CC 9/29/21

LD 9/29/21

AR 9/30/21

Tesoro Refining & Marketing Company LLC
A subsidiary of Marathon Petroleum Corporation
Martinez Refinery
150 Solano Way
Martinez CA 94553

September 22, 2021

Sent via email to COMPLIANCE@BAAQMD.GOV

Mr. Jeff Gove
Director of Enforcement
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

Subject: **April 28, 2020 Refinery Idling Flare Event Causal Analysis**
Tesoro Refining and Marketing Company, subsidiary of Marathon Petroleum, Martinez Refinery Plant #B2758

Dear Mr. Gove:

Pursuant to Regulation 12, Rule 12, and the Compliance Advisory dated June 25, 2007 from the BAAQMD Compliance and Enforcement Division, the final flare causal analysis for the April 28, 2020 event is attached. This report is being submitted under both the requirements specified in Regulation 12-12-406, for a reportable event when flaring occurs within a facility, and the Required Contents for Causal Analysis Reports, outlined in the Compliance Advisory. A public copy has been included.

If you have any questions or wish to discuss any of these items further, please feel free to call me at (925) 335-3467 or (925) 708-0159.

Sincerely,

Sharon Lim

Sharon Lim
Advanced HES Professional

Attachments

Cc: (via email)
Chris Crowley, BAAQMD
Mariel Adler-McAllister, BAAQMD
Miguel Zepeda, BAAQMD

File No. AI-02-03-07, Read File (ED No. 8174)

FLARE CAUSAL ANALYSIS REPORT – PUBLIC COPY

Refinery Idled due to COVID-19

1. **Date on which the report was drafted.**
   September 22, 2021

2. **The refinery name and site number.**
   Marathon's Tesoro Martinez Refinery, Plant # B2758

3. **The assigned refinery contact name and phone number.**
   Sharon Lim, Advanced HES Engineer, 925-335-3467

4. **Identification of the flare(s) at which the reportable event occurred by reviewing the water seal monitoring data to determine which seals were breached during the event.**
   Steam Flares, **S944 & S945,** East Air Flare, **S854,** West Air Flare, **S1012,** Coker Flare, **S1517** See Attachments - *Steam Flares Seal Pot, East Air Flare Seal Pot, West Air Flare Seal Pot, Coker Flare Seal Pot. All of these flares were used during the shutdown. After all process units were shutdown, one flare typically operated. The Coker Flare was staged first until March 17, 2021. Then the West Air Flare was first up until May 12 when East Air flare was staged first.*

5. **The flaring event duration for each affected flare:**
   a. **The date(s) of the event**
      04/28/2020 – 08/09/2021
   b. **The start and end time of the event**
      See table below for start and end times

Start Date:	**04/28/20**	**End Date:**	**08/09/2021**
From:	**13:13**	To:	**15:45**

The net duration of the event
The flare event lasted 468 days, 2 hours and 32 minutes.

6. **A brief description of the flaring event**
   The Martinez Refinery was safely brought down to an idle operating state in April 2020. This change was necessitated by reduced market demand resulting from the 2020 COVID-19 outbreak. When the No. 5 Gas Plant was taken offline, the vent flare gas pressure exceeded flare gas seal pots, resulting in an ongoing flaring event. Vapor recovery has been running throughout the refinery during this time to control emissions from refinery storage tanks as well as product loading and these vapors, which are combusted in refinery process heaters during normal operations, were routed to the flare for safe combustion.

   On August 9, 2021, Envent Thermal Oxidizer was started up to process gases from vapor recovery.

7. **A process flow diagram showing the equipment and process units that were the primary cause of the event.**

Refinery process units were shutdown. Vapor recovery was operated to recover gases from tanks and loading operations. Since all heaters were shutdown, the flares were used to combust these vapors. PFD redacted.

8. **The total volume of vent gas flared (MMSCF) throughout the event.**
497 MMSCF has been processed from April 28, 2020 through August 9, 2021.

This value is based on calculations supplied in the monthly flare reports from this facility since April 2020.

9. **The emissions associated with the flaring event per calendar day:**
   a. **# methane emitted**
   See Table 1
   b. **# non-methane hydrocarbon emitted**
   See Table 1
   c. **# SO_2 emitted**
   See Table 1

   These values are based on calculations supplied in the monthly flare reports from this facility from April 28, 2020 to August 9, 2021.

   Also provide the assumptions used to calculate emissions associated with the flaring event if they are different from those used for reporting under Regulation 12 Rule 11.
   The emissions associated with this flaring event were based on the methodology used for reporting under Regulation 12 Rule 11.

