V-26		715	910	813	2,402	2,398	2,400	2.40	1.00	0.20	0.60	0.15
V-27		23	25	24	2,222	2,269	2,246	2.25	1.80	0.30	1.05	0.14
V-28		600	600	600	2,291	2,308	2,300	2.30	2.80	1.90	2.35	0.16
V-29	DINV	427	732	580	2,100	2,078	2,089	2.09	4.60	5.20	4.90	0.16
V-30		1,950	5,200	3,575	1,929	1,931	1,930	1.93	0.20	0.20	0.20	0.12
V-31	PEG	120,000	120,000	120,000	2,349	2,350	2,340	2.34	0.60	0.40	0.50	0.14
V-32		17,000	17,000	17,000	966	1,004	985	0.99	0.10	0.10	0.10	0.06
V-33	DINV	113	450	281	638	629	634	0.63	5.00	5.40	5.20	0.05
V-34		29	25	27	805	808	807	0.81	3.60	3.60	3.60	0.06
V-35		68	228	148	733	1,134	934	0.93	1.20	0.40	0.80	0.06
V-36		267	369	318	2,357	2,385	2,371	2.37	0.80	0.40	0.60	0.15

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL			BAG TEMPERATURE				LABORATORY DATA					
ID	Code		Initial (F)	Final (F)	Avg. (F)	Temp deg R	NMOC		METHANE		THC	
							ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)
V-1	ACCY		76	79	78	537	NA	2,492.50	10.00	5.66	280.00	2,498.16
V-2			83	86	85	544	NA	1,046.71	4.60	2.61	1,600.00	1,049.32
V-3			83	85	84	544	NA	1,172.41	5.10	2.90	670.00	1,175.31
V-4	SINV		83	82	83	542	NA	1,873.42	8.10	4.60	750.00	1,878.02
V-5			82	81	82	541	NA	4,189.21	16.00	9.03	1,200.00	4,198.23
V-6	INV		103	109	106	566	NA				2,700.00	
V-7	INV										650.00	
V-8			87	83	85	545	NA	1,093.50	4.10	2.33	700.00	1,095.82
V-9			84	88	86	546	NA	2,197.65	5.10	2.91	1,400.00	2,200.56
V-10			95	96	96	555	NA	7,809.24	0.00	0.00	5,000.00	7,809.24
V-11	SINV		106	113	110	569	NA	10,924.34	0.00	0.00	7,000.00	10,924.34
V-12	PEG		84	84	84	544	NA	0.00	140,000.00	78,155.64	35,000.00	53,854.12
V-13			93	97	95	555	NA	190.44	300.00	171.09	230.00	361.53
V-14	PEG		77	76	77	536	NA	84,951.25	700.00	387.02	56,000.00	85,336.27
V-15			90	106	98	558	NA	440.36	0.00	0.00	280.00	440.36
V-16	INV		83	86	87	546	NA	40.01	26.00	14.76	35.00	54.77
V-17			87	86	87	546	NA	59.97	2.20	1.25	39.00	61.22
V-18			83	84	84	543	NA	486.61	0.00	0.00	310.00	486.61
V-19			84	85	85	544	NA	119.14	0.00	0.00	76.00	119.14
V-20			86	86	86	546	NA	84.96	0.00	0.00	54.00	84.96
V-21	DUP		86	86	86	546	NA	81.81	0.00	0.00	52.00	81.81
V-22	SINV		86	85	86	545	NA	6.27	0.00	0.00	4.00	6.27
V-23			86	84	85	545	NA	10.84	0.00	0.00	6.90	10.84
V-24			70	71	71	530	NA	5,413.93	380.00	215.59	3,600.00	5,629.53
V-25			81	83	82	542	NA	2,656.30	2.80	1.59	1,700.00	2,657.89
V-26			73	72	73	532	NA	0.00	380.00	216.79	110.00	172.97
V-27			72	74	73	533	NA	23.74	19.00	10.83	22.00	34.57
V-28			71	72	72	531	NA	0.00	340.00	193.49	69.00	108.23
V-29	DINV		82	83	83	542	NA	0.00	230.00	130.42	41.00	64.08
V-30			80	79	80	539	NA	1,547.12	320.00	182.56	1,100.00	1,729.68
V-31	PEG		81	80	81	540	NA	91,026.81	35,000.00	19,168.58	73,000.00	110,195.39
V-32			79	80	80	539	NA	10,513.60	4,100.00	2,329.88	8,200.00	12,843.48
V-33	DINV		80	80	80	540	NA	0.00	13.00	7.37	1.80	2.81
V-34			84	86	85	545	NA	7.67	0.00	0.00	4.90	7.67
V-35			90	92	91	551	NA	53.45	0.00	0.00	34.00	53.45
V-36			92	98	95	555	NA	155.35	86.00	49.06	130.00	204.41

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE									
ID	Code	MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW Bag	NMOC		Methane		THC						
							(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)					
V-1	ACCY	1.2	0.0124	96.3	27.0	28.17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00					
V-2		1.6	0.0706	94.8	26.6	28.24	1.39E-03	1.22E+01	3.16E-06	2.76E-02	1.39E-03	1.22E+01					
V-3		1.0	0.0296	96.7	27.1	28.16	4.76E-04	4.17E+00	1.19E-06	1.04E-02	4.77E-04	4.18E+00					
V-4	SINV	0.9	0.0331	97.2	27.2	28.14	6.27E-04	5.49E+00	1.55E-06	1.36E-02	6.28E-04	5.50E+00					
V-5		1.1	0.0529	96.4	27.0	28.18	1.04E-03	9.10E+00	2.55E-06	2.23E-02	1.04E-03	9.13E+00					
V-6	INV	2.4	0.1191	92.2	25.8	28.36	7.95E-03	6.96E+01	1.71E-05	1.50E-01	7.97E-03	6.98E+01					
V-7	INV																
V-8		1.1	0.0309	96.4	27.0	28.17	1.03E-03	9.04E+00	2.20E-06	1.93E-02	1.03E-03	9.06E+00					
V-9		0.1	0.0618	98.5	27.9	28.06	1.06E-03	9.25E+00	1.40E-06	1.22E-02	1.06E-03	9.26E+00					
V-10		1.1	0.2206	96.1	26.9	28.24	4.04E-03	3.54E+01	0.00E+00	0.00E+00	4.04E-03	3.54E+01					
V-11	SINV	1.0	0.3088	96.2	26.9	28.26	5.70E-03	4.99E+01	0.00E+00	0.00E+00	5.70E-03	4.99E+01					
V-12	PEG	0.6	1.5439	94.6	26.5	28.66	0.00E+00	0.00E+00	1.32E-02	1.16E+02	9.09E-03	7.97E+01					
V-13		0.3	0.0101	99.2	27.8	28.06	7.30E-05	6.40E-01	6.58E-05	5.75E-01	1.39E-04	1.21E+00					
V-14	PEG	0.1	2.4702	94.0	26.3	28.94	2.90E-02	2.54E+02	1.32E-04	1.16E+00	2.91E-02	2.55E+02					
V-15		0.1	0.0124	99.6	27.9	28.04	1.36E-04	1.19E+00	0.00E+00	0.00E+00	1.36E-04	1.19E+00					
V-16	INV	1.3	0.0015	96.0	26.9	28.18	2.14E-05	1.88E-01	7.90E-06	6.92E-02	2.93E-05	2.57E-01					
V-17		0.6	0.0017	98.1	27.5	28.09	3.59E-05	3.14E-01	7.50E-07	6.57E-03	3.66E-05	3.21E-01					
V-18		0.6	0.0137	98.2	27.5	28.09	6.99E-05	6.12E-01	0.00E+00	0.00E+00	6.99E-05	6.12E-01					
V-19		0.9	0.0034	97.2	27.2	28.13	1.79E-05	1.56E-01	0.00E+00	0.00E+00	1.79E-05	1.56E-01					
V-20		0.1	0.0024	99.7	27.9	28.03	2.90E-05	2.54E-01	0.00E+00	0.00E+00	2.90E-05	2.54E-01					
V-21	DUP	0.1	0.0023	99.7	27.9	28.03	2.79E-05	2.44E-01	0.00E+00	0.00E+00	2.79E-05	2.44E-01					
V-22	SINV	0.8	0.0002	97.6	27.3	28.12	2.33E-06	2.04E-02	0.00E+00	0.00E+00	2.33E-06	2.04E-02					
V-23		0.5	0.0003	98.5	27.6	28.08	1.71E-06	1.50E-02	0.00E+00	0.00E+00	1.71E-06	1.50E-02					
V-24		1.0	0.1588	96.5	27.1	28.20	2.81E-03	2.46E+01	1.12E-04	9.80E-01	2.92E-03	2.56E+01					
V-25		1.3	0.0750	95.8	26.9	28.21	4.35E-04	3.81E+00	2.60E-07	2.28E-03	4.36E-04	3.82E+00					
V-26		0.2	0.0049	99.4	27.8	28.05	0.00E+00	0.00E+00	8.19E-05	7.17E-01	6.53E-05	5.72E-01					
V-27		0.3	0.0010	98.9	27.7	28.06	6.58E-06	7.51E-02	3.91E-06	3.43E-02	1.25E-05	1.09E-01					
V-28		0.8	0.0030	97.6	27.4	28.11	0.00E+00	0.00E+00	7.69E-05	6.74E-01	4.30E-05	3.77E-01					
V-29	DINV	1.6	0.0018	95.1	26.6	28.22	0.00E+00	0.00E+00	5.37E-05	4.70E-01	2.64E-05	2.31E-01					
V-30		0.1	0.0485	99.7	27.9	28.05	4.55E-04	3.99E+00	5.37E-05	4.70E-01	5.09E-04	4.46E+00					
V-31	PEG	0.2	3.2200	92.2	25.8	29.21	3.42E-02	3.00E+02	7.21E-03	6.32E+01	4.14E-02	3.63E+02					
V-32		0.0	0.3617	99.1	27.8	28.16	1.58E-03	1.38E+01	3.49E-04	3.06E+00	1.93E-03	1.69E+01					
V-33	DINV	1.7	0.0001	94.8	26.6	28.23	0.00E+00	0.00E+00	9.42E-07	8.25E-03	3.59E-07	3.15E-03					
V-34		1.2	0.0002	96.4	27.0	28.16	1.12E-06	9.82E-03	0.00E+00	0.00E+00	1.12E-06	9.82E-03					
V-35		0.3	0.0015	99.2	27.8	28.05	7.67E-06	6.72E-02	0.00E+00	0.00E+00	7.67E-06	6.72E-02					
V-36		0.2	0.0057	99.4	27.8	28.05	5.56E-05	4.87E-01	1.76E-05	1.54E-01	7.32E-05	6.41E-01					

Response factor = 1.0 and gas constant = 4.836E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		COMMENTS
ID	Code	Comments
V-1	ACCY	Bagging accuracy check.
V-2		SV varied by a factor of 2. High O2.
V-3		
V-4	SINV	SV varied by a factor of 2.9.
V-5		
V-6	INV	O2 too high (7.5%).
V-7	INV	Resampled.
V-8		
V-9		
V-10		
V-11	SINV	SV varied by a factor of 2.5.
V-12	PEG	
V-13		
V-14	PEG	
V-15		
V-16	INV	Unstable O2 concentration
V-17		
V-18		
V-19		
V-20		
V-21	DUP	Duplicate of V020.
V-22	SINV	SV varied by a factor of 2.9.
V-23		SV varied by a factor of 2.
V-24		
V-25		
V-26		
V-27		
V-28		
V-29	DINV	Final O2 concentration is greater than 5% (5.2%).
V-30		
V-31	PEG	
V-32		
V-33	DINV	O2 too high (5.2%). Variable bagged THC.
V-34		Liquid sample V040 taken.
V-35		Variable bagged THC and O2 concentration.
V-36		Liquid sample V041 taken.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL			AMBIENT CONDITIONS			COMPONENT DATA			STREAM CHARACTERISTICS		
ID	Code	Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product
V-37		7.5	84	30.00	PUMP	12.00	HC		N	LL	LT Naptha
V-38		5.0	86		C	1.00	U		Y	LL	LT Naptha
V-39	L	5.0	86						Y		
V-40	L								Y		
V-41	L								Y		
V-42		5.0	85	30.00	C	1.00	TH		Y	LL	LT Naptha
V-43		15.0	85	29.90	C	4.00	FL		Y	LL	LT Naptha
V-44		12.5	87	29.90	VALVE	1.00	GATE		Y	LL	H Naptha
V-45	DUP	12.5	87	29.90	VALVE	1.00	GATE		Y	LL	H Naptha
V-46	INV	10.0	65		VALVE	1.00	GATE		Y	LL	Naptha
V-47	SINV	10.0	64	30.24	VALVE	3.00	GATE		Y	LL	H Naptha
V-48		10.0	65	30.24	C	1.00	TH		Y	LL	H Naptha
V-49	SINV	5.0	66	30.24	VALVE	2.00	GATE		Y	LL	H Naptha
V-50	L	10.0	65	30.24					Y		
V-51	L	5.0	66	30.24					Y		
V-52	DINV	2.5	77	30.24	VALVE	10.00	GATE		Y	LL	Naptha Feed
V-53		2.5	71	30.24	VALVE	2.00	GATE		Y	LL	Naptha Feed
V-54	BL										
V-55	DINV	2.5	67	30.44	VALVE	10.00	GATE		Y	LL	Naptha Feed
V-56		15.0	60	30.46	VALVE	3.00	GATE		Y	GAS	H2 Isobutane
V-57	L/INV	2.5	67	30.44					Y		
V-58	PEG	2.5	59	30.48	OEL	0.75	OEL		Y	GAS	Fuel Gas
V-59	PEG	7.5	63	30.49	VALVE	0.50	GATE		Y	GAS	Fuel Gas
V-60	PEG	7.5	62	30.49	VALVE	3.00	MC		Y	GAS	
V-61		2.5	62	30.49	VALVE	1.00	GATE		Y	GAS	Fuel Gas
V-62	PEG	7.5	62	30.49	C	1.00	TH		Y	GAS	Fuel Gas
V-63		7.5	60	30.40	OEL	0.50	OEL		Y	HL	Kerosene
V-64	DINV	7.5	58	30.40	C	0.75	TH		Y	HL	Kerosene
V-65		7.5	61	30.40	VALVE	0.75	GLOBE		Y	HL	Kerosene
V-66	PEG/DRIP	7.5	64	30.40	C	1.00	TH		Y	HL	Kerosene
V-67	INV	7.5		30.40	C	0.75	TH		Y	HL	Kerosene
V-68	L		60	30.40							
V-69	L	7.5	61	30.40							
V-70	L	7.5	59	30.00							
V-71		7.5	65	30.40	C	0.75	TH		Y	HL	
V-72		7.5	59	30.00	PUMP		HC		Y	HL	
V-73		2.5	65	30.25	VALVE	3.00	GLOBE		Y	HL	Kerosene

