

Detterman, Mark, Env. Health

From: Ruchi Mathur [rmathur@somaenv.com]
Sent: Tuesday, October 29, 2013 10:21 AM
To: Detterman, Mark, Env. Health
Subject: MPE Weekly Status_Oct 28, 2013_RO0000473
Attachments: Table 2_Mass Removal_Oct 28, 2013.pdf; Table 1_Operational data_Oct 28, 2013.pdf

Dear Mr. Detterman:

Please find attached tables for the MPE operation at 15101 Freedom Avenue, San Leandro for last week's operation (October 28, 2013). Please feel free to call us if you have any questions or concerns.

Ruchi Mathur

Staff Engineer

SOMA Environmental Engineering, Inc.

Phone: 925-734-6400

FAX : 925-734-6401

From: Ruchi Mathur [<mailto:rmathur@somaenv.com>]
Sent: Tuesday, October 22, 2013 1:46 PM
To: 'Mark.Detterman@acgov.org'
Subject: Weekly Status Update_MPE_RO0000473_15101 Freedom Ave

Dear Mr. Detterman:

Based on your directive dated October 10, 2013, SOMA started operation of Multi-Phase Extraction (MPE) treatment system at 15101 Freedom Ave, San Leandro on October 15, 2013. Please find attached MPE tables for the operation from October 15th to October 20th, 2013. Please feel free to call us if you have any questions or concerns.

Thank You,

Ruchi Mathur

Staff Engineer

SOMA Environmental Engineering, Inc.

Phone: 925-734-6400

FAX : 925-734-6401

Table 1
MPE Event
Operational Data : October-November 2013

15101 Freedom Ave.
San Leandro, California

DATE	TIME	PID (ppmv)	WELL MANIFOLD VACUUM (In of Hg)	OXIDIZER TEMPERATURE (°F)	WELL FIELD FLOW VAPOR RATE (scfm)	TOTAL SYSTEM VAPOR FLOW RATE (scfm)	DILUTION AIR FLOW RATE (scfm)	SYSTEM (BLOWER) VACUUM (In of Hg)	SYSTEM TOTALIZER READING (gallons)	COMMENTS	
10/15/2013	1130								0	begin extraction from MPE-1, MPE-2, and MW-6	
	1200	1,030	13.7	1498	149	149	0	20			
	1230	1,011	13.7	1499	149	149	0	20			
	1300	989	13.7	1501	149	149	0	20			
	1330	956	13.7	1498	149	149	0	20			
	1400	928	13.6	1500	149	149	0	20			
	1430	907	13.6	1497	150	150	0	19.9			
	1500	885	13.6	1501	150	150	0	19.9			
	1600	852	13.6	1498	150	150	0	19.9			
	1700	823	13.7	1499	149	149	0	20			
	1800	796	13.7	1501	149	149	0	20			
	10/16/2013	800	738	13.7	1500	149	149	0	20		Extracting from MPE-1 and MW-6
		900	706	13.6	1498	149	149	0	20		
		1000	697	13.7	1501	149	149	0	20		
		1100	671	13.7	1499	149	149	0	20		
		1200	783	9.5	1498	192	192	0	17.3		
		1300	751	9.5	1500	193	193	0	17.2		
1400		740	9.4	1501	193	193	0	17.2			
1500		731	9.4	1498	193	193	0	17.2			
10/17/2013	1600	706	9.5	1499	192	192	0	17.3	Extracting from MPE-1, MPE-2, and MW-6		
	1700	681	9.5	1501	192	192	0	17.3			
	800	547	9.8	1499	192	192	0	17.3			
	900	539	9.8	1500	192	192	0	17.3			
	1000	530	9.8	1499	192	192	0	17.3			
	1100	559	9.7	1501	192	192	0	17.3			
	1200	551	9.7	1500	192	192	0	17.3			
	1300	558	9.7	1499	192	192	0	17.3			
	1400	554	9.7	1501	192	192	0	17.3			
	1500	549	9.7	1499	192	192	0	17.3			
	1600	545	9.7	1501	192	192	0	17.3			
10/18/2013	1700	544	9.7	1500	192	192	0	17.3	15,972		
	800	595	9.8	1501	192	192	0	17.3			
	900	594	9.8	1499	192	192	0	17.3			
	1000	592	9.8	1501	192	192	0	17.3			
	1100	588	9.8	1500	192	192	0	17.3			
	1200	581	9.8	1498	192	192	0	17.3			
	1300	568	9.7	1501	192	192	0	17.3			
	1400	577	9.7	1499	192	192	0	17.3			
	1500	582	9.7	1500	192	192	0	17.3			
	1600	571	9.7	1498	192	192	0	17.3			
	1700	560	9.7	1500	192	192	0	17.3			