10. **A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which scrubbing was performed.**

During the periods when the flared gas was not being recovered by the flare gas recovery compressors, the vented gas was not being scrubbed, but combusted at the flares. See the attachments *Flare Flow.*

11. **The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent gas flow to the flare header and provide other flow instrumentation data where available.**

Due to a significant decrease in market demand stemming from reduced fuel consumption during the COVID-19 outbreak, the Martinez Refinery was temporarily idled in April 2020. Marathon executed a safe and orderly shutdown of the refinery. The idled refinery has continued to operate the vapor recovery system that provides emission controls on gas blanketed tanks, the truck loading rack and Avon dock marine vapor recovery system. With both of the Refinery gas plants along with the Sulfuric Acid Plant and Sulfur Recovery Unit shut down there are no facilities available to process the material collected in the vapor recovery system. Therefore, the flare gas recovery compressors have been shut down and this material is being directed to the Refinery Flare system. During this idling period, a Reportable Flaring Event as defined in BAAQMD 12-12-208 occurred at 16:00 on April 28, 2020.

Marathon had initially intended to resume refining of petroleum products at the Refinery when demand for transportation fuels returned. As the Pandemic wore on, however, Marathon announced plans to indefinitely idle petroleum refining and convert the Refinery from refining of petroleum products to production of 100% renewable fuels instead. As you are aware, on September 30, 2020, Marathon submitted an application to the District to make the changes necessary to accomplish this goal and support the State's low carbon fuel objectives.

After the announcement in August 2020, facility proceeded with evacuating all hydrocarbon in process units, steam and chemical cleaning of units, and isolating the units to the flare system. Natural gas sweeps were shutdown at process unit plot limits.

No. 1 Gas Plant compressor is oversized for current operations. A single compressor can create high vacuum in the suction of the No. 1 Gas Plant. To increase the suction pressure, natural gas was added. Opening up the bypasses around PSV's and compressor spillback increased the amount of recycle gas and therefore decrease the demand for natural gas. This change was evaluated and implemented on March 4, 2021.

Other items to decrease emissions included the potential shutdown of one or more flares. This will reduce combustion products from pilot and purge gases.

On August 9, 2021, Envent Thermal Oxidizer was started up to process gases from vapor recovery.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flared gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why.

Since this reduction was a planned event, the idling of the Refinery's production units was accomplished in a staged sequence to maximize safety precautions and to reduce emissions from flaring. The Refinery's No. 5 Gas Plant unit was the last to be idled to maximize recovery of the flare vent gas.

On May 4, 2020, the seal pots of the Refinery's staged flaring system were reconfigured so that all flare gas would be combusted at the Coker flare (S-1517). On May 7, 2020 the North and South Steam flares were blocked out so that no further flare gas could be combusted at those sources.

13. Was the flaring the result of an *emergency*? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

Flaring was not the result of an Emergency.

"Emergency: A condition at a petroleum refinery beyond the reasonable control of the owner or operator requiring immediate corrective action to restore normal and safe operation that is caused by sudden, infrequent and not reasonably preventable equipment failure, natural disaster, act of war or terrorism or external power curtailment, excluding power curtailment due to an interruptible power service agreement from a utility."

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination.

On October 1, 2020 the FMP was revised to include refinery idling. The unit shutdowns and final unit evacuations/decontamination are covered under Flare Minimization Plan (FMP), Section 3.4.1, which explains maintenance activities including shutdowns. During refinery idling, we have an imbalance of fuel gas producers and users. At this time, no process heaters are operating. Vapors are required to be controlled by BAAQMD Regulation 8-5 for vapor recovery tanks and Regulation 8-6 for loading racks.

The 2021 FMP will be revised to include thermal oxidizers for planned 5 Gas Plant shutdowns.

15. If the flaring was due to a regulatory mandate, to vent to the flare, why couldn't the gas be recovered, treated, and used as fuel gas?

While the vapor recovery system is active, there is no place for the recovered gasses other than the flare system.