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		SCREENING DATA											
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
V-37		200	15				20				18	2	16
V-38			20				20				20	2	18
V-39	L												
V-40	L												
V-41	L												
V-42			40				40				40	2	38
V-43			1,500				1,500				1,500	5	1,495
V-44		500	4,000				3,000				3,500	7	3,493
V-45	DUP	500	4,000				3,000				3,500	7	3,493
V-46	INV	100,000	20,000				8,000				14,000	2	
V-47	SINV	50	70				150				110	1	109
V-48			3,000				4,200				3,600	5	3,596
V-49	SINV	200	700				1,700				1,200	4	1,196
V-50	L												
V-51	L												
V-52	DINV	30	5				8				7	1	6
V-53		0	4,000				6,000				5,000	3	4,998
V-54	BL												
V-55	DINV	500	2,000				2,000				2,000	1	1,999
V-56		50	15				15				15	2	13
V-57	L/INV												
V-58	PEG	100,000	100,000				100,000				100,000	3	99,998
V-59	PEG	1,000	100,000				100,000				100,000	2	99,999
V-60	PEG	100,000	109,000				109,000				109,000	1	108,999
V-61		50	60				100				80	2	78
V-62	PEG		91,000				91,000				91,000	3	90,998
V-63			200				210				205	10	195
V-64	DINV		450				480				465	5	460
V-65			120				230				175	6	167
V-66	PEG/DRIP		1,700				1,200				1,450	16	1,434
V-67	INV		75				0				38	5	33
V-68	L												
V-69	L												
V-70	L												
V-71			75				60				68	9	59
V-72			350				320				335	12	323
V-73			180				200				190	7	183

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg ppm	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
V-37		1,656	1,840	1,748	3,456	3,470	3,463	3.46	0.40	0.40	0.40	0.21
V-38		28	32	30	865	872	869	0.87	1.20	2.60	1.90	0.06
V-39	L											
V-40	L											
V-41	L											
V-42		51	34	43	893	908	901	0.90	0.50	1.40	0.95	0.06
V-43		73,600	78,200	75,900	2,353	2,385	2,369	2.37	0.50	0.20	0.35	0.14
V-44		1,638	1,911	1,775	2,104	2,072	2,088	2.09	0.60	0.20	0.40	0.13
V-45	DUP	1,638	1,911	1,775	2,104	2,072	2,088	2.09	0.60	0.20	0.40	0.13
V-46	INV	8,000	8,000		1,974	1,960			0.20	0.30		
V-47	SINV	135	99	117	4,004	4,004	4,004	4.00	3.50	1.50	2.50	0.27
V-48		3,486	3,486	3,486	859	875	867	0.87	0.60	0.50	0.55	0.05
V-49	SINV	325	360	343	3,800	3,762	3,781	3.78	2.00	1.00	1.50	0.24
V-50	L											
V-51	L											
V-52	DINV	14	12	13	6,056	6,056	6,056	6.06	5.00	6.50	5.75	0.50
V-53		7,280	7,280	7,280	3,888	3,155	3,522	3.52	3.50	1.50	2.50	0.24
V-54	BL											
V-55	DINV	383	340	362	6,324	6,382	6,353	6.35	4.20	5.60	4.90	0.50
V-56		17	16	16	3,555	5,262	4,409	4.41	2.20	1.00	1.60	0.29
V-57	L/INV											
V-58	PEG	10,000	7,500	8,750	732	702	717	0.72	2.00	2.00	2.00	0.05
V-59	PEG	12,000	19,000	15,500	2,931	2,927	2,929	2.93	3.00	1.40	2.20	0.20
V-60	PEG	17,440	19,620	18,530	1,561	1,572	1,567	1.57	0.40	0.70	0.55	0.10
V-61		189	258	224	1,134	1,140	1,137	1.14	0.60	0.70	0.65	0.07
V-62	PEG	91,000	91,000	91,000	740	741	741	0.74	0.40	0.40	0.40	0.05
V-63		221	221	221	563	564	564	0.56	0.40	0.40	0.40	0.03
V-64	DINV	192	178	185	916	910	913	0.91	5.00	5.20	5.10	0.07
V-65		91	117	104	2,013	1,654	1,834	1.83	0.40	0.30	0.35	0.11
V-66	PEG/DRIP	1,235	845	1,040	1,360	2,667	2,014	2.01	1.00	0.40	0.70	0.12
V-67	INV	131	109	120	811	6,458	3,635	3.63	2.00	0.20	1.10	0.23
V-68	L											
V-69	L											
V-70	L											
V-71		218	153	186	1,163	1,177	1,170	1.17	1.00	0.80	0.90	0.07
V-72		436	436	436	8,847	8,847	8,847	8.85	5.10	5.10	5.10	0.70
V-73		275	220	248	3,464	3,418	3,441	3.44	3.90	1.10	2.50	0.23



WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			BAG TEMPERATURE				LABORATORY DATA						
ID	Code	Initial (F)	Final (F)	Avg. (F)	Temp deg R	NMOC		METHANE		THC			
						ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)		
V-37		86	88	87	547	NA	2,196.47	6.90	3.93	1,400.00	2,200.41		
V-38		88	87	88	547	NA	10.83	0.00	0.00	6.90	10.83		
V-39	L												
V-40	L												
V-41	L												
V-42		86	85	86	545	NA	5.03	0.00	0.00	3.20	5.03		
V-43		88	88	88	548	NA	23,356.51	68.00	38.48	15,000.00	23,394.99		
V-44		87	88	88	547	NA	1,568.43	6.40	3.65	1,000.00	1,572.08		
V-45	DUP	87	88	88	547	NA	1,568.54	6.20	3.54	1,000.00	1,572.08		
V-46	INV	62	63					15.00		2,800.00			
V-47	SINV	70	70	70	530	NA	188.18	0.00	0.00	120.00	188.18		
V-48		67	69	68	528	NA	4,239.58	0.00	0.00	2,700.00	4,239.58		
V-49	SINV	72	74	73	533	NA	376.88	0.00	0.00	240.00	376.88		
V-50	L												
V-51	L												
V-52	DINV	79	80	80	539	NA	4.06	0.00	0.00	2.60	4.06		
V-53		74	74	74	534	NA	1,171.12	8.10	4.61	750.00	1,175.73		
V-54	BL							0.00		0.00			
V-55	DINV	72	74	73	533	26.00	40.64	0.00	0.00	NA	40.64		
V-56		61	61	61	521	47.00	73.80	0.00	0.00	NA	73.80		
V-57	L/INV												
V-58	PEG	65	68	67	526	900.00	1,412.48	1,900.00	1,081.87	NA	2,494.34		
V-59	PEG	64	63	64	523	4,200.00	6,589.69	4,000.00	2,276.97	NA	8,866.65		
V-60	PEG	69	69	69	529	7,500.00	11,794.85	7,200.00	4,108.14	NA	15,902.99		
V-61		64	64	64	524	4.50	7.08	22.00	12.55	NA	19.63		
V-62	PEG	63	62	63	522	65.00	102.24	41,000.00	23,388.55	NA	23,500.80		
V-63		69	65	67	527	12.00	18.88	27.00	15.41	NA	34.28		
V-64	DINV	95	104	100	559	5.70	8.91	0.00	0.00	NA	8.91		
V-65		76	90	83	543	370.00	582.04	0.00	0.00	NA	582.04		
V-66	PEG/DRIP	72	67	70	529	1,400.00	2,201.24	40.00	22.82	NA	2,224.06		
V-67	INV	80	93	87	546	70.00	110.00	2.80	1.60	NA	111.60		
V-68	L												
V-69	L												
V-70	L												
V-71		90	103	97	556								
V-72		135	130	133	592	4.50	7.07	0.00	0.00	NA	7.07		
V-73		77	83	80	540	720.00	1,125.04	3.10	1.76	NA	1,126.80		
						540.00	846.89	0.00	0.00	NA	846.89		

WSPA EMISSION RATE CALCULATION SPREADSHEET SORTED BY CATEGORY AND CORRECTED SCREENING VALUE

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SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE							
ID	Code	MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW fraction Bag	MW	NMOC		Methane		THC			
								(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)		
V-37		0.1	0.0618	99.5	27.9	28.06		1.15E-03	1.01E+01	2.07E-06	1.81E-02	1.16E-03	1.01E+01		
V-38		0.6	0.0003	98.1	27.5	28.10		1.54E-06	1.35E-02	0.00E+00	0.00E+00	1.54E-06	1.35E-02		
V-39	L														
V-40	L														
V-41	L														
V-42		0.3	0.0001	99.0	27.8	28.06		7.08E-07	6.21E-03	0.00E+00	0.00E+00	7.08E-07	6.21E-03		
V-43		0.1	0.6617	98.2	27.5	28.28		8.43E-03	7.38E+01	1.39E-05	1.22E-01	8.44E-03	7.40E+01		
V-44		0.1	0.0441	99.5	27.9	28.05		4.97E-04	4.35E+00	1.16E-06	1.01E-02	4.98E-04	4.36E+00		
V-45	DUP	0.1	0.0441	99.5	27.9	28.05		4.97E-04	4.35E+00	1.12E-06	9.81E-03	4.98E-04	4.36E+00		
V-46	INV														
V-47	SINV	0.8	0.0053	97.5	27.3	28.12		1.32E-04	1.15E+00	0.00E+00	0.00E+00	1.32E-04	1.15E+00		
V-48		0.2	0.1191	99.2	27.8	28.09		5.83E-04	5.11E+00	0.00E+00	0.00E+00	5.83E-04	5.11E+00		
V-49	SINV	0.5	0.0106	98.5	27.6	28.08		2.35E-04	2.06E+00	0.00E+00	0.00E+00	2.35E-04	2.06E+00		
V-50	L														
V-51	L														
V-52	DINV	1.8	0.0001	94.2	26.4	28.25		5.15E-06	4.51E-02	0.00E+00	0.00E+00	5.15E-06	4.51E-02		
V-53		0.8	0.0331	97.4	27.3	28.13		7.16E-04	6.27E+00	2.82E-06	2.47E-02	7.19E-04	6.30E+00		
V-54	BL														
V-55	DINV	1.6	0.0000	95.1	26.6	28.22		5.18E-05	4.53E-01	0.00E+00	0.00E+00	5.18E-05	4.53E-01		
V-56		0.5	0.0000	98.4	27.6	28.08		5.51E-05	4.83E-01	0.00E+00	0.00E+00	5.51E-05	4.83E-01		
V-57	L/INV														
V-58	PEG	0.6	0.0000	98.0	27.5	28.10		1.73E-04	1.52E+00	1.33E-04	1.16E+00	3.06E-04	2.68E+00		
V-59	PEG	0.7	0.0000	97.8	27.4	28.11		3.36E-03	2.94E+01	1.16E-03	1.02E+01	4.52E-03	3.96E+01		
V-60	PEG	0.2	0.0000	99.5	27.9	28.04		2.92E-03	2.56E+01	1.02E-03	8.91E+00	3.94E-03	3.45E+01		
V-61		0.2	0.0000	99.4	27.8	28.05		1.29E-06	1.13E-02	2.29E-06	2.00E-02	3.58E-06	3.13E-02		
V-62	PEG	0.1	0.0000	99.6	27.9	28.04		1.20E-05	1.05E-01	2.75E-03	2.41E+01	2.76E-03	2.42E+01		
V-63		0.1	0.0000	99.6	27.9	28.04		1.67E-06	1.47E-02	1.37E-06	1.20E-02	3.04E-06	2.66E-02		
V-64	DINV	1.6	0.0000	94.9	26.6	28.22		1.57E-06	1.38E-02	0.00E+00	0.00E+00	1.57E-06	1.38E-02		
V-65		0.1	0.0000	99.7	27.9	28.03		1.63E-04	1.43E+00	0.00E+00	0.00E+00	1.63E-04	1.43E+00		
V-66	PEG/DRIP	0.2	0.0000	99.3	27.8	28.05		7.54E-04	6.61E+00	7.31E-06	6.40E-02	7.07E-02	6.19E+02		
V-67	INV	0.4	0.0000	98.9	27.7	28.06		6.29E-05	5.51E-01	9.13E-07	8.00E-03	6.38E-05	5.59E-01		
V-68	L														
V-69	L														
V-70	L														
V-71		0.3	0.0000	99.1	27.8	28.06		1.27E-06	1.11E-02	0.00E+00	0.00E+00	1.27E-06	1.11E-02		
V-72		1.6	0.0000	94.9	26.6	28.22		1.82E-03	1.59E+01	2.84E-06	2.49E-02	1.82E-03	1.60E+01		
V-73		0.8	0.0000	97.5	27.3	28.12		5.00E-04	4.38E+00	0.00E+00	0.00E+00	5.00E-04	4.38E+00		

Response factor = 1.0 and gas constant = 4.836E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		COMMENTS
ID	Code	Comments
V-37		
V-38		Liquid sample V039 taken.
V-39	L	Reported with sample V038.
V-40	L	Reported with sample V034.
V-41	L	Reported with sample V036.
V-42		
V-43		
V-44		
V-45	DUP	Duplicate of V044.
V-46	INV	
V-47	SINV	SV varied by a factor of 2.1. Liquid sample V050 taken.
V-48		Liquid sample V050 taken.
V-49	SINV	SV varied by a factor of 2.4. Liquid sample V051 taken.
V-50	L	Reported with samples V047 and V048.
V-51	L	Reported with sample V049.
V-52	DINV	O2 too high (5.75%).
V-53		
V-54	BL	
V-55	DINV	Final O2 concentration is greater than 5% (5.6%). Liquid sample V057 taken.
V-56		
V-57	L/INV	Reported with sample V055.
V-58	PEG	
V-59	PEG	
V-60	PEG	
V-61		
V-62	PEG	
V-63		Liquid sample V068 taken.
V-64	DINV	Final O2 concentration is greater than 5% (5.2%). Liquid sample V068 taken.
V-65		Liquid sample V069 taken.
V-66	PEG/DRIP	Varying N2 flow. Dripping. Drip rate = 12ml/16min. Liquid sample V068 taken.
V-67	INV	Large change in N2 flow
V-68	L	Reported with samples V063, V064 and V066.
V-69	L	Reported with samples V065 and V071.
V-70	L	Reported with sample V072.
V-71		Liquid sample V069 taken.
V-72		O2 concentration high (5.1). Liquid sample V070 taken.
V-73		Liquid sample V079 taken.