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15101 Freedom Ave.
San Leandro, California

DATE	TIME	PID (ppmv)	WELL MANIFOLD VACUUM (In of Hg)	OXIDIZER TEMPERATURE (°F)	WELL FIELD FLOW VAPOR RATE (scfm)	TOTAL SYSTEM VAPOR FLOW RATE (scfm)	DILUTION AIR FLOW RATE (scfm)	SYSTEM (BLOWER) VACUUM (In of Hg)	SYSTEM TOTALIZER READING (gallons)	COMMENTS
10/19/2013	800	542	10	1500	158	158	0	19.4	28,239	
	1000	549	10	1499	165	165	0	19		
	1130	656	10	1500	196	196	0	17		
	1400	650	9.4	1501	193	193	0	17.2		
	1600	672	9.6	1503	193	193	0	17.2		
10/20/2013	800	609	9.6	1498	192	192	0	17.3	33,593	
	900	621	9.6	1500	192	192	0	17.3		
	1000	647	10.1	1499	189	189	0	17.5		
	1100	653	10	1500	189	189	0	17.5		
	1200	659	10	1498	189	189	0	17.5		
	1300	655	10	1501	189	189	0	17.5		
	1400	688	9.9	1500	190	190	0	17.4		
	1500	703	10	1498	190	190	0	17.4		
	1600	694	9.9	1499	192	192	0	17.3		
	1700	687	9.9	1498	192	192	0	17.3		
10/21/2013	800	650	10	1499	192	192	0	17.3	39,158	
	900	655	10	1500	192	192	0	17.3		
	1000	489	10.2	1498	157	157	0	19.5		
	1100	483	10.2	1501	157	157	0	19.5		
	1200	478	10.2	1499	157	157	0	19.5		
	1300	497	10.2	1501	157	157	0	19.5		
	1400	721	10	1500	192	192	0	17.3		
	1500	704	9.8	1498	192	192	0	17.3		
	1600	873	9.8	1501	192	192	0	17.3		
	1700	895	9.8	1500	192	192	0	17.3		
10/22/2013	800	1,091	10.4	1502	182	182	0	17.9	46,005	
	900	1,069	10.4	1500	182	182	0	17.9		
	1000	1,007	10.3	1502	184	184	0	17.8		
	1100	935	9.9	1502	184	184	0	17.8		
	1200	901	9.9	1500	184	184	0	17.8		
	1300	845	9.8	1498	193	193	0	17.2		
	1400	826	9.8	1502	193	193	0	17.2		
	1500	798	9.8	1499	192	192	0	17.3		
	1600	753	9.7	1501	193	193	0	17.2		
	1700	724	9.7	1500	193	193	0	17.2		
10/23/2013	800	598	10.2	1500	189	189	0	17.5	53,059	
	900	586	10.2	1499	189	189	0	17.5		
	1000	571	10.2	1501	192	192	0	17.3		
	1100	574	10.2	1498	192	192	0	17.3		