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		AMBIENT CONDITIONS				COMPONENT DATA			STREAM CHARACTERISTICS		
ID	Code	Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product
V-74		2.5	66	30.25	VALVE	4.00	GLOBE		Y	HL	Kerosene
V-75	DUP	2.5	66	30.25	VALVE	4.00	GLOBE		Y	HL	Kerosene
V-76	DZ	2.5	66	30.25	VALVE	1.00	GLOBE		Y	HL	Kerosene
V-77	PEG/DRIP	2.5	66	30.25	OEL	0.50	OEL		Y	HL	Kerosene
V-78	PEG	2.5	67	30.24	VALVE	3.00	GATE		Y	GAS	Fuel Gas
V-79	L	2.5	65	30.25					Y		
V-80	L	2.5	66	30.25					Y		
V-81	PEG	2.5	71	30.24	OEL	0.75	OEL		Y	GAS	Fuel Gas
V-82	PEG	2.5	72	30.24	OEL	0.75	OEL		Y	GAS	Fuel Gas
V-83		2.5	70	30.24	OEL	1.00	OEL		Y	GAS	Fuel Gas
V-84		2.5	70	30.21	VALVE	4.00	GATE		Y	GAS	H2
V-85	DZ	2.5	73	30.21	VALVE	2.00	GLOBE		Y	GAS	
V-86	BL										
V-87		7.5	60	30.20	VALVE	3.00	GATE		Y	GAS	Fuel Gas
V-88	INV	2.5	70	30.20	PUMP		HC		Y	HL	
V-89	DZ	2.5	70	30.20	VALVE	2.00	GATE		Y	HL	R Diesel
V-90	PEG	2.5	72	30.21	VALVE	2.00	GLOBE		Y	GAS	Comp. Gasses
V-91	PEG	2.5	70	30.21	VALVE	2.00	GLOBE		Y	GAS	Comp. Gasses
V-92		2.5	71	30.21	C	1.00	TH		Y	LL	Diesel
V-93	PEG	2.5	59	30.28	C	24.00	FL		Y	GAS	Comp. Gasses
V-94		2.5	58	30.28	VALVE	1.00	GATE		Y	LL	H2
V-95	PEG	7.5	58	30.28	C	4.00	FL		Y	GAS	Propane
V-96	DZ/DINV	7.5	59	30.28	C	4.00	FL		Y	GAS	
V-97		2.5	60	30.30	VALVE	2.00	GATE		Y	LL	H2 Naptha
V-98	DUP	2.5	60	30.30	VALVE	2.00	GATE		Y	LL	H2 Naptha
V-99	INV	2.5	62	30.28	VALVE	1.00	GATE		Y	LL	
V-100		7.5	56	30.28	C	1.00	TH		Y	GAS	Comp. Gasses
V-101	DZ	7.5	54	30.28	C	1.00	TH		Y	GAS	Comp. Gasses
V-102	DZ	12.5	57	30.28	PRV	3.00	PRV		Y	GAS	Butane/Propane
V-103	DZ	2.5	53	30.30	PRV	1.50	PRV		Y	GAS	Butane/Propane
V-104	DZ	2.5	57	30.30	PRV	1.50	PRV		Y	GAS	Butane/Propane
V-105	DZ	7.5	55	30.30	VALVE	6.00	GATE		N	GAS	
V-106	PEG	2.5	62	30.30	VALVE	3.00	GLOBE		Y	GAS	H2
V-107	PEG	2.5	66	30.30	VALVE	4.00	MC		Y	GAS	H2
V-108	PEG	2.5	70	30.30	VALVE	4.00	MC		Y	GAS	H2
V-109		2.5	63	30.26	OEL	1.00	OEL		N	LL	Propane
V-110		7.5	63	30.24	VALVE	9.00	GLOBE		Y	LL	Propane

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			SCREENING DATA										
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
V-74	DUP		230				390				310	20	290
V-75	DUP		230				390				310	20	290
V-76	DZ		15				7				11	11	0
V-77	PEG/DRIP		700				700				700	7	693
V-78	PEG	100,000	67,000				100,000				83,500	25	83,475
V-79	L												
V-80	L												
V-81	PEG		110,000				110,000				110,000	10	109,990
V-82	PEG	300.0	119,000				119,000				119,000	20	118,980
V-83			13,400				16,750				15,075	7	15,068
V-84		300	700				1,000				850	20	830
V-85	DZ		20				12				16	16	0
V-86	BL												
V-87													
V-88	INV	2,000	200				300				250	10	240
V-89	DZ		4				4				4	4	0
V-90	PEG	100,000	77,000				77,000				77,000	6	76,994
V-91	PEG	100,000	80,000				80,000				80,000	5	79,996
V-92			1,200				1,500				1,350	15	1,335
V-93	PEG	100,000	86,000				86,000				86,000	13	85,987
V-94			7				12				10	4	6
V-95	PEG	10,050	86,000				86,000				86,000	10	85,990
V-96	DZ/DINV		5				7				6	6	0
V-97			80,000				80,000				80,000	3	79,997
V-98	DUP		80,000				80,000				80,000	3	79,997
V-99	INV		7				90				49	7	
V-100			48,000				40,000				44,000	5	43,995
V-101	DZ		4				3				4	4	0
V-102	DZ		4				4				4	4	0
V-103	DZ		2				2				2	2	0
V-104	DZ		2				2				2	2	0
V-105	DZ		1				1				1	1	0
V-106	PEG	30,000	100,000				100,000				100,000	5	99,995
V-107	PEG	10,050	71,400				71,400				71,400	3	71,397
V-108	PEG	10,050	78,000				78,000				78,000	4	77,996
V-109			1,300				1,600				1,450	2	1,448
V-110			400				500				450	3	448

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg ppm	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
V-74		138	110	124	3,340	3,356	3,348	3.35	2.50	0.80	1.65	0.22
V-75	DUP	138	110	124	3,340	3,356	3,348	3.35	2.50	0.80	1.65	0.22
V-76	DZ	85	85	85	1,960	1,980	1,970	1.97	0.50	0.40	0.45	0.12
V-77	PEG/DRIP	1,875	1,000	1,438	1,164	1,168	1,166	1.17	2.00	2.00	2.00	0.08
V-78	PEG	3,850	3,620	3,735	3,665	3,671	3,668	3.67	3.20	2.30	2.75	0.25
V-79	L											
V-80	L											
V-81	PEG	49,500	49,500	49,500	710	703	707	0.71	1.30	2.00	1.65	0.05
V-82	PEG	95,200	119,000	107,100	718	713	716	0.72	0.20	0.60	0.40	0.04
V-83		5,360	2,680	4,020	750	768	759	0.76	2.40	1.40	1.90	0.05
V-84		635	592	614	3,418	3,452	3,435	3.44	2.50	1.20	1.85	0.23
V-85	DZ	133	78	105	3,351	3,345	3,348	3.35	5.00	1.20	3.10	0.24
V-86	BL											
V-87		278	760	519	3,630	3,610	3,620	3.62	2.80	0.80	1.80	0.24
V-88	INV											
V-89	DZ	42	32	37	3,286	3,261	3,274	3.27	4.00	0.40	2.20	0.22
V-90	PEG	15,400	15,400	15,400	3,430	3,452	3,441	3.44	0.40	0.40	0.40	0.21
V-91	PEG	13,600	15,200	14,400	3,600	3,620	3,710	3.71	5.00	3.80	4.40	0.28
V-92		200	200	200	754	756	755	0.76	2.00	2.20	2.10	0.05
V-93	PEG	2,580	241	1,411	8,246	8,246	8,246	8.25	4.00	4.00	4.00	0.61
V-94		44	59	52	1,552	1,576	1,564	1.56	1.20	0.60	0.90	0.10
V-95	PEG	86,000	86,000	86,000	1,295	1,310	1,303	1.30	0.60	0.30	0.45	0.08
V-96	DZ/DINV	23	31	27	1,486	1,502	1,494	1.49	0.20	0.20	0.20	0.09
V-97		6,000	5,000	5,500	3,870	3,904	3,887	3.89	3.20	0.70	1.95	0.26
V-98	DUP	6,000	5,000	5,500	3,870	3,904	3,887	3.89	3.20	0.70	1.95	0.26
V-99	INV	56	35		1,806	1,832			2.10	1.40		
V-100		20,000	17,600	18,800	1,090	1,111	1,101	1.10	1.00	0.80	0.90	0.07
V-101	DZ	59	50	55	708	726	717	0.72	0.40	0.40	0.40	0.04
V-102	DZ	41	36	38	2,187	2,206	2,197	2.20	0.30	0.20	0.25	0.13
V-103	DZ	26	26	26	1,557	1,598	1,578	1.58	0.20	0.10	0.15	0.10
V-104	DZ	11	7	9	1,390	1,395	1,393	1.39	0.40	0.20	0.30	0.08
V-105	DZ	20	20	20	4,220	4,170	4,195	4.20	4.00	2.00	3.00	0.29
V-106	PEG	60,000	90,000	75,000	2,274	2,365	2,320	2.32	2.80	2.20	2.50	0.16
V-107	PEG	71,400	71,400	71,400	2,410	2,341	2,376	2.38	0.20	0.20	0.20	0.14
V-108	PEG	24,960	26,520	25,740	2,415	2,427	2,421	2.42	1.50	0.80	1.15	0.15
V-109		137	137	137	1,800	1,790	1,795	1.80	2.00	1.00	1.50	0.12
V-110		66	57	62	4,116	4,102	4,109	4.11	3.50	3.20	3.35	0.29

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			BAG TEMPERATURE			LABORATORY DATA					
ID	Code	Initial (F)	Final (F)	Avg. (F)	Temp deg R	NMOC		METHANE		THC	
						ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)
V-74		73	80	77	536	640.00	1,004.93	0.00	0.00	NA	1,004.93
V-75	DUP	73	80	77	536	380.00	596.67	0.00	0.00	NA	596.67
V-76	DZ	68	67	68	527	NA	204.46	0.00	0.00	130.00	204.46
V-77	PEG/DRIP	69	68	69	528	970.00	1,522.33	0.00	0.00	NA	1,522.33
V-78	PEG	73	76	75	534	5,000.00	7,838.76	3,500.00	1,990.80	NA	9,829.56
V-79	L										
V-80	L										
V-81	PEG	74	74	74	534	59,000.00	92,641.55	30,000.00	17,090.57	NA	109,732.12
V-82	PEG	73	73	73	533	29,000.00	45,616.48	13,000.00	7,419.05	NA	53,035.53
V-83		72	70	71	531	360.00	565.07	260.00	148.07	NA	713.14
V-84		74	85	80	539	490.00	769.18	5.30	3.02	NA	772.20
V-85	DZ	80	80	80	540	NA	57.98	0.00	0.00	37.00	57.98
V-86	BL					NA		0.00		61.00	
V-87		64	68	66	526	9.20	14.44	38.00	21.64	NA	36.09
V-88	INV										
V-89	DZ	71	71	71	531	NA	58.05	0.00	0.00	37.00	58.05
V-90	PEG	77	80	79	538	7,600.00	11,954.66	3,900.00	2,225.72	NA	14,180.38
V-91	PEG	80	79	80	539	5,800.00	9,071.78	3,100.00	1,759.17	NA	10,830.95
V-92		76	76	76	536	12.00	18.83	8.90	5.07	NA	23.90
V-93	PEG	109	120	115	574	18.00	28.17	160.00	90.85	NA	119.02
V-94		58	60	59	519	6.80	10.69	0.00	0.00	NA	10.69
V-95	PEG	58	57	58	517	20,000.00	31,457.41	14,000.00	7,989.18	NA	39,446.59
V-96	DZ/DINV	59	59	59	519	NA	87.73	42.00	23.98	71.00	111.71
V-97		65	62	64	523	2,400.00	3,766.87	1,200.00	683.33	NA	4,450.20
V-98	DUP	65	62	64	523	2,400.00	3,766.87	1,200.00	683.33	NA	4,450.20
V-99	INV	71	71			6.10		0.00			
V-100		57	56	57	516	17,000.00	26,721.73	110.00	62.73	NA	26,784.46
V-101	DZ	75	81	78	538	NA	72.36	0.00	0.00	46.00	72.36
V-102	DZ	56	57	57	516	NA	0.07	0.00	0.00	0.05	0.07
V-103	DZ	55	54	55	514	NA	0.07	0.00	0.00	0.05	0.07
V-104	DZ	60	60	60	520	NA	0.07	0.00	0.00	0.05	0.07
V-105	DZ	56	53	55	514	NA	0.08	0.00	0.00	0.05	0.08
V-106	PEG	78	82	80	540	25,000.00	39,207.67	36,000.00	20,484.01	NA	59,691.67
V-107	PEG	97	96	97	556	67,000.00	105,419.73	93,000.00	53,089.84	NA	158,509.57
V-108	PEG	93	96	95	554	13,000.00	20,427.02	17,000.00	9,691.52	NA	30,118.54
V-109		63	65	64	524	8.00	12.56	13.00	7.41	NA	19.97
V-110		67	70	69	528	94.00	147.24	0.00	0.00	NA	147.24