Table 1
MPE Event
Operational Data : October-November 2013

15101 Freedom Ave.
San Leandro, California

DATE	TIME	PID (ppmv)	WELL MANIFOLD VACUUM (In of Hg)	OXIDIZER TEMPERATURE (°F)	WELL FIELD FLOW VAPOR RATE (scfm)	TOTAL SYSTEM VAPOR FLOW RATE (scfm)	DILUTION AIR FLOW RATE (scfm)	SYSTEM (BLOWER) VACUUM (In of Hg)	SYSTEM TOTALIZER READING (gallons)	COMMENTS		
10/24/2013	1200	577	10.2	1502	192	192	0	17.3	59,974			
	1300	570	10	1500	192	192	0	17.3				
	1400	562	9.9	1501	193	193	0	17.2				
	1500	557	9.9	1499	193	193	0	17.2				
	1600	554	9.9	1500	193	193	0	17.2				
	1700	548	9.9	1500	193	193	0	17.2				
	800	494	9.8	1501	192	192	0	17.3				
	900	489	9.8	1499	192	192	0	17.3				
	1000	485	9.8	1498	192	192	0	17.3				
	1100	472	9.8	1501	192	192	0	17.3				
	1200	474	9.8	1502	192	192	0	17.3				
	1300	470	9.8	1498	192	192	0	17.3				
	1400	467	9.8	1500	192	192	0	17.3				
	1500	472	9.8	1499	192	192	0	17.3				
10/25/2013	1600	465	9.8	1500	192	192	0	17.3	66,953			
	1700	461	9.8	1502	192	192	0	17.3				
	800	435	10	1500	189	189	0	17.5				
	900	429	10	1501	189	189	0	17.5				
	1000	420	10	1499	189	189	0	17.5				
	1100	428	10	1502	189	189	0	17.5				
	1200	425	10	1500	190	190	0	17.4				
	1300	427	10	1501	192	192	0	17.3				
	1400	432	10	1500	192	192	0	17.3				
	1500	429	10	1501	193	193	0	17.2				
	1600	418	10	1500	193	193	0	17.2				
	1700	417	10	1501	193	193	0	17.2				
	800	407	10	1500	193	193	0	17.2				
	900	414	10	1500	193	193	0	17.2				
10/26/2013	1000	406	10	1502	193	193	0	17.2	73,499			
	1100	401	10	1499	192	192	0	17.3				
	1200	395	10	1500	192	192	0	17.3				
	1300	403	10	1502	192	192	0	17.3				
	1400	401	10	1502	192	192	0	17.3				
	1500	402	10	1500	193	193	0	17.2				
	1600	399	10	1502	193	193	0	17.2				
	1700	395	10	1500	193	193	0	17.2				
	800	374	10	1501	192	192	0	17.3				
	900	367	10	1499	192	192	0	17.3				
	10/27/2013										80,628	

Table 1

**MPE Event
Operational Data : October-November 2013**

15101 Freedom Ave.
San Leandro, California

DATE	TIME	PID (ppmv)	WELL MANIFOLD VACUUM (In of Hg)	OXIDIZER TEMPERATURE (°F)	WELL FIELD FLOW VAPOR RATE (scfm)	TOTAL SYSTEM VAPOR FLOW RATE (scfm)	DILUTION AIR FLOW RATE (scfm)	SYSTEM (BLOWER) VACUUM (In of Hg)	SYSTEM TOTALIZER READING (gallons)	COMMENTS
10/28/2013	1000	364	10	1500	192	192	0	17.3	87,685	
	1100	368	10	1498	192	192	0	17.3		
	1200	364	10	1499	192	192	0	17.3		
	1300	371	10	1499	192	192	0	17.3		
	1400	368	10	1501	192	192	0	17.3		
	1500	367	10	1502	192	192	0	17.3		
	1600	368	10	1500	192	192	0	17.3		
	1700	365	10	1501	192	192	0	17.3		
	800	358	10	1502	192	192	0	17.3		
	900	355	10	1500	192	192	0	17.3		
	1000	351	10	1501	192	192	0	17.3		
	1100	347	10	1501	192	192	0	17.3		
	1200	342	10	1500	192	192	0	17.3		
	1300	350	10	1499	192	192	0	17.3		
	1400	347	10	1499	192	192	0	17.3		
	1500	354	9.9	1501	193	193	0	17.2		
	1600	346	9.9	1498	193	193	0	17.2		
	1700	343	9.9	1499	193	193	0	17.2		

Totalizer readings = 87,685 gallons = 4.6 gpm

Total time of test = 19,050 minutes = 317.5 hours = 13.23 days

Notes

- ppmv parts per million vapor
- In of Hg inches of mercury
- In of H₂O inches of water
- °F degrees Fahrenheit
- scfm standard cubic feet per minute

Table 2

**MPE Event
Extraction Data and VOC Mass Removal Rate
October-November 2013**
15101 Freedom Avenue
San Leandro, California

MPE WELL	COMMENT	DATE	CLOCK TIME	INCREMENTAL TIME	ELAPSED TIME	Q			PID		MASS REMOVAL					
						minutes	minutes	minutes	SCFM	ft ³ of extracted air	Moles of extracted air	ppmv as hexane	VOC mole %	lb VOC mass removal as hexane	lbs/min	lbs/day
MPE-1,MPE-2,MW-6	START	10/15/2013	1130	0	0											
			1200	30	30	149	4,465	11.7815	1,030	0.0010	1.0460	0.0349	50			
			1230	30	60	149	4,465	11.7815	1,011	0.0010	1.0267	0.0342	49			
			1300	30	90	149	4,465	11.7815	989	0.0010	1.0044	0.0335	48			
			1330	30	120	149	4,465	11.7815	956	0.0010	0.9709	0.0324	47			
			1400	30	150	149	4,465	11.7815	928	0.0009	0.9424	0.0314	45			
			1430	30	180	150	4,513	11.9071	907	0.0009	0.9309	0.0310	45			
			1500	30	210	150	4,513	11.9071	885	0.0009	0.9084	0.0303	44			
			1600	60	270	150	9,026	23.8143	852	0.0009	1.7490	0.0291	42			
			1700	60	330	149	8,930	23.5631	823	0.0008	1.6716	0.0279	40			
			1800	60	390	149	8,930	23.5631	796	0.0008	1.6168	0.0269	39			
			MPE-1, MW-6		10/16/2013	800	840	1,230	149	125,026	329.8828	738	0.0007	20.9857	0.0250	36
						900	60	1,290	149	8,930	23.5631	706	0.0007	1.4340	0.0239	34
			1000	60	1,350	149	8,930	23.5631	697	0.0007	1.4157	0.0236	34			
			1100	60	1,410	149	8,930	23.5631	671	0.0007	1.3629	0.0227	33			
MPE-1,MPE-2,MW-6			1200	60	1,470	192	11,501	30.3457	783	0.0008	2.0482	0.0341	49			
			1300	60	1,530	193	11,596	30.5969	751	0.0008	1.9807	0.0330	48			
			1400	60	1,590	193	11,596	30.5969	740	0.0007	1.9517	0.0325	47			
			1500	60	1,650	193	11,596	30.5969	731	0.0007	1.9280	0.0321	46			
			1600	60	1,710	192	11,501	30.3457	706	0.0007	1.8468	0.0308	44			
			1700	60	1,770	192	11,501	30.3457	681	0.0007	1.7814	0.0297	43			
		10/17/2013	800	900	2,670	192	172,515	455.1853	547	0.0005	21.4626	0.0238	34			
			900	60	2,730	192	11,501	30.3457	539	0.0005	1.4099	0.0235	34			
			1000	60	2,790	192	11,501	30.3457	530	0.0005	1.3864	0.0231	33			
			1100	60	2,850	192	11,501	30.3457	559	0.0006	1.4622	0.0244	35			
			1200	60	2,910	192	11,501	30.3457	551	0.0006	1.4413	0.0240	35			
			1300	60	2,970	192	11,501	30.3457	558	0.0006	1.4596	0.0243	35			
			1400	60	3,030	192	11,501	30.3457	554	0.0006	1.4492	0.0242	35			
			1500	60	3,090	192	11,501	30.3457	549	0.0005	1.4361	0.0239	34			
			1600	60	3,150	192	11,501	30.3457	545	0.0005	1.4256	0.0238	34			
			1700	60	3,210	192	11,501	30.3457	544	0.0005	1.4230	0.0237	34			
		10/18/2013	800	900	4,110	192	172,515	455.1853	595	0.0006	23.3460	0.0259	37			
			900	60	4,170	192	11,501	30.3457	594	0.0006	1.5538	0.0259	37			
			1000	60	4,230	192	11,501	30.3457	592	0.0006	1.5486	0.0258	37			
			1100	60	4,290	192	11,501	30.3457	588	0.0006	1.5381	0.0256	37			
			1200	60	4,350	192	11,501	30.3457	581	0.0006	1.5198	0.0253	36			
			1300	60	4,410	192	11,501	30.3457	568	0.0006	1.4858	0.0248	36			