WSPA EMISSION RATE CALCULATION SPREADSHEET SORTED BY CATEGORY AND CORRECTED SCREENING VALUE

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SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE					
ID	Code	MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW fraction Bag	MW	NMOC (lb/hr)	NMOC (lb/yr)	Methane (lb/hr)	Methane (lb/yr)	THC (lb/hr)	THC (lb/yr)
V-74		0.5	0.0000	98.4	27.6	28.09		5.55E-04	4.86E+00	0.00E+00	0.00E+00	5.55E-04	4.86E+00
V-75	DUP	0.5	0.0000	98.4	27.6	28.09		3.30E-04	2.89E+00	0.00E+00	0.00E+00	3.30E-04	2.89E+00
V-76	DZ	0.1	0.0057	99.5	27.9	28.04		6.35E-05	5.56E-01	0.00E+00	0.00E+00	6.35E-05	5.56E-01
V-77	PEG/DRIP	0.6	0.0000	98.0	27.5	28.10		1.03E-02	9.03E+01	0.00E+00	0.00E+00	1.03E-02	9.03E+01
V-78	PEG	0.9	0.0000	97.3	27.2	28.13		5.06E-03	4.43E+01	1.28E-03	1.12E+01	6.34E-03	5.55E+01
V-79	L												
V-80	L												
V-81	PEG	0.5	0.0000	98.4	27.6	28.09		1.08E-02	9.50E+01	2.00E-03	1.75E+01	1.28E-02	1.13E+02
V-82	PEG	0.1	0.0000	99.6	27.9	28.04		5.08E-03	4.45E+01	8.26E-04	7.24E+00	5.91E-03	5.18E+01
V-83		0.6	0.0000	98.1	27.5	28.10		7.24E-05	6.35E-01	1.90E-05	1.68E-01	9.14E-05	8.01E-01
V-84		0.6	0.0000	98.2	27.5	28.09		4.38E-04	3.84E+00	1.72E-06	1.51E-02	4.40E-04	3.85E+00
V-85	DZ	1.0	0.0016	96.9	27.2	28.14		3.45E-05	3.02E-01	0.00E+00	0.00E+00	3.45E-05	3.02E-01
V-86	BL		0.0027										
V-87		0.6	0.0000	98.2	27.5	28.09		8.87E-06	7.77E-02	1.33E-05	1.16E-01	2.22E-05	1.94E-01
V-88	INV												
V-89	DZ	0.7	0.0016	97.8	27.4	28.11		3.26E-05	2.86E-01	0.00E+00	0.00E+00	3.26E-05	2.86E-01
V-90	PEG	0.1	0.0000	99.6	27.9	28.04		6.34E-03	5.55E+01	1.18E-03	1.03E+01	7.52E-03	6.59E+01
V-91	PEG	1.4	0.0000	95.6	26.8	28.20		6.46E-03	5.66E+01	1.25E-03	1.10E+01	7.71E-03	6.76E+01
V-92		0.7	0.0000	97.9	27.4	28.10		2.40E-06	2.11E-02	6.47E-07	5.67E-03	3.05E-06	2.67E-02
V-93	PEG	1.3	0.0000	96.0	26.9	28.18		4.09E-05	3.58E-01	1.32E-04	1.15E+00	1.73E-04	1.51E+00
V-94		0.3	0.0000	99.1	27.8	28.06		2.74E-06	2.40E-02	0.00E+00	0.00E+00	2.74E-06	2.40E-02
V-95	PEG	0.1	0.0000	99.6	27.9	28.04		6.59E-03	5.77E+01	1.67E-03	1.47E+01	8.26E-03	7.24E+01
V-96	DZ/DINV	0.1	0.0031	99.8	28.0	28.03		2.08E-05	1.82E-01	5.67E-06	4.97E-02	2.64E-05	2.31E-01
V-97		0.6	0.0000	98.1	27.5	28.10		2.52E-03	2.20E+01	4.56E-04	4.00E+00	2.97E-03	2.60E+01
V-98	DUP	0.6	0.0000	98.1	27.5	28.10		2.52E-03	2.20E+01	4.56E-04	4.00E+00	2.97E-03	2.60E+01
V-99	INV												
V-100		0.3	0.0000	99.1	27.8	28.06		4.85E-03	4.24E+01	1.14E-05	9.96E-02	4.86E-03	4.25E+01
V-101	DZ	0.1	0.0020	99.6	27.9	28.04		8.00E-06	7.01E-02	0.00E+00	0.00E+00	8.00E-06	7.01E-02
V-102	DZ	0.1	0.0000	99.7	27.9	28.03		2.48E-08	2.17E-04	0.00E+00	0.00E+00	2.48E-08	2.17E-04
V-103	DZ	0.0	0.0000	99.8	28.0	28.03		1.78E-08	1.56E-04	0.00E+00	0.00E+00	1.78E-08	1.56E-04
V-104	DZ	0.1	0.0000	99.7	27.9	28.03		1.57E-08	1.37E-04	0.00E+00	0.00E+00	1.57E-08	1.37E-04
V-105	DZ	1.0	0.0000	97.0	27.2	28.14		6.09E-08	5.33E-04	0.00E+00	0.00E+00	6.09E-08	5.33E-04
V-106	PEG	0.8	0.0000	97.5	27.3	28.12		1.56E-02	1.37E+02	8.15E-03	7.14E+01	2.38E-02	2.08E+02
V-107	PEG	0.1	0.0000	99.8	28.0	28.03		3.70E-02	3.24E+02	1.86E-02	1.63E+02	5.56E-02	4.87E+02
V-108	PEG	0.4	0.0000	98.9	27.7	28.07		7.69E-03	6.73E+01	3.65E-03	3.20E+01	1.13E-02	9.93E+01
V-109		0.5	0.0000	98.5	27.6	28.08		3.78E-06	3.31E-02	2.23E-06	1.95E-02	6.01E-06	5.26E-02
V-110		1.1	0.0000	96.7	27.1	28.15		1.11E-04	9.75E-01	0.00E+00	0.00E+00	1.11E-04	9.75E-01

Response factor = 1.0 and gas constant = 4.836E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		COMMENTS
ID	Code	Comments
V-74		Liquid sample V079 taken.
V-75	DUP	Liquid sample V079 taken. Duplicate of V074.
V-76	DZ	
V-77	PEG/DRIP	Dripping. Liquid sample V080 taken from bag. Drip rate = 10.2ml/18min.
V-78	PEG	
V-79	L	Reported with samples V073, V074 and V075.
V-80	L	Reported with sample V077.
V-81	PEG	
V-82	PEG	Variable bagged THC and O2 concentration.
V-83		
V-84		
V-85	DZ	
V-86	BL	
V-87		Variable bagged THC and O2 concentration.
V-88	INV	Unable to get adequate seal.
V-89	DZ	O2 concentration varied by a factor of 10.
V-90	PEG	
V-91	PEG	
V-92		
V-93	PEG	Bagged THC varies by a factor of 11.
V-94		
V-95	PEG	
V-96	DZ/DINV	Possible contamination in field; followed a pegged source.
V-97		
V-98	DUP	Duplicate of V097.
V-99	INV	Unstable THC reading.
V-100		
V-101	DZ	
V-102	DZ	
V-103	DZ	
V-104	DZ	
V-105	DZ	
V-106	PEG	
V-107	PEG	
V-108	PEG	
V-109		
V-110		

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Documents
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WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			AMBIENT CONDITIONS				COMPONENT DATA				STREAM CHARACTERISTICS			
ID	Code		Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product		
V-111			7.5	65	30.24	VALVE	8.00	GATE		Y	GAS	H2 - Propane		
V-112	BL													
W-1	ACCY		0.0	62		OEL	3.00	OEL			LL	Water		
W-2	INV		2.5	68		VALVE	2.00	GLOBE	M		GAS	VRU		
W-3	SINV		2.5	70		VALVE	3.00	MC	C		GAS	VRU		
W-4	PEG		2.5	74		C	3.00	TH			GAS	SRU		
W-5			2.5	71		C	1.00	TH			HL	Sour water		
W-6			1.5	70		VALVE	3.00	MC	C		LL			
W-7	PEG		1.5	63		VALVE	6.00	MC	C		GAS	Fuel gas		
W-8			0.0	65		VALVE	1.00	GLOBE	M		GAS	VRU		
W-9	PEG		0.0	70		C	1.00	FL			GAS			
W-10	PEG		0.0	67		VALVE	1.50	DIA	M		GAS	Fuel gas		
W-11	INV		0.0	72		C	1.00	TH			GAS	Fuel gas		
W-12			2.5	72		OEL	0.375	OEL			GAS	VRU		
W-13	DZ		2.5	73		OEL	0.50	OEL			GAS	VRU		
W-14	DZ		1.5	72		C	1.00	U			GAS			
W-15	BL													
W-16	DZ		0.0	62		C	0.50	FL			GAS	VRU		
W-17	L			63										
W-18			0.0	63		OEL	1.00	OEL			GAS			
W-19			0.0	63		VALVE	1.00	GATE	M		LL	Propane		
W-20	PEG		0.0	67		OEL	0.50	OEL			LL	Propane		
W-21			1.5	80		PUMP	4.00	VC		N	LL	Propane (LPG)		
W-22	DUP		1.5	80		PUMP	4.00	VC		N	LL	Propane (LPG)		
W-23			2.5	80		C	3.00	FL			GAS	Propane (LPG)		
W-24			4.5	79		C	2.00	FL			GAS	Propane (LPG)		
W-25			4.0	79		C	1.00	TH			GAS	Propane (LPG)		
W-26	DZ		1.5	64		C	1.00	FL			GAS	Propane (LPG)		
W-27	SINV		1.5	66		C	1.00	FL			GAS	Propane (LPG)		
W-28	DZ		1.5	66		C	1.00	FL			GAS	Fuel gas		
W-29	SINV		0.0	75		PUMP	4.00	HC			LL	Fuel gas		
W-30			4.5	80		VALVE	4.00	GLOBE	M		HL	Crude		
W-31	L/INV			75										
W-32	L			80										
W-33				82										
W-34	SINV		1.5	82		VALVE	3.00	GLOBE	M		HL	Crude		
W-35	PEG		0.0	77		C	1.00	TH			GAS	Fuel gas		
W-35			0.0	67		VALVE	2.00	GATE	M		LL	D B		

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		SCREENING DATA											
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
V-111	BL	50	150				250				200	3	198
V-112	ACCY		5				5				5	5	0
W-1	INV	100	25				25				25	5	20
W-3	SINV	8,000	2,000				400				1,200	6	1,195
W-4	PEG	100,000	100,000				100,000				100,000	4	99,996
W-5		8,000	9,000				9,000				9,000	6	8,994
W-6			50				60				55	5	50
W-7	PEG	10,000	100,000				100,000				100,000	9	99,991
W-8			28				30				29	7	23
W-9	PEG	100,000	100,000				100,000				100,000	5	99,995
W-10	PEG	10,000	100,000				100,000				100,000	5	99,995
W-11	INV	2,500	5,000				4,000				4,500	4	4,496
W-12			60				70				65	5	61
W-13	DZ		4				4				4	4	0
W-14	DZ		4				4				4	4	0
W-15	BL												
W-16	DZ		6				6				6	6	0
W-17	L												
W-18			6,000										
W-19		80,000	24,000				10,000				8,000	5	7,995
W-20	PEG		100,000				24,000				24,000	6	23,995
W-21		5,000	5,000				100,000				100,000	5	99,995
W-22	DUP	5,000	5,000				8,000				6,500	5	6,496
W-23		5,000	5,000				8,000				6,500	5	6,496
W-24			80				5,000				5,000	4	4,996
W-25	DZ		5				90				85	4	81
W-26	SINV	400	500				5				5	5	0
W-27	DZ		8				200				350	6	345
W-28	SINV	200	80				5				7	7	0
W-29		150	600				300				190	7	184
W-30	L/INV						500				550	10	540
W-31	L												
W-32	L												
W-33	SINV		250										
W-34	PEG	10,000	100,000				700				475	11	464
W-35			40				100,000				100,000	5	99,995
							45				43	11	32

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg ppm	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
V-111		27	28	27	13,090	13,090	13,090	13.09	5.00	4.00	4.50	1.00
V-112	BL											
W-1	ACCY	1,100	1,100	1,100	1,036	1,004	1,020	1.02	2.50	2.70	2.60	0.07
W-2	INV	50	50	50	1,961	1,911	1,936	1.94	1.00	1.00	1.00	0.12
W-3	SINV	420	350	385	1,989	1,955	1,972	1.97	0.80	0.60	0.70	0.12
W-4	PEG	100,000	100,000	100,000	1,217	1,165	1,191	1.19	0.50	0.10	0.30	0.07
W-5		7,600	6,650	7,125	1,250	1,237	1,244	1.24	0.20	0.20	0.20	0.08
W-6		49	97	73	1,221	1,206	1,214	1.21	2.40	1.30	1.85	0.08
W-7	PEG	20,800	19,200	20,000	1,429	1,390	1,410	1.41	1.60	0.40	1.00	0.09
W-8		76	64	70	1,350	1,257	1,304	1.30	0.50	0.60	0.55	0.08
W-9	PEG	100,000	100,000	100,000	467	370	419	0.42	4.00	4.20	4.10	0.03
W-10	PEG	37,500	36,000	36,750	1,296	1,276	1,286	1.29	1.80	0.40	1.10	0.08
W-11	INV	50	50	50	1,047	1,039	1,039	1.04	3.40	2.40	2.90	0.07
W-12		80	90	85	1,245	1,252	1,249	1.25	0.20	0.10	0.15	0.08
W-13	DZ	33	33	33	1,232	1,263	1,248	1.25	1.50	1.50	1.50	0.08
W-14	DZ	33	33	33	1,035	1,035	1,035	1.04	3.60	3.50	3.55	0.07
W-15	BL											
W-16	DZ	46	46	46	1,126	1,125	1,126	1.13	1.80	1.60	1.70	0.07
W-17	L											
W-18		2,500	2,100	2,300	1,534	1,512	1,523	1.52	0.10	0.10	0.10	0.09
W-19		2,000	3,500	2,750	1,514	1,482	1,498	1.50	0.30	0.20	0.25	0.09
W-20	PEG	8,800	8,800	8,800	1,463	1,354	1,409	1.41	0.10	0.10	0.10	0.08
W-21		78,000	78,000	78,000	2,620	2,627	2,624	2.62	4.50	2.30	3.40	0.19
W-22	DUP	78,000	78,000	78,000	2,620	2,627	2,624	2.62	4.50	2.30	3.40	0.19
W-23		100,000	100,000	100,000	1,411	1,332	1,372	1.37	0.50	0.60	0.55	0.08
W-24		630	630	630	1,350	1,375	1,363	1.36	2.00	1.50	1.75	0.09
W-25	DZ	34	34	34	1,164	1,165	1,165	1.16	2.80	2.00	2.40	0.08
W-26	SINV	60	75	68	1,225	1,222	1,224	1.22	2.50	1.50	2.00	0.08
W-27	DZ	61	61	61	1,173	1,175	1,174	1.17	2.60	1.50	2.05	0.08
W-28	SINV	1,540	1,540	1,540	4,088	4,088	4,088	4.09	4.50	4.50	4.50	0.31
W-29		825	880	853	2,995	2,937	2,966	2.97	1.00	0.10	0.55	0.18
W-30	L/INV											
W-31	L											
W-32	L											
W-33	SINV	720	720	720	2,935	2,850	2,893	2.89	1.20	1.60	1.40	0.19
W-34	PEG	70,000	63,000	66,500	1,313	1,361	1,337	1.34	0.10	0.10	0.10	0.08
W-35		88	94	91	1,645	1,600	1,623	1.62	0.30	0.20	0.25	0.10



WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL			BAG TEMPERATURE				LABORATORY DATA									
ID	Code	Initial (F)	Final (F)	Avg. (F)	Temp deg R		NMOG		METHANE		THC					
							ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as C3H8)	ppmw (as C3H8)
V-111		155	164	160	619		59.00	92.27	7.10	4.03	NA	22.00	NA	22.00	NA	96.30
V-112	BL						NA	0.00	9.70	147.92		35.00		35.00		54.88
W-1	ACCY	64	69	67	526		NA	0.00	260.00							
W-2	INV	71	70	70	530		NA	0.00	3.80	2.17		0.64		0.64		1.01
W-3	SINV	70	71	70	530		NA	44.75	120.00	68.45		72.00		72.00		113.20
W-4	PEG	81	81	81	541		9,500.00	14,945.45	400,000.00	228,310.99		NA		243,256.44		243,256.44
W-5		72	71	72	531		5,500.00	8,653.86	4,600.00	2,625.95		NA		11,279.81		11,279.81
W-6		72	72	72	531		7.60	11.93	15.00	8.54		NA		20.47		20.47
W-7	PEG	69	68	69	528		1,100.00	1,728.81	7,300.00	4,162.54		NA		5,891.35		5,891.35
W-8		68	69	68	528		16.00	25.16	80.00	45.65		NA		70.81		70.81
W-9	PEG	75	75	75	534		270,000.00	422,486.04	470,000.00	266,825.82		NA		689,311.85		689,311.85
W-10	PEG	71	67	69	529		6,400.00	10,057.09	6,200.00	3,534.81		NA		13,591.90		13,591.90
W-11	INV	80	84	82	542		12.00	18.81	6.60	3.75		NA		22.56		22.56
W-12		74	75	74	534		13.00	20.46	0.00	0.00		NA		20.46		20.46
W-13	DZ	77	73	75	535		NA	0.07	0.00	0.00		0.0475		0.0475		0.07
W-14	DZ	78	82	80	540		NA	0.07	0.00	0.00		0.0475		0.0475		0.07
W-15	BL						NA	0.00	0.00	0.00		0.0000		0.0000		0.00
W-16	DZ	66	66	66	526		NA	0.07	0.00	0.00		0.0475		0.0475		0.07
W-17	L															
W-18		66	65	66	525		1,400.00	2,203.11	13.00	7.42		NA		2,210.54		2,210.54
W-19		61	62	62	521		3,600.00	5,663.94	0.00	0.00		NA		5,663.94		5,663.94
W-20	PEG	66	66	66	526		5,500.00	8,655.09	0.00	0.00		NA		8,655.09		8,655.09
W-21		86	90	88	548		30,000.00	46,989.34	6.50	3.69		NA		46,989.34		46,989.34
W-22	DUP	86	90	88	548		26,000.00	40,724.10	3.50	1.99		NA		40,726.09		40,726.09
W-23		88	89	89	548		18,000.00	28,307.65	10.00	5.71		NA		28,313.36		28,313.36
W-24		87	88	88	547		240.00	376.79	0.00	0.00		NA		376.79		376.79
W-25	DZ	78	78	78	538		NA	0.28	0.00	0.00		0.18		0.18		0.28
W-26	SINV	77	82	80	539		9.20	14.44	0.00	0.00		NA		14.44		14.44
W-27	DZ	69	76	73	532		NA	0.08	0.00	0.00		0.05		0.05		0.08
W-28	SINV	112	112	112	572		2,900.00	4,535.25	18.00	10.21		NA		4,545.46		4,545.46
W-29		213	231	222	682		1,200.00	1,867.18	0.00	0.00		NA		1,867.18		1,867.18
W-30	L/INV															
W-31	L															
W-32	L															
W-33	SINV	163	180	172	631		1,000.00	1,570.75	0.00	0.00		NA		1,570.75		1,570.75
W-34	PEG	82	83	83	542		1,200.00	1,888.38	35,000.00	19,982.89		NA		21,871.27		21,871.27
W-35		81	77	79	539		8.90	14.00	0.00	0.00		NA		14.00		14.00



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WSPA EMISSION RATE CALCULATION SPREADSHEET SORTED BY CATEGORY AND CORRECTED SCREENING VALUE

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SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE						
		MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW fraction Bag	MW Bag	NMOC			Methane			THC
								(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/yr)
V-111	Code	1.4	0.0000		95.5	26.8	28.20	2.03E-04	1.78E+00	6.87E-06	7.77E-02	2.12E-04	1.86E+00	
V-112	BL													
W-1	ACCY	0.8	0.0015	97.4	27.3	28.12		0.00E+00	0.00E+00	2.67E-05	2.34E-01	9.91E-06	8.68E-02	
W-2	INV	0.3	0.0000	99.0	27.7	28.06		0.00E+00	0.00E+00	6.77E-07	5.93E-03	3.14E-07	2.75E-03	
W-3	SINV	0.2	0.0032	99.3	27.8	28.05		1.40E-05	1.23E-01	2.14E-05	1.88E-01	3.55E-05	3.11E-01	
W-4	PEG	0.1	0.0000	99.7	27.9	28.03		2.72E-03	2.38E+01	4.15E-02	3.64E+02	4.42E-02	3.87E+02	
W-5		0.1	0.0000	99.8	28.0	28.03		1.66E-03	1.46E+01	5.05E-04	4.42E+00	2.17E-03	1.90E+01	
W-6		0.6	0.0000	98.2	27.5	28.09		2.44E-06	2.13E-02	1.74E-06	1.53E-02	4.18E-06	3.66E-02	
W-7	PEG	0.3	0.0000	99.0	27.7	28.06		3.94E-04	3.46E+00	9.50E-04	8.32E+00	1.34E-03	1.18E+01	
W-8		0.2	0.0000	99.5	27.9	28.04		5.19E-06	4.55E-02	9.42E-06	8.25E-02	1.46E-05	1.28E-01	
W-9	PEG	1.3	0.0000	95.9	26.9	28.18		3.36E-02	2.94E+02	2.12E-02	1.86E+02	5.48E-02	4.80E+02	
W-10	PEG	0.4	0.0000	98.9	27.7	28.06		2.10E-03	1.84E+01	7.39E-04	6.47E+00	2.84E-03	2.49E+01	
W-11	INV	0.9	0.0000	97.1	27.2	28.14		3.42E-06	2.99E-02	6.82E-07	5.97E-03	4.10E-06	3.59E-02	
W-12		0.0	0.0000	99.9	28.0	28.03		3.92E-06	3.43E-02	0.00E+00	0.00E+00	3.92E-06	3.43E-02	
W-13	DZ	0.5	0.0000	98.5	27.6	28.08		1.53E-08	1.34E-04	0.00E+00	0.00E+00	1.53E-08	1.34E-04	
W-14	DZ	1.1	0.0000	96.4	27.0	28.16		1.40E-08	1.23E-04	0.00E+00	0.00E+00	1.40E-08	1.23E-04	
W-15	BL	0.0	0.0000	100.0	28.0	28.02								
W-16	DZ	0.5	0.0000	98.3	27.5	28.09		1.42E-08	1.24E-04	0.00E+00	0.00E+00	1.42E-08	1.24E-04	
W-17	L													
W-18		0.0	0.0000	99.9	28.0	28.02		5.22E-04	4.57E+00	1.76E-06	1.54E-02	5.24E-04	4.59E+00	
W-19		0.1	0.0000	99.8	27.9	28.03		1.34E-03	1.17E+01	0.00E+00	0.00E+00	1.34E-03	1.17E+01	
W-20	PEG	0.0	0.0000	99.9	28.0	28.02		1.89E-03	1.66E+01	0.00E+00	0.00E+00	1.89E-03	1.66E+01	
W-21		1.1	0.0000	96.6	27.1	28.16		2.19E-02	1.92E+02	1.72E-06	1.51E-02	2.19E-02	1.92E+02	
W-22	DUP	1.1	0.0000	96.6	27.1	28.16		1.90E-02	1.67E+02	9.29E-07	8.14E-03	1.90E-02	1.67E+02	
W-23		0.2	0.0000	99.5	27.9	28.04		5.92E-03	5.18E+01	1.19E-06	1.04E-02	5.92E-03	5.18E+01	
W-24		0.6	0.0000	98.3	27.5	28.09		8.34E-05	7.31E-01	0.00E+00	0.00E+00	8.34E-05	7.31E-01	
W-25	DZ	0.8	0.0000	97.6	27.3	28.12		5.63E-08	4.93E-04	0.00E+00	0.00E+00	5.63E-08	4.93E-04	
W-26	SINV	0.6	0.0000	98.0	27.5	28.10		2.95E-06	2.59E-02	0.00E+00	0.00E+00	2.95E-06	2.59E-02	
W-27	DZ	0.7	0.0000	97.9	27.4	28.10		1.56E-08	1.37E-04	0.00E+00	0.00E+00	1.56E-08	1.37E-04	
W-28	SINV	1.4	0.0000	95.5	26.8	28.20		3.38E-03	2.96E+01	7.61E-06	6.86E-02	3.38E-03	2.97E+01	
W-29		0.2	0.0000	99.5	27.9	28.04		6.86E-04	6.01E+00	0.00E+00	0.00E+00	6.86E-04	6.01E+00	
W-30	L/INV													
W-31	L													
W-32														
W-33	SINV	0.4	0.0000	98.6	27.6	28.08		6.28E-04	5.50E+00	0.00E+00	0.00E+00	6.28E-04	5.50E+00	
W-34	PEG	0.0	0.0000	99.9	28.0	28.02		3.80E-04	3.33E+00	4.03E-03	3.53E+01	4.41E-03	3.88E+01	
W-35		0.1	0.0000	99.8	27.9	28.03		3.47E-06	3.04E-02	0.00E+00	0.00E+00	3.47E-06	3.04E-02	

Response factor = 1.0 and gas constant = 4.836E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		COMMENTS
ID	Code	Comments
V-111		
V-112	BL	
W-1	ACCY	Leaking canister.
W-2	INV	Probable canister leak.
W-3	SINV	Screening concentration not steady. SV varied by a factor of 5.
W-4	PEG	
W-5		
W-6		
W-7	PEG	
W-8		
W-9	PEG	
W-10	PEG	
W-11	INV	Appears canister leaked.
W-12		Final screening value fluctuating.
W-13	DZ	
W-14	DZ	
W-15	BL	
W-16	DZ	
W-17	L	Reported with sample W018.
W-18		Liquid sample W017 taken.
W-19		
W-20	PEG	
W-21		SV 2 inches away from seal.
W-22	DUP	Duplicate of W021.
W-23		
W-24		
W-25	DZ	Plug.
W-26	SINV	SV varied by a factor of 2.5.
W-27	DZ	
W-28	SINV	SV varied by a factor of 3.75. Liquid sample W030 taken.
W-29		Liquid sample W031 taken.
W-30	L/INV	Reported with sample W028.
W-31	L	Reported with sample W029.
W-32	L	Reported with sample W033.
W-33	SINV	SV varied by a factor of 2.8. Liquid sample W032 taken.
W-34	PEG	
W-35		Liquid sample W037 taken.

SAMPLE CONTROL			AMBIENT CONDITIONS			COMPONENT DATA				STREAM CHARACTERISTICS		
ID	Code		Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product
W-36	DZ		0.0	67		VALVE	0.50	GATE	M		LL	
W-37	L			67								
W-38			1.5	71		VALVE	2.00	GATE	M		LL	D B
W-39	L			71								
W-40	DZ		5.5	71		VALVE	10.00	GATE	M		LL	
W-41	SINV		5.5	70		VALVE	10.00	GATE	M		LL	
W-42			0.0	76		PUMP	3.00	HC			HL	
W-43	DZ		0.0	76		VALVE	0.50	GATE	M		HL	
W-44			0.0	70		VALVE	0.50	GATE	M		LL	Crude naptha
W-45	DZ		0.0	71		OEL	0.50	OEL			HL	
W-46	L			70								
W-47	L			68								
W-48			1.5	68		VALVE	3.00	GATE	M		LL	Crude naptha
W-49	DZ		2.5	71		VALVE	1.00	GATE	M		HL	
W-50	DZ/DUP		2.5	71		VALVE	1.00	GATE	M		HL	
W-51	DZ		4.5	70		PUMP	4.00	VERT			HL	
W-52			2.5	74		VALVE	8.00	GATE	M		GAS	Gas oil
W-53			2.5	71		VALVE	8.00	MC	C		GAS	Sour gas
W-54	DZ		1.5	65		VALVE	0.75	GATE	M		LL	Sour gas
W-55			2.5	68		VALVE	8.00	MC	C		HL	
W-56	L			68								
W-57			1.5	70		VALVE	8.00	GATE	M		HL	
W-58	L/INV			70								
W-59	L			70								
W-60	DZ		2.5	75		VALVE	0.75	GATE	M		HL	Diesel
W-61	DZ		2.5	71		VALVE	0.75	GATE	M		HL	Diesel
W-62			0.0	62		VALVE	4.00	GATE	M		HL	Diesel
W-63			1.5	71		VALVE	0.75	GATE	M		HL	Diesel
W-64	DINV		1.5	71		OEL	0.50	OEL			HL	Diesel
W-65	L			62								
W-66	L			71								
W-67	L			71								
W-68	SINV		0.0	71		PUMP	4.00	HC			HL	Jet fuel
W-69	L			71								
W-70			0.0	71		VALVE	8.00	GATE	M		LL	Reg UL
W-71	L			71								
W-72	PEGF/SINV		1.5	74		C	8.00	TH			LL	Reg UL

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		SCREENING DATA											
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
W-36	DZ		9				8					9	0
W-37	L												
W-38			30				40				35	9	26
W-39	L												
W-40	DZ		6				5				6	6	0
W-41	SINV		10				30				20	5	15
W-42			13				16				15	5	10
W-43	DZ		8				3						
W-44			50				65				58	11	47
W-45	DZ		14				15				15	15	0
W-46	L												
W-47	L												
W-48			90				90				90	10	80
W-49	DZ		7				7				7	7	0
W-50	DZ/DUP		7				7				7	7	0
W-51	DZ		7				7				7	7	0
W-52			30				50				40	7	33
W-53			3,000				4,000				3,500	7	3,493
W-54	DZ		9				8				9	9	0
W-55		200	25				35				30	7	24
W-56	L												
W-57		300	40				30				35	7	28
W-58	L/INV												
W-59	L												
W-60	DZ		6				6				6	6	0
W-61	DZ		6				6				6	6	0
W-62			40				40				40	9	31
W-63			25				35				30	8	22
W-64	DINV		110				100				105	6	99
W-65	L												
W-66	L												
W-67	L												
W-68	SINV		130				450				290	9	281
W-69	L												
W-70			17,000				34,000				25,500	10	25,490
W-71	L												
W-72	PEGF/SINV		48,000				100,000				74,000	8	73,992