Table 2

**MPE Event
Extraction Data and VOC Mass Removal Rate
October-November 2013**
15101 Freedom Avenue
San Leandro, California

MPE WELL	COMMENT	DATE	CLOCK TIME	INCREMENTAL TIME	ELAPSED TIME	Q			PID		MASS REMOVAL				
						minutes	minutes	SCFM	ft ³ of extracted air	Moles of extracted air	ppmv as hexane	VOC mole %	lb VOC mass removal as hexane	lbs/min	lbs/day
MPE-1, MPE-2		10/19/2013	1400	60	4,470	192	11,501	30.3457	577	0.0006	1.5093	0.0252	36		
			1500	60	4,530	192	11,501	30.3457	582	0.0006	1.5224	0.0254	37		
			1600	60	4,590	192	11,501	30.3457	571	0.0006	1.4936	0.0249	36		
			1700	60	4,650	192	11,501	30.3457	560	0.0006	1.4648	0.0244	35		
			800	900	5,550	158	142,525	376.0547	542	0.0005	17.5694	0.0195	28		
			1000	120	5,670	165	19,765	52.1503	549	0.0005	2.4679	0.0206	30		
			1130	90	5,760	196	17,680	46.6490	656	0.0007	2.6379	0.0293	42		
		10/20/2013	1400	150	5,910	193	28,991	76.4922	650	0.0007	4.2859	0.0286	41		
			1600	120	6,030	193	23,192	61.1938	672	0.0007	3.5447	0.0295	43		
			800	960	6,990	192	184,016	485.5310	609	0.0006	25.4883	0.0266	38		
			900	60	7,050	192	11,501	30.3457	621	0.0006	1.6244	0.0271	39		
			1000	60	7,110	189	11,311	29.8433	647	0.0006	1.6644	0.0277	40		
			1100	60	7,170	189	11,311	29.8433	653	0.0007	1.6798	0.0280	40		
			1200	60	7,230	189	11,311	29.8433	659	0.0007	1.6953	0.0283	41		
		10/21/2013	1300	60	7,290	189	11,311	29.8433	655	0.0007	1.6850	0.0281	40		
			1400	60	7,350	190	11,406	30.0945	688	0.0007	1.7848	0.0297	43		
			1500	60	7,410	190	11,406	30.0945	703	0.0007	1.8237	0.0304	44		
			1600	60	7,470	192	11,501	30.3457	694	0.0007	1.8154	0.0303	44		
			1700	60	7,530	192	11,501	30.3457	687	0.0007	1.7971	0.0300	43		
			800	900	8,430	192	172,515	455.1853	650	0.0007	25.5040	0.0283	41		
			900	60	8,490	192	11,501	30.3457	655	0.0007	1.7133	0.0286	41		
		10/22/2013	1000	60	8,550	157	9,406	24.8191	489	0.0005	1.0462	0.0174	25		
			1100	60	8,610	157	9,406	24.8191	483	0.0005	1.0333	0.0172	25		
			1200	60	8,670	157	9,406	24.8191	478	0.0005	1.0226	0.0170	25		
			1300	60	8,730	157	9,406	24.8191	497	0.0005	1.0633	0.0177	26		
			1400	60	8,790	192	11,501	30.3457	721	0.0007	1.8860	0.0314	45		
			1500	60	8,850	192	11,501	30.3457	704	0.0007	1.8415	0.0307	44		
			1600	60	8,910	192	11,501	30.3457	873	0.0009	2.2836	0.0381	55		
		MPE-1, MPE-2, MW-6		10/22/2013	1700	60	8,970	192	11,501	30.3457	895	0.0009	2.3411	0.0390	56
					800	900	9,870	182	163,947	432.5766	1,091	0.0011	40.6813	0.0452	65
					900	60	9,930	182	10,930	28.8384	1,069	0.0011	2.6574	0.0443	64
					1000	60	9,990	184	11,025	29.0896	1,007	0.0010	2.5251	0.0421	61
					1100	60	10,050	184	11,025	29.0896	935	0.0009	2.3445	0.0391	56
1200	60				10,110	184	11,025	29.0896	901	0.0009	2.2593	0.0377	54		
1300	60				10,170	193	11,596	30.5969	845	0.0008	2.2286	0.0371	53		
1400	60				10,230	193	11,596	30.5969	826	0.0008	2.1785	0.0363	52		
1500	60				10,290	192	11,501	30.3457	798	0.0008	2.0874	0.0348	50		

Table 2

**MPE Event
Extraction Data and VOC Mass Removal Rate
October-November 2013**
15101 Freedom Avenue
San Leandro, California

MPE WELL	COMMENT	DATE	CLOCK TIME	INCREMENTAL TIME	ELAPSED TIME	Q			PID		MASS REMOVAL		
						minutes	minutes	SCFM	ft ³ of extracted air	Moles of extracted air	ppmv as hexane	VOC mole %	lb VOC mass removal as hexane
		10/23/2013	1600	60	10,350	193	11,596	30.5969	753	0.0008	1.9860	0.0331	48
			1700	60	10,410	193	11,596	30.5969	724	0.0007	1.9095	0.0318	46
			800	900	11,310	189	169,659	447.6491	598	0.0006	23.0752	0.0256	37
			900	60	11,370	189	11,311	29.8433	586	0.0006	1.5075	0.0251	36
			1000	60	11,430	192	11,501	30.3457	571	0.0006	1.4936	0.0249	36
			1100	60	11,490	192	11,501	30.3457	574	0.0006	1.5015	0.0250	36
			1200	60	11,550	192	11,501	30.3457	577	0.0006	1.5093	0.0252	36
			1300	60	11,610	192	11,501	30.3457	570	0.0006	1.4910	0.0249	36
			1400	60	11,670	193	11,596	30.5969	562	0.0006	1.4822	0.0247	36
			1500	60	11,730	193	11,596	30.5969	557	0.0006	1.4691	0.0245	35
		10/24/2013	1600	60	11,790	193	11,596	30.5969	554	0.0006	1.4611	0.0244	35
			1700	60	11,850	193	11,596	30.5969	548	0.0005	1.4453	0.0241	35
			800	900	12,750	192	172,515	455.1853	494	0.0005	19.3831	0.0215	31
			900	60	12,810	192	11,501	30.3457	489	0.0005	1.2791	0.0213	31
			1000	60	12,870	192	11,501	30.3457	485	0.0005	1.2687	0.0211	30
			1100	60	12,930	192	11,501	30.3457	472	0.0005	1.2347	0.0206	30
			1200	60	12,990	192	11,501	30.3457	474	0.0005	1.2399	0.0207	30
			1300	60	13,050	192	11,501	30.3457	470	0.0005	1.2294	0.0205	30
			1400	60	13,110	192	11,501	30.3457	467	0.0005	1.2216	0.0204	29
			1500	60	13,170	192	11,501	30.3457	472	0.0005	1.2347	0.0206	30
		10/25/2013	1600	60	13,230	192	11,501	30.3457	465	0.0005	1.2163	0.0203	29
			1700	60	13,290	192	11,501	30.3457	461	0.0005	1.2059	0.0201	29
			800	900	14,190	189	169,659	447.6491	435	0.0004	16.7855	0.0187	27
			900	60	14,250	189	11,311	29.8433	429	0.0004	1.1036	0.0184	26
			1000	60	14,310	189	11,311	29.8433	420	0.0004	1.0804	0.0180	26
			1100	60	14,370	189	11,311	29.8433	428	0.0004	1.1010	0.0184	26
			1200	60	14,430	190	11,406	30.0945	425	0.0004	1.1025	0.0184	26
			1300	60	14,490	192	11,501	30.3457	427	0.0004	1.1169	0.0186	27
			1400	60	14,550	192	11,501	30.3457	432	0.0004	1.1300	0.0188	27
			1500	60	14,610	193	11,596	30.5969	429	0.0004	1.1315	0.0189	27
		10/26/2013	1600	60	14,670	193	11,596	30.5969	418	0.0004	1.1025	0.0184	26
			1700	60	14,730	193	11,596	30.5969	417	0.0004	1.0998	0.0183	26
			800	900	15,630	193	173,943	458.9535	407	0.0004	16.1016	0.0179	26
			900	60	15,690	193	11,596	30.5969	414	0.0004	1.0919	0.0182	26
			1000	60	15,750	193	11,596	30.5969	406	0.0004	1.0708	0.0178	26
			1100	60	15,810	192	11,501	30.3457	401	0.0004	1.0489	0.0175	25
			1200	60	15,870	192	11,501	30.3457	395	0.0004	1.0332	0.0172	25