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg ppm	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
W-36	DZ	80	80	80	1,980	1,983	1,982	1.98	0.50	0.20	0.35	0.12
W-37	L											
W-38												
W-39	L											
W-40	DZ	65	65	65	3,535	3,550	3,543	3.54	4.00	3.80	3.90	0.26
W-41	SINV	45	50	48	3,574	3,539	3,557	3.56	3.60	2.10	2.85	0.25
W-42		100	140	120	4,245	4,245	4,245	4.25	4.40	4.80	4.60	0.33
W-43	DZ	33	24	29	1,527	1,519	1,523	1.52	2.50	2.30	2.40	0.10
W-44		272	308	289	2,026	2,016	2,021	2.02	0.50	0.20	0.35	0.12
W-45	DZ	140	160	150	975	972	974	0.97	2.30	2.10	2.20	0.07
W-46	L											
W-47	L											
W-48		63	144	104	2,973	3,002	2,988	2.99	2.70	1.10	1.90	0.20
W-49	DZ	126	126	126	2,041	2,033	2,037	2.04	0.30	0.20	0.25	0.12
W-50	DZ/DUP	126	126	126	2,041	2,033	2,037	2.04	0.30	0.20	0.25	0.12
W-51	DZ	114	114	114	4,085	4,088	4,087	4.09	5.00	4.00	4.50	0.31
W-52		108	108	108	3,704	3,687	3,696	3.70	4.80	1.10	2.95	0.26
W-53		4,000	4,000	4,000	2,409	2,402	2,406	2.41	4.70	0.50	2.60	0.16
W-54	DZ	60	60	60	853	867	860	0.86	0.80	0.80	0.80	0.05
W-55		50	50	50	3,070	3,070	3,070	3.07	4.20	1.20	2.70	0.21
W-56	L											
W-57		90	60	75	3,050	3,170	3,110	3.11	4.20	1.60	2.90	0.22
W-58	L/INV											
W-59	L											
W-60	DZ	55	66	61	1,178	1,189	1,184	1.18	1.30	0.30	0.80	0.07
W-61	DZ	78	78	78	1,215	1,231	1,223	1.22	0.50	0.20	0.35	0.07
W-62		70	70	70	2,211	2,218	2,215	2.21	1.20	0.10	0.65	0.14
W-63		91	91	91	947	946	947	0.95	3.00	3.70	3.35	0.07
W-64	DINV	150	150	150	947	939	943	0.94	4.00	3.80	3.90	0.07
W-65	L											
W-66	L											
W-67	L											
W-68	SINV	160	144	152	2,407	2,407	2,407	2.41	0.40	0.30	0.35	0.15
W-69	L											
W-70		27,200	40,800	34,000	3,820	3,830	3,825	3.83	4.60	2.00	3.30	0.27
W-71	L											
W-72	PEGF/SINV	1,680	1,960	1,820	2,009	1,985	1,997	2.00	1.10	0.30	0.70	0.12

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL			BAG TEMPERATURE				LABORATORY DATA						
ID	Code	Initial (F)	Final (F)	Avg. (F)	Temp deg R	ppmv (as C3H8)	NMOC ppmw (as C3H8)	METHANE ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	THC ppmw (as C3H8)		
W-36	DZ	70	70	70	530	NA	0.08	0.00	0.00	0.05	0.08		
W-37	L												
W-38		74	74	74	534	9.10	14.32	0.00	0.00	NA	14.32		
W-39	L												
W-40	DZ	72	71	72	531	NA	0.07	0.00	0.00	0.05	0.07		
W-41	SINV	74	76	75	535	4.70	7.37	0.00	0.00	NA	7.37		
W-42		115	115	115	575	4.40	6.88	0.00	0.00	NA	6.88		
W-43	DZ	79	79	79	539	13.00	20.39	0.00	0.00	NA	20.39		
W-44		74	74	74	534	3.00	4.72	0.00	0.00	NA	4.72		
W-45	DZ	86	93	90	549	NA	0.08	0.00	0.00	0.05	0.08		
W-46	L												
W-47	L												
W-48		70	74	72	532	14.00	21.97	0.00	0.00	NA	21.97		
W-49	DZ	77	78	78	537	NA	0.07	0.00	0.00	0.05	0.07		
W-50	DZ/DUP	77	78	78	537	NA	0.08	0.00	0.00	0.05	0.08		
W-51	DZ	120	128	124	584	NA	0.08	0.00	0.00	0.05	0.08		
W-52		137	137	137	597	7.70	12.07	0.00	0.00	NA	12.07		
W-53		84	91	88	547	2,100.00	3,292.98	540.00	307.22	NA	3,600.19		
W-54	DZ	67	69	68	528	NA	0.07	0.00	0.00	0.05	0.07		
W-55		78	81	80	539	11.00	17.25	0.00	0.00	NA	17.25		
W-56	L												
W-57		79	80	80	539	9.90	15.52	0.00	0.00	NA	15.52		
W-58	L/INV												
W-59	L												
W-60	DZ	81	82	82	541	NA	0.08	0.00	0.00	0.05	0.08		
W-61	DZ	82	84	83	543	NA	0.08	0.00	0.00	0.05	0.08		
W-62		74	73	74	533	NA	1.57	0.00	0.00	1.00	1.57		
W-63		78	78	78	538	NA	0.96	0.00	0.00	0.61	0.96		
W-64	DINV	81	81	81	541	6.90	10.80	0.00	0.00	NA	10.80		
W-65	L												
W-66	L												
W-67	L												
W-68	SINV	73	76	75	534	3.40	5.35	0.00	0.00	NA	5.35		
W-69	L												
W-70		72	74	73	533	35,000.00	54,828.65	0.00	0.00	NA	54,828.65		
W-71	L												
W-72	PEGF/SINV	82	83	83	542	2,800.00	4,402.47	9.50	5.42	NA	4,407.89		

WSPA EMISSION RATE CALCULATION SPREADSHEET SORTED BY CATEGORY AND CORRECTED SCREENING VALUE

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SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE					
ID	Code	MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW Bag		NMOC (lb/hr)	(lb/yr)	Methane (lb/hr)	(lb/yr)	THC (lb/hr)	(lb/yr)
W-36	DZ	0.1	0.0000	99.6	27.9	28.03		2.43E-08	2.13E-04	0.00E+00	0.00E+00	2.43E-08	2.13E-04
W-37	L												
W-38													
W-39	L	0.1	0.0000	99.7	27.9	28.03		4.49E-06	3.93E-02	0.00E+00	0.00E+00	4.49E-06	3.93E-02
W-40	DZ	1.2	0.0000	96.1	26.9	28.18		4.72E-08	4.13E-04	0.00E+00	0.00E+00	4.72E-08	4.13E-04
W-41	SINV	0.9	0.0000	97.2	27.2	28.13		4.63E-06	4.05E-02	0.00E+00	0.00E+00	4.63E-06	4.05E-02
W-42		1.5	0.0000	95.4	26.7	28.20		5.33E-06	4.67E-02	0.00E+00	0.00E+00	5.33E-06	4.67E-02
W-43	DZ	0.8	0.0000	97.6	27.3	28.12		5.31E-06	4.65E-02	0.00E+00	0.00E+00	5.31E-06	4.65E-02
W-44		0.1	0.0000	99.7	27.9	28.03		1.48E-06	1.30E-02	0.00E+00	0.00E+00	1.48E-06	1.30E-02
W-45	DZ	0.7	0.0000	97.8	27.4	28.11		1.27E-08	1.11E-04	0.00E+00	0.00E+00	1.27E-08	1.11E-04
W-46	L												
W-47	L												
W-48		0.6	0.0000	98.1	27.5	28.10		1.11E-05	9.70E-02	0.00E+00	0.00E+00	1.11E-05	9.70E-02
W-49	DZ	0.1	0.0000	99.7	27.9	28.03		2.33E-08	2.04E-04	0.00E+00	0.00E+00	2.33E-08	2.04E-04
W-50	DZ/DUP	0.1	0.0000	99.7	27.9	28.03		2.46E-08	2.15E-04	0.00E+00	0.00E+00	2.46E-08	2.15E-04
W-51	DZ	1.4	0.0000	95.5	26.8	28.20		5.70E-08	4.99E-04	0.00E+00	0.00E+00	5.70E-08	4.99E-04
W-52		0.9	0.0000	97.1	27.2	28.14		7.10E-06	6.22E-02	0.00E+00	0.00E+00	7.10E-06	6.22E-02
W-53		0.8	0.0000	97.4	27.3	28.12		1.35E-03	1.18E+01	1.26E-04	1.10E+00	1.47E-03	1.29E+01
W-54	DZ	0.3	0.0000	99.2	27.8	28.05		1.03E-08	9.02E-05	0.00E+00	0.00E+00	1.03E-08	9.02E-05
W-55		0.9	0.0000	97.3	27.3	28.13		9.20E-06	8.06E-02	0.00E+00	0.00E+00	9.20E-06	8.06E-02
W-56	L												
W-57		0.9	0.0000	97.1	27.2	28.14		8.48E-06	7.43E-02	0.00E+00	0.00E+00	8.48E-06	7.43E-02
W-58	L/INV												
W-59	L												
W-60	DZ	0.3	0.0000	99.2	27.8	28.05		1.45E-08	1.27E-04	0.00E+00	0.00E+00	1.45E-08	1.27E-04
W-61	DZ	0.1	0.0000	99.6	27.9	28.03		1.47E-08	1.28E-04	0.00E+00	0.00E+00	1.47E-08	1.28E-04
W-62		0.2	0.0000	99.3	27.8	28.05		5.48E-07	4.80E-03	0.00E+00	0.00E+00	5.48E-07	4.80E-03
W-63		1.1	0.0000	96.6	27.1	28.15		1.63E-07	1.43E-03	0.00E+00	0.00E+00	1.63E-07	1.43E-03
W-64	DINV	1.2	0.0000	96.1	26.9	28.18		1.89E-06	1.66E-02	0.00E+00	0.00E+00	1.89E-06	1.66E-02
W-65	L												
W-66	L												
W-67	L												
W-68	SINV	0.1	0.0000	99.7	27.9	28.03		1.99E-06	1.75E-02	0.00E+00	0.00E+00	1.99E-06	1.75E-02
W-69	L												
W-70		1.1	0.0000	96.7	27.1	28.15		3.82E-02	3.34E+02	0.00E+00	0.00E+00	3.82E-02	3.34E+02
W-71	L												
W-72	PEG/SINV	0.2	0.0000	99.3	27.8	28.05		1.37E-03	1.20E+01	1.68E-06	1.47E-02	1.37E-03	1.20E+01

Response factor = 1.0 and gas constant = 4.936E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		COMMENTS
ID	Code	Comments
W-36	DZ	
W-37	L	Reported with sample W035.
W-38		Liquid sample W039 taken.
W-39	L	Reported with sample W038.
W-40	DZ	
W-41	SINV	SV varied by a factor of 3.
W-42		
W-43	DZ	SV varied by a factor of 3.2.
W-44		Liquid sample W046 taken.
W-45	DZ	
W-46	L	Reported with sample W044.
W-47	L	Reported with sample W048.
W-48		Variable bagged THC and O2 concentration. Liquid sample W047 taken.
W-49	DZ	
W-50	DZ/DUP	Duplicate of W049.
W-51	DZ	
W-52		
W-53		
W-54	DZ	
W-55		Liquid sample W056 taken.
W-56	L	Reported with sample W055.
W-57		Changed product half way through bag. Diesel running through during bag sample (1204 - 1205). Liquid samples W058 and W059 taken.
W-58	L/INV	Not enough liquid to fill vial. Reported with sample W057.
W-59	L	Reported with sample W057.
W-60	DZ	
W-61	DZ	
W-62		O2 went from 1.2% to 0.1%. Liquid sample W065 taken.
W-63		Liquid sample W066 taken.
W-64	DINV	Appears Nitrogen flow is preventing THC emissions. Liquid sample W067 taken.
W-65	L	Reported with sample W062.
W-66	L	Reported with sample W063.
W-67	L	Reported with sample W064.
W-68	SINV	SV varied by a factor of 3.5. Liquid sample W069 taken.
W-69	L	Reported with sample W068. Not enough liquid to fill.
W-70		SV varied by a factor of 2. Liquid sample W071 taken.
W-71	L	Reported with sample W070.
W-72	PEGF/SINV	SV varied by more than a factor of 2.

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Documents

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WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL			AMBIENT CONDITIONS			COMPONENT DATA				STREAM CHARACTERISTICS		
ID	Code		Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product
W-73	L			74		PUMP	2.00	VERT			LL	D B
W-74			3.5	75		C	1.00	TH			LL	D B/Gasoline/LCO
W-75	DZ		4.5	77		PUMP	2.00	VERT		N	LL	D B/LCO
W-76			5.5	72		PUMP	6.00	HC			LL	Naptha
W-77			12.5	65		VALVE	3.00	GATE	M		LL	Butane
W-78	DZ		12.5	69		OEL	0.50	OEL			LL	Butane
W-79	DZ		12.5	67		VALVE	3.00	GATE	M		LL	Butane
W-80			12.5	67		OEL	0.75	OEL			HL	
W-81	DZ		12.5	69		VALVE	8.00	GATE	M		LL	Naptha
W-82			1.5	58		VALVE	8.00	GATE	M		LL	Naptha
W-83	DUP		1.5	58		VALVE	8.00	GATE	M		LL	Naptha
W-84	AUTD		1.5	58		VALVE	8.00	GATE	M		LL	Naptha
W-85	L		1.5	58			6.00	GATE	M		LL	Naptha
W-86			3.5	57		VALVE	4.00	GATE	M		LL	Naptha
W-87	L		3.5	57							LL	Naptha
W-88			5.5	61							LL	Naptha
W-89	L											
W-90	SINV		5.5	63		OEL	0.75	OEL			LL	Platformate
W-91	SINV		5.5	64		OEL	0.50	OEL			LL	Platformate
W-92	L		5.5	64							LL	Platformate
W-93			3.5	64		C	0.50	TH			LL	HC
W-94			5.5	67		VALVE	0.75	GATE	M		GAS	OVHD gas
W-95	DZ		0.0	66		VALVE	4.00	MC	C		GAS	Fuel gas
W-96			1.5	58		VALVE	4.00	MC	C		HL	Jet fuel
W-97			1.5	64		VALVE	1.00	MC	C		LL	Naptha
W-98			5.5	64		VALVE	3.00	MC	C		GAS	Fuel gas
W-99	AUTD		5.5	64		VALVE	3.00	MC	C		GAS	Fuel gas
W-100	DZ		5.5	63		VALVE	3.00	MC	C		GAS	Fuel gas
W-101			4.5	66		PUMP	1.50	VERT			LL	Naptha
W-102			4.5	64		OEL	0.50	OEL			LL	Naptha
W-103	L		4.5	66							LL	Naptha
W-104	L		4.5	64							LL	Naptha
W-105	BL											
W-106	PEGI		1.5	59		VALVE	3.00	MC	C		GAS	Treated fuel gas
W-107	DZ		0.0	64		VALVE	6.00	GATE	M		GAS	Treated fuel gas
W-108	DZ		0.0	65		OEL	0.50	OEL			GAS	Treated fuel gas
W-109	PEG		0.0	63		C	0.75	TH			LL	LPG (butane)

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			SCREENING DATA										
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
W-73	L		6,000				5,500				5,750	5	5,746
W-74			8				5				6	6	0
W-75	DZ		120				140				130	4	126
W-76			50				90				70	4	66
W-77	DZ		5				4				5	5	0
W-78	DZ		4				4				4	4	0
W-79	DZ		42,000				28,000				35,000	4	34,997
W-80			4				4				4	4	0
W-81	DZ		3,000	700	300	350	2,500	1,000	1,000	300	2,750	14	2,736
W-82	DUP		3,000	700	300	350	2,500	1,000	1,000	300	2,750	14	2,736
W-83	AUDTD		3,000	700	300	350	2,500	1,000	1,000	300	2,750	14	2,736
W-84	L		700	140	25	25	1,100	700	160	50	900	6	894
W-85	L		50	9	5	10	80	10	7	12	65	5	60
W-86	L		150				60				105	5	100
W-87	SINV		2,000				4,500				3,250	7	3,243
W-88	SINV												
W-89	L		49,700	31,500	17,500	21,700	56,000	38,500	38,500	42,000	52,850	7	52,843
W-90	L		14	8	8	14	20	20	14	20	17	6	11
W-91	DZ		4	4	4	4	4	4	4	4	4	4	0
W-92			650	400	350	400	400	400	300	400	525	20	505
W-93			500	400	250	250	800	100	120	100	650	4	646
W-94			110	100	80	35	100	40	35	35	105	5	100
W-95	AUDTD		110	100	80	35	100	40	35	35	105	5	100
W-96	DZ		4	4	4	4	3	3	3	3	3	3	0
W-97			8	8	4	8	7	6	5	7	8	3	5
W-98			600				450				525	3	523
W-99	L												
W-100	L												
W-101	BL												
W-102	PEGI		80,000	32,000	9,600	1,280	48,000	8,000	16,000	400	64,000	5	63,996
W-103	DZ		4	4	4	4	4	4	4	4	4	4	0
W-104	DZ		3	3	3	3	3				3	3	0
W-105	PEG		100,000	20,000	100,000	50,000	100,000	60,000	90,000	20,000	100,000	3	99,997

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg (ppm)	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
W-73	L	8,400	9,800	9,100	3,635	3,603	3,619	3.62	4.50	2.30	3.40	0.26
W-74		84	84	84	1,047	1,043	1,045	1.05	2.80	3.00	2.90	0.07
W-75	DZ	144	120	132	3,969	4,082	4,026	4.03	3.10	1.20	2.15	0.27
W-76		1,200	1,200	1,200	4,256	4,241	4,249	4.25	0.80	0.30	0.55	0.26
W-77	DZ	50	35	43	3,176	3,145	3,161	3.16	3.60	0.30	1.95	0.21
W-78	DZ	40	30	35	832	826	829	0.83	4.00	4.40	4.20	0.06
W-80		1,000	1,000	1,000	3,464	3,450	3,457	3.46	2.10	0.40	1.25	0.22
W-81	DZ	35	35	35	1,297	1,297	1,297	1.30	0.40	0.10	0.25	0.08
W-82		306	324	315	6,192	6,192	6,192	6.19	2.30	0.80	1.55	0.40
W-83	DUP	306	324	315	6,192	6,192	6,192	6.19	2.30	0.80	1.55	0.40
W-84	AUDTD	306	324	315	6,192	6,192	6,192	6.19	2.30	0.80	1.55	0.40
W-85	L	230	270	250	4,901	4,829	4,865	4.87	3.90	1.60	2.75	0.34
W-86		90	54	72	4,763	4,694	4,729	4.73	1.40	0.30	0.85	0.30
W-87	L	50	55	52	988	983	986	0.99	0.60	0.60	0.60	0.06
W-88	SINV	675	648	662	1,131	1,131	1,131	1.13	0.30	0.20	0.25	0.07
W-89	L	8,000	13,600	10,800	1,124	1,126	1,125	1.13	0.20	0.20	0.20	0.07
W-90		64	44	54	1,156	1,130	1,143	1.14	0.50	0.30	0.40	0.07
W-91	DZ	36	36	36	3,859	3,851	3,855	3.86	1.30	0.20	0.75	0.24
W-92		504	441	473	2,069	2,051	2,060	2.06	1.30	0.30	0.80	0.13
W-93		126	144	135	1,502	1,498	1,500	1.50	0.90	0.80	0.85	0.09
W-94		72	72	72	2,373	2,373	2,373	2.37	1.30	0.30	0.80	0.15
W-95	AUDTD	72	72	72	2,373	2,373	2,373	2.37	1.30	0.30	0.80	0.15
W-96	DZ	29	27	28	2,373	2,368	2,371	2.37	0.30	0.20	0.25	0.14
W-97		45	41	43	4,926	4,951	4,939	4.94	3.40	1.80	2.60	0.34
W-98		63	49	56	1,001	1,015	1,008	1.01	0.60	0.30	0.45	0.06
W-99	L											
W-100	L											
W-101	BL											
W-102	PEGI	7,200	7,200	7,200	2,276	2,270	2,273	2.27	1.60	0.30	0.95	0.14
W-103	DZ	32	24	28	4,601	4,625	4,613	4.61	1.40	0.30	0.85	0.29
W-104	DZ	27	27	27	902	912	907	0.91	4.60	4.70	4.65	0.07
W-105	PEG	24,000	26,000	25,000	1,166	1,166	1,166	1.17	0.60	0.40	0.50	0.07

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			BAG TEMPERATURE				LABORATORY DATA					
ID	Code		Initial (F)	Final (F)	Avg. (F)	Temp deg R	NMOC		METHANE		THC	
							ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)
W-73	L		94	94	94	554	15,000.00	23,494.67	0.00	0.00	NA	23,494.67
W-74			78	79	79	538	NA	56.43	0.00	0.00	36.00	56.43
W-75	DZ		72	72	72	532	84.00	131.80	0.00	0.00	NA	131.80
W-76			107	107	107	567	1,400.00	2,201.71	5.50	3.14	NA	2,204.84
W-77	DZ		69	68	69	528	NA	2.20	0.00	0.00	1.40	2.20
W-78	DZ		68	70	69	529	NA	0.07	0.00	0.00	0.05	0.07
W-79	DZ		68	69	69	528	870.00	1,366.85	16.00	9.12	NA	1,375.97
W-80			69	69	69	529	NA	1.07	0.00	0.00	0.68	1.07
W-81	DZ		87	88	88	547	NA	580.93	0.00	0.00	370.00	580.93
W-82	DUP		87	88	88	547	NA	628.02	0.00	0.00	400.00	628.02
W-83			87	88	88	547	NA	580.93	0.00	0.00	370.00	580.93
W-84	AUDTD											
W-85	L											
W-86			63	64	64	523	NA	423.23	0.00	0.00	270.00	423.23
W-87	L											
W-88			73	74	74	533	NA	31.44	0.00	0.00	20.00	31.44
W-89	L											
W-90	SINV		76	77	77	536	NA	11.32	0.00	0.00	7.20	11.32
W-91	SINV		64	64	64	524	NA	990.83	0.00	0.00	630.00	990.83
W-92	L											
W-93			66	68	67	527	NA	41,834.15	0.00	0.00	27,000.00	41,834.15
W-94			68	68	68	528	NA	58.20	0.00	0.00	37.00	58.20
W-95	DZ		69	69	69	529	NA	2.20	0.00	0.00	1.40	2.20
W-96			80	88	84	544	NA	220.07	0.00	0.00	140.00	220.07
W-97			65	66	66	525	NA	267.21	0.00	0.00	170.00	267.21
W-98			66	66	66	526	NA	144.08	0.00	0.00	100.00	157.20
W-99	AUDTD		66	66	66	526	NA	40.76	23.00	13.12	35.00	55.02
W-100	DZ		64	63	64	523	NA	69.22	0.00	0.00	44.00	69.22
W-101			78	81	80	539	NA	156.80	0.00	0.00	100.00	156.80
W-102			66	65	66	525	NA	188.73	0.00	0.00	120.00	188.73
W-103	L											
W-104	L											
W-105	BL											
W-106	PEGI		55	57	56	516	NA	3,085.10	3,400.00	1,935.30	3,200.00	5,020.40
W-107	DZ		73	74	74	533	NA	0.11	0.00	0.00	0.07	0.11
W-108	DZ		70	66	68	528	NA	17.20	0.00	0.00	11.00	17.20
W-109	PEG		65	71	68	528	NA	32,634.68	0.00	0.00	21,000.00	32,634.68

WSPA EMISSION RATE CALCULATION SPREADSHEET SORTED BY CATEGORY AND CORRECTED SCREENING VALUE

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SAMPLE CONTROL		MOLECULAR WEIGHT DETERMINATION						EMISSION RATE					
ID	Code	MW fraction O2	MW fraction C3H8	% fraction N2	MW fraction N2	MW fraction N2	MW Bag	NMOC (lb/hr)	NMOC (lb/yr)	Methane (lb/hr)	Methane (lb/yr)	THC (lb/hr)	THC (lb/yr)
W-73	L												
W-74		1.1	0.0000	96.6	27.1	28.16		1.50E-02	1.31E+02	0.00E+00	0.00E+00	1.50E-02	1.31E+02
W-75	DZ	0.9	0.0016	97.1	27.2	28.14		1.04E-05	9.09E-02	0.00E+00	0.00E+00	1.04E-05	9.09E-02
W-76		0.7	0.0000	97.9	27.4	28.11		9.07E-05	7.94E-01	0.00E+00	0.00E+00	9.07E-05	7.94E-01
W-77		0.2	0.0000	99.5	27.9	28.04		1.38E-03	1.21E+01	1.97E-06	1.72E-02	1.38E-03	1.21E+01
W-78	DZ	0.6	0.0001	98.0	27.5	28.10		1.18E-06	1.04E-02	0.00E+00	0.00E+00	1.18E-06	1.04E-02
W-79	DZ	1.3	0.0000	95.8	26.8	28.19		1.19E-08	1.04E-04	0.00E+00	0.00E+00	1.19E-08	1.04E-04
W-80		0.4	0.0000	98.8	27.7	28.07		7.75E-04	6.79E+00	5.17E-06	4.59E-02	7.80E-04	6.89E+00
W-81	DZ	0.1	0.0000	99.7	27.9	28.03		2.16E-07	1.89E-03	0.00E+00	0.00E+00	2.16E-07	1.89E-03
W-82		0.5	0.0163	98.4	27.6	28.09		5.78E-04	5.07E+00	0.00E+00	0.00E+00	5.78E-04	5.07E+00
W-83	DUP	0.5	0.0176	98.4	27.6	28.09		6.25E-04	5.48E+00	0.00E+00	0.00E+00	6.25E-04	5.48E+00
W-84	AUTD	0.5	0.0163	98.4	27.6	28.09		5.78E-04	5.07E+00	0.00E+00	0.00E+00	5.78E-04	5.07E+00
W-85	L												
W-86		0.9	0.0119	97.2	27.2	28.13		3.70E-04	3.24E+00	0.00E+00	0.00E+00	3.70E-04	3.24E+00
W-87	L												
W-88		0.3	0.0009	99.1	27.8	28.05		2.37E-05	2.07E-01	0.00E+00	0.00E+00	2.37E-05	2.07E-01
W-89	L												
W-90	SINV	0.2	0.0003	99.4	27.9	28.04		1.74E-06	1.53E-02	0.00E+00	0.00E+00	1.74E-06	1.53E-02
W-91	SINV	0.1	0.0278	99.7	27.9	28.04		1.76E-04	1.54E+00	0.00E+00	0.00E+00	1.76E-04	1.54E+00
W-92	L												
W-93		0.1	1.1910	97.1	27.2	28.46		7.45E-03	6.53E+01	0.00E+00	0.00E+00	7.45E-03	6.53E+01
W-94		0.1	0.0018	99.6	27.9	28.04		1.05E-05	9.16E-02	0.00E+00	0.00E+00	1.05E-05	9.16E-02
W-95	DZ	0.2	0.0001	99.2	27.8	28.05		1.35E-06	1.19E-02	0.00E+00	0.00E+00	1.35E-06	1.19E-02
W-96		0.3	0.0062	99.2	27.8	28.05		7.06E-05	6.18E-01	0.00E+00	0.00E+00	7.06E-05	6.18E-01
W-97		0.3	0.0075	99.1	27.8	28.06		6.48E-05	5.67E-01	0.00E+00	0.00E+00	6.48E-05	5.67E-01
W-98	AUTD	0.3	0.0044	99.2	27.8	28.05		5.50E-05	4.82E-01	5.01E-06	4.39E-02	6.01E-05	5.26E-01
W-99		0.3	0.0015	99.2	27.8	28.05		1.56E-05	1.36E-01	5.45E-06	4.77E-02	2.10E-05	1.84E-01
W-100	DZ	0.1	0.0019	99.7	27.9	28.03		2.58E-05	2.26E-01	0.00E+00	0.00E+00	2.58E-05	2.26E-01
W-101		0.8	0.0044	97.4	27.3	28.13		1.34E-04	1.17E+00	0.00E+00	0.00E+00	1.34E-04	1.17E+00
W-102		0.1	0.0053	99.5	27.9	28.04		3.01E-05	2.64E-01	0.00E+00	0.00E+00	3.01E-05	2.64E-01
W-103	L												
W-104	L												
W-105	BL												
W-106	PEGI	0.3	0.1412	98.7	27.7	28.11		1.16E-03	1.02E+01	7.29E-04	6.39E+00	1.89E-03	1.66E+01
W-107	DZ	0.3	0.0000	99.1	27.8	28.05		8.08E-08	7.08E-04	0.00E+00	0.00E+00	8.08E-08	7.08E-04
W-108	DZ	1.5	0.0005	95.3	26.7	28.21		3.11E-06	2.72E-02	0.00E+00	0.00E+00	3.11E-06	2.72E-02
W-109	PEG	0.2	0.9263	97.4	27.3	28.38		6.08E-03	5.33E+01	0.00E+00	0.00E+00	6.08E-03	5.33E+01

Response factor = 1.0 and gas constant = 4.836E-05 for emission rate calculation.