Table 2
MPE Event
Extraction Data and VOC Mass Removal Rate
October-November 2013
 15101 Freedom Avenue
 San Leandro, California

MPE WELL	COMMENT	DATE	CLOCK TIME	INCREMENTAL TIME	ELAPSED TIME	Q			PID		MASS REMOVAL		
						minutes	minutes	minutes	SCFM	ft ³ of extracted air	Moles of extracted air	ppmv as hexane	VOC mole %
		10/27/2013	1300	60	15,930	192	11,501	30.3457	403	0.0004	1.0542	0.0176	25
			1400	60	15,990	192	11,501	30.3457	401	0.0004	1.0489	0.0175	25
			1500	60	16,050	193	11,596	30.5969	402	0.0004	1.0603	0.0177	25
			1600	60	16,110	193	11,596	30.5969	399	0.0004	1.0523	0.0175	25
			1700	60	16,170	193	11,596	30.5969	395	0.0004	1.0418	0.0174	25
			800	900	17,070	192	172,515	455.1853	374	0.0004	14.6746	0.0163	23
			900	60	17,130	192	11,501	30.3457	367	0.0004	0.9600	0.0160	23
			1000	60	17,190	192	11,501	30.3457	364	0.0004	0.9522	0.0159	23
			1100	60	17,250	192	11,501	30.3457	368	0.0004	0.9626	0.0160	23
			1200	60	17,310	192	11,501	30.3457	364	0.0004	0.9522	0.0159	23
			1300	60	17,370	192	11,501	30.3457	371	0.0004	0.9705	0.0162	23
			1400	60	17,430	192	11,501	30.3457	368	0.0004	0.9626	0.0160	23
			1500	60	17,490	192	11,501	30.3457	367	0.0004	0.9600	0.0160	23
			1600	60	17,550	192	11,501	30.3457	368	0.0004	0.9626	0.0160	23
		10/28/2013	1700	60	17,610	192	11,501	30.3457	365	0.0004	0.9548	0.0159	23
			800	900	18,510	192	172,515	455.1853	358	0.0004	14.0468	0.0156	22
			900	60	18,570	192	11,501	30.3457	355	0.0004	0.9286	0.0155	22
			1000	60	18,630	192	11,501	30.3457	351	0.0004	0.9181	0.0153	22
			1100	60	18,690	192	11,501	30.3457	347	0.0003	0.9077	0.0151	22
			1200	60	18,750	192	11,501	30.3457	342	0.0003	0.8946	0.0149	21
			1300	60	18,810	192	11,501	30.3457	350	0.0004	0.9155	0.0153	22
			1400	60	18,870	192	11,501	30.3457	347	0.0003	0.9077	0.0151	22
			1500	60	18,930	193	11,596	30.5969	354	0.0004	0.9337	0.0156	22
			1600	60	18,990	193	11,596	30.5969	346	0.0003	0.9126	0.0152	22
		1700	60	19,050	193	11,596	30.5969	343	0.0003	0.9046	0.0151	22	
	TOTAL				19,050		3,536,038	9330			457	0.0240	35
	MEDIAN					192			558	0.0006			

Notes

Q volumetric flow rate
 SCFM standard cubic feet per minute
 ft³ cubic feet per minute
 VOC volatile organic compounds
 PID photo-ionization detector
 ppmv parts per million vapor

DERIVATION OF MASS REMOVAL RATE

ppmv as hexane/1,000,000 = VOC mole %
 ft³ of extracted air/(379 ft³ air/lb-mole air) = moles of extracted air
 (moles of extracted air)(VOC mole %)(86.2 lb/lb-mole hexane) = lbs of VOC removed as hexane
 (lbs of VOC mass removed as hexane)(elapsed time) = lbs/min of VOC removed as hexane
 (lbs/min of VOC removed as hexane)(60 min/1 hour)(24 hours/1 day) = lbs/day of VOC removed as hexane