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		COMMENTS
ID	Code	Comments
W-73	L	Reported with sample W072.
W-74		
W-75	DZ	Plug.
W-76		
W-77		
W-78	DZ	High O2 variability (factor of 12).
W-79	DZ	
W-80		Initial screening value fluctuating. Final screening is intermittent emitter.
W-81	DZ	
W-82		Liquid sample W085 taken.
W-83	DUP	Duplicate of W082.
W-84	AUTD	Sample to RTI. Duplicate of W082.
W-85	L	Reported with sample W082.
W-86		Intermittent emitter. Liquid sample W087 taken.
W-87	L	Reported with sample W086.
W-88		Liquid sample W089 taken.
W-89	L	Reported with sample W088.
W-90	SINV	SV varied by a factor of 2.5.
W-91	SINV	Liquid sample W092 taken. SV varied by a factor of 2.25
W-92	L	Reported with sample W091.
W-93		Plug.
W-94		
W-95	DZ	
W-96		Initial screening response time very slow - HL.
W-97		
W-98		Restart bag due to emergency.
W-99	AUTD	Sample to RTI. Duplicate of W098.
W-100	DZ	
W-101		Liquid sample W103 taken.
W-102		Liquid sample W104 taken. Final QC 1000ppm.
W-103	L	Reported with sample W101.
W-104	L	Reported with sample W102.
W-105	BL	
W-106	PEGI	Intermittent emitter.
W-107	DZ	
W-108	DZ	
W-109	PEG	

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Documents

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WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL			AMBIENT CONDITIONS			COMPONENT DATA			STREAM CHARACTERISTICS		
ID	Code	Windspeed (mph)	Temp. (F)	Barometric Pressure (Hg)	Category	Size (Inches)	Type	Valve Actuation	Load Y/N	Service	Product
W-110		1.5	66		C	1.00	TH			LL	LPG
W-111		1.5	62		VALVE	8.00	GATE	M		LL	LPG
W-112	DUP	1.5	62		VALVE	8.00	GATE	M		LL	LPG
W-113	AUDTD	1.5	62		VALVE	8.00	GATE	M		LL	LPG
W-114	PEGI/SINV	1.5	65		VALVE	8.00	GATE	M		LL	Gasoline
W-115		1.5	65		VALVE	8.00	GATE	M		LL	Gasoline
W-116	L	1.5	65		VALVE	8.00	GATE	M		LL	Gasoline
W-117	L	1.5	65		VALVE	8.00	GATE	M		LL	Gasoline
W-118	SINV	1.5	55		PUMP	4.00	HC		N	LL	Coker naptha
W-119		1.5	54		VALVE	1.50	MC	C		HL	Coker naptha
W-120		1.5	57		VALVE	3.00	MC	C		HL	QT slop
W-121	DINV	1.5	62		VALVE	1.50	MC	C		HL	
W-122	DZ	1.5	67		VALVE	3.00	GATE	M		HL	
W-123	DZ	0.0	71		VALVE	3.00	GATE	M		HL	
W-124	DINV	1.5	70		PUMP	4.00	HC			HL	
W-125		1.5	65		OEL	1.00	OEL			HL	Heavy vac. oil
W-126	AUDTD	1.5	65		OEL	1.00	OEL			HL	Coker naptha
W-127	PEGF/SINV	9.0	54		VALVE	3.00	MC	C		LL	Coker naptha
W-128		9.0	56		PUMP	6.00	VERT		Y	GAS	Propane gas
W-129	DZ	9.0	56		PUMP	6.00	VERT			LL	LPG
W-130	DZ	5.5	57		OEL	0.75	OEL		N	LL	LPG
W-131	SINV	5.5	60		VALVE	4.00	GATE	M		LL	Butane
W-132		5.5	60		VALVE	2.00	GATE	M		LL	Butane
W-133	DZ	1.5	52		VALVE	1.50	GATE	M		LL	Butane (LPG)
W-134		1.5	54		OEL	0.50	OEL			LL	Naptha
W-135	SINV	2.5	55		VALVE	3.00	MC	C		LL	Naptha
W-136		3.5	63		VALVE	0.50	BALL	M		LL	Naptha
W-137	DUP	3.5	63		VALVE	0.50	BALL	M		LL	Naptha
W-138		3.5	57		C	1.00	TH			LL	Naptha
W-139	PEGI	3.5	58		VALVE	6.00	GATE	M		LL	Platformate
W-140	BL									GAS	HC & H2
W-141		1.5	52		PUMP	2.00	VERT				
W-142		3.5	60		OEL	0.75	OEL		N	LL	Naptha
W-143	SINV	3.5	64		OEL	0.75	OEL			LL	Platformate
W-144	DZ	5.5	64		OEL	0.75	OEL			LL	Platformate
W-145		4.5	65		PUMP	3.00	VERT		Y	LL	Propane
W-146		3.5	64		VALVE	4.00	GATE	M		GAS	HC & H2

WSPA EMISSION RATE CALCULATION SPREADSHEET

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SAMPLE CONTROL		SCREENING DATA											
ID	Code	I & M (ppm)	Initial (ppm)	East (ppm)	South (ppm)	West (ppm)	Final (ppm)	East (ppm)	South (ppm)	West (ppm)	Avg. (ppm)	Bkgrnd (ppm)	Corrected (ppm)
W-110			90,000	50	500	80,000	90,000	600	1,000	20,000	90,000	4	89,997
W-111			250	80	25	110	140	35	30	50	195	3	192
W-112	DUP		250	80	25	110	140	35	30	50	195	3	192
W-113	AUTD		250	80	25	110	140	35	30	50	195	3	192
W-114	PEGI/SINV		80,000	55	60	900	32,000	80	100	800	56,000	5	55,996
W-115			21	16	12	7	20	16	10	4	21	4	17
W-116	L												
W-117	L												
W-118	SINV		2,000	30	40	110	800	30	70	80	1,400	6	1,394
W-119			10,000	4,000	2,400	6,000	16,000	9,000	11,200	6,000	13,000	9	12,991
W-120			25	20	14	20	24	20	13	10	25	6	19
W-121	DINV		26	22	22	12	40	35	31	27	33	4	30
W-122	DZ		4	4	4	4	3	3	3	3	3	3	0
W-123	DZ		4	4	4	4	4	4	4	4	4	4	0
W-124	DINV		12	8	6	8	8	6	6	7	10	3	7
W-125			50				90			70	70	4	67
W-126	AUTD		50				90			70	70	4	67
W-127	PEGI/SINV		16,000	6,000	5,000	3,000	80,000	64,000	40,000	500	48,000	4	47,997
W-128			2,000	500	160	500	1,400	50	50	350	1,700	3	1,697
W-129	DZ		3	3	3	3	3	3	3	3	3	3	0
W-130	DZ		3	3	3	3	3	3	3	3	3	3	0
W-131	SINV		5,000	4	30	200	300	10	35	150	2,650	5	2,646
W-132			600	120	500	50	1,000	900	100	1,000	800	4	797
W-133	DZ		6	6	6	6	4	4	4	4	5	5	0
W-134			12,000				13,000				12,500	7	12,494
W-135	SINV		610	50	20	90	200	50	16	12	405	5	401
W-136			24,500	21,700	5,600	21,000	27,300	24,500	8,400	26,600	25,900	5	25,896
W-137	DUP		24,500	21,700	5,600	21,000	27,300	24,500	8,400	26,600	25,900	5	25,896
W-138			1,200	30	180	800	1,500	80	120	450	1,350	5	1,346
W-139	PEGI		70,000	105	14,000	8,400	63,000	560	9,800	840	66,500	5	66,496
W-140	BL												
W-141			40,500	1,600	90	1,800	27,000	1,300	140	2,000	33,750	6	33,745
W-142			14,000				12,000				13,000	10	12,990
W-143	SINV		80				1,000				540	5	535
W-144	DZ		4	3.5	3.5	3.5	4				4	4	0
W-145			150	80	9	20	130	25	18	25	140	4	136
W-146			1,000	120	600	750	1,000	275	225	600	1,000	4	996

WSPA EMISSION RATE CALCULATION SPREADSHEET

SAMPLE CONTROL		BAG CONCENTRATION			NITROGEN FLOW				OXYGEN CONCENTRATION			
ID	Code	Initial (ppm)	Final (ppm)	Avg ppm	Initial ml/min	Final ml/min	Average ml/min	N2 l/min	Initial %	Final %	Average %	Q m3/hr
W-110		12,000	12,000	12,000	1,171	1,161	1,166	1.17	0.10	0.10	0.10	0.07
W-111		184	176	180	4,739	4,730	4,735	4.73	1.60	0.30	0.95	0.30
W-112	DUP	184	176	180	4,739	4,730	4,735	4.73	1.60	0.30	0.95	0.30
W-113	AUDTD	184	176	180	4,739	4,730	4,735	4.73	1.60	0.30	0.95	0.30
W-114	PEGI/SINV	280	280	280	4,647	4,689	4,668	4.67	1.60	0.30	0.95	0.29
W-115		40	40	40	4,647	4,705	4,676	4.68	2.50	0.40	1.45	0.30
W-116	L											
W-117	L											
W-118	SINV	1,760	1,720	1,740	4,541	4,541	4,541	4.54	4.60	5.40	5.00	0.36
W-119		1,600	2,080	1,840	1,935	1,913	1,924	1.92	1.80	0.30	1.05	0.12
W-120		88	88	88	1,920	1,920	1,920	1.92	2.60	4.00	3.30	0.14
W-121	DINV	36	36	36	2,944	2,944	2,944	2.94	0.90	0.50	0.70	0.18
W-122	DZ	41	32	36	3,004	3,006	3,005	3.01	0.30	0.20	0.25	0.18
W-123	DZ	32	24	28	2,474	2,483	2,479	2.48	0.40	0.10	0.25	0.15
W-124	DINV	48	48	48	6,944	6,944	6,944	6.94	7.80	7.80	7.80	0.66
W-125		270	270	270	1,029	1,017	1,023	1.02	0.30	0.30	0.30	0.06
W-126	AUDTD	270	270	270	1,029	1,017	1,023	1.02	0.30	0.30	0.30	0.06
W-127	PEGI/SINV	80,000	80,000	80,000	2,015	1,959	1,987	1.99	1.90	1.60	1.75	0.13
W-128		2,480	2,400	2,440	5,770	5,770	5,770	5.77	4.60	2.70	3.65	0.42
W-129	DZ	23	23	23	5,750	5,750	5,750	5.75	4.50	2.10	3.30	0.41
W-130	DZ	23	23	23	900	903	902	0.90	0.30	0.30	0.30	0.05
W-131	SINV	315	396	356	2,327	2,333	2,330	2.33	1.50	0.20	0.85	0.15
W-132		855	855	855	2,053	2,036	2,045	2.04	0.50	0.40	0.45	0.13
W-133	DZ	32	28	30	1,886	1,848	1,867	1.87	0.50	0.10	0.30	0.11
W-134		7,000	6,000	6,500	1,043	1,025	1,034	1.03	0.30	0.20	0.25	0.06
W-135	SINV	201	225	213	1,716	1,722	1,719	1.72	1.70	0.60	1.15	0.11
W-136		21,000	17,500	19,250	1,934	1,932	1,933	1.93	0.40	0.10	0.25	0.12
W-137	DUP	21,000	17,500	19,250	1,934	1,932	1,933	1.93	0.40	0.10	0.25	0.12
W-138		154	119	137	1,319	1,315	1,317	1.32	0.20	0.10	0.15	0.08
W-139	PEGI	17,500	14,700	16,100	4,857	4,810	4,834	4.83	1.00	0.40	0.70	0.30
W-140	BL											
W-141		1,200	1,120	1,160	4,233	4,126	4,180	4.18	2.50	0.90	1.70	0.27
W-142		5,400	4,950	5,175	1,064	1,006	1,035	1.04	0.40	0.40	0.40	0.06
W-143	SINV	400	640	520	1,036	965	1,001	1.00	0.40	0.30	0.35	0.06
W-144	DZ	32	28	30	1,012	972	992	0.99	0.20	0.20	0.20	0.06
W-145		352	352	352	5,436	5,436	5,436	5.44	4.00	1.00	2.50	0.37
W-146		840	840	840	3,700	3,648	3,674	3.67	2.50	0.40	1.45	0.24

SAMPLE CONTROL		BAG TEMPERATURE				LABORATORY DATA						
ID	Code	Initial (F)	Final (F)	Avg. (F)	Temp deg R	NMOC		METHANE		THC		
						ppmv (as C3H8)	ppmw (as C3H8)	ppmv (as CH4)	ppmw (as CH4)	ppmv (as C3H8)	ppmw (as C3H8)	
W-110		67	66	67	526	NA	10,034.50	0.00	0.00	6,400.00	10,034.50	
W-111		65	64	65	524	NA	251.46	0.00	0.00	160.00	251.46	
W-112	DUP	65	64	65	524	NA	235.74	0.00	0.00	150.00	235.74	
W-113	AUDTD	65	64	65	524	NA	267.17	0.00	0.00	170.00	267.17	
W-114	PEGI/SINV	67	69	68	528	NA	267.17	0.00	0.00	170.00	267.17	
W-115		120	122	121	581	NA	36.12	0.00	0.00	23.00	36.12	
W-116	L											
W-117	L											
W-118	SINV	55	53	54	514	NA	2,808.19	3.40	1.93	1,800.00	2,810.11	
W-119		56	55	56	515	NA	2,979.30	5.90	3.36	1,900.00	2,982.66	
W-120		60	63	62	521	NA	36.03	0.00	0.00	23.00	36.03	
W-121	DINV	60	62	61	521	NA	0.08	0.00	0.00	0.05	0.08	
W-122	DZ	78	80	79	539	NA	0.08	0.00	0.00	0.05	0.08	
W-123	DZ	81	82	82	541	NA	0.08	0.00	0.00	0.05	0.08	
W-124	DINV	169	163	166	626	NA	45.14	0.00	0.00	29.00	45.14	
W-125		66	63	65	524	NA	456.15	0.00	0.00	290.00	456.15	
W-126	AUDTD	66	63	65	524	NA	723.48	0.00	0.00	460.00	723.48	
W-127	PEGF/SINV	54	53	54	513	NA	85,183.76	4.00	2.21	56,000.00	85,185.97	
W-128		81	84	83	542	NA	3,752.67	0.00	0.00	2,400.00	3,752.67	
W-129	DZ	57	57	57	517	NA	1.10	0.00	0.00	0.70	1.10	
W-130	DZ	59	61	60	520	NA	0.08	0.00	0.00	0.05	0.08	
W-131	SINV	64	68	66	526	NA	455.80	0.00	0.00	290.00	455.80	
W-132		61	61	61	521	NA	1,018.50	6.10	3.48	650.00	1,021.98	
W-133	DZ	64	64	64	524	NA	0.07	0.00	0.00	0.05	0.07	
W-134		57	58	58	517	NA	7,531.17	0.00	0.00	4,800.00	7,531.17	
W-135	SINV	122	130	126	586	NA	377.06	0.00	0.00	240.00	377.06	
W-136		68	70	69	529	NA	43,356.03	0.00	0.00	28,000.00	43,356.03	
W-137	DUP	68	70	69	529	NA	49,438.02	0.00	0.00	32,000.00	49,438.02	
W-138		61	62	62	521	NA	130.60	0.00	0.00	83.00	130.60	
W-139	PEGI	59	58	59	518	NA	17,265.71	2,600.00	1,473.04	12,000.00	18,738.75	
W-140	BL					NA	7.40	0.00	0.00	4.70	7.40	
W-141		58	60	59	519	NA	2,657.44	16.00	9.11	1,700.00	2,666.55	
W-142		59	60	60	519	NA	12,210.43	7.30	4.15	7,800.00	12,214.58	
W-143	SINV	63	62	63	522	NA	1,886.41	0.00	0.00	1,200.00	1,886.41	
W-144	DZ	64	64	64	524	NA	10.86	0.00	0.00	6.90	10.86	
W-145		75	77	76	536	NA	795.96	6.40	3.64	510.00	799.60	
W-146		75	75	75	535	NA	962.54	460.00	262.01	780.00	1,224.55	