16. Identify and describe in detail each preventative measure (PM) considered to minimize the flaring from the type of reportable flaring event that occurred:

a. State whether the PM is feasible (and will be implemented), or not feasible

	Corrective Actions	Anticipated Date of Completion
1	Evacuate hydrocarbon from process units	Completed

2	Minimize natural gas sweeps and purges	Completed
3	Shutdown flares 50 Unit and ARU Flares (pilots and purges shutdown)	Completed
4	Shutdown Emergency Flare and North and South Steam Flares	1Q2022
5	Assess Shutdown of Coker Flare	Completed, will be maintained as backup.
6	Shutdown Vapor Recovery Tanks: Tank 532 emptied but still contains heel	1Q2022
7	Issue: Excessive vacuum at 1 Gas Plant a. Decrease natural gas at 1 Gas by opening bypasses on PSVs and compressor spillback valve	Completed
	b. Return V-7 to service, which allows higher pressure spillback to be sent to suction of compressors.	Completed
	c. Locate and repair O2 sources in pipe	Completed
8	Long Term: Evaluate thermal oxidizer(s) for future 5 Gas Plant shutdowns	Completed installation of a rental thermal oxidizer. Submitted permit application to extend time for rental and future TO.

a. Explain why the PM is not feasible, if applicable

N/A

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
4/28/2020	1.86	764	517	269
4/29/2020	4.11	1702	1434	219
4/30/2020	3.38	1554	1629	109
5/1/2020	2.95	1501	472	49
5/2/2020	2.96	1559	295	31
5/3/2020	3.06	1617	257	36
5/4/2020	2.54	1301	245	9
5/5/2020	2.17	1182	188	0
5/6/2020	2.07	1020	241	0
5/7/2020	1.91	837	403	0
5/8/2020	1.99	809	472	0
5/9/2020	1.78	778	228	0
5/10/2020	1.78	758	137	0
5/11/2020	1.71	801	122	1
5/12/2020	1.85	823	265	1
5/13/2020	2.03	844	414	0
5/14/2020	1.96	851	340	0
5/15/2020	1.97	790	415	0
5/16/2020	2.15	807	690	0
5/17/2020	2.19	830	547	0
5/18/2020	2.14	858	595	0
5/19/2020	1.72	767	552	0
5/20/2020	1.76	793	592	0
5/21/2020	1.78	807	531	0
5/22/2020	1.62	725	445	1
5/23/2020	1.50	678	409	4
5/24/2020	1.87	799	591	5
5/25/2020	1.78	653	841	0
5/26/2020	2.11	911	775	1
5/27/2020	1.72	652	901	1
5/28/2020	1.44	670	427	12
5/29/2020	1.13	580	163	11
5/30/2020	1.36	650	213	10
5/31/2020	1.63	674	177	2
6/1/2020	1.69	682	236	0
6/2/2020	1.40	627	455	0
6/3/2020	1.73	694	669	6
6/4/2020	1.77	855	620	11
6/5/2020	1.53	864	161	11
6/6/2020	1.26	707	115	12
6/7/2020	1.19	668	97	8

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	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
6/8/2020	1.25	678	136	8
6/9/2020	1.45	656	376	7
6/10/2020	1.57	666	518	4
6/11/2020	1.79	734	614	5
6/12/2020	1.89	781	521	4
6/13/2020	1.94	827	479	8
6/14/2020	1.91	852	438	8
6/15/2020	1.77	824	348	7
6/16/2020	1.81	821	229	8
6/17/2020	1.74	816	354	1
6/18/2020	1.83	753	649	9
6/19/2020	1.77	789	463	12
6/20/2020	1.92	971	338	14
6/21/2020	1.85	880	361	11
6/22/2020	1.62	763	304	10
6/23/2020	1.71	816	306	12
6/24/2020	1.77	805	447	10
6/25/2020	1.85	807	449	9
6/26/2020	1.62	764	288	11
6/27/2020	1.62	803	207	10
6/28/2020	1.68	885	151	10
6/29/2020	1.63	800	187	10
6/30/2020	1.53	709	241	7
7/1/2020	1.49	698	215	8
7/2/2020	1.54	782	151	7
7/3/2020	1.52	777	138	7
7/4/2020	1.46	727	201	10
7/5/2020	1.57	729	348	8
7/6/2020	1.54	752	228	10
7/7/2020	1.46	726	191	9
7/8/2020	1.60	684	452	6
7/9/2020	1.60	675	498	8
7/10/2020	1.69	678	598	7
7/11/2020	1.65	692	585	9
7/12/2020	1.63	700	473	9
7/13/2020	1.56	714	309	9
7/14/2020	1.68	728	459	10
7/15/2020	1.45	714	185	11
7/16/2020	1.52	776	166	10
7/17/2020	1.45	761	143	10
7/18/2020	1.45	743	160	11

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	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
7/19/2020	1.45	761	147	9
7/20/2020	1.56	845	112	8
7/21/2020	1.45	723	178	9
7/22/2020	1.31	617	192	5
7/23/2020	1.31	636	230	7
7/24/2020	1.41	635	426	7
7/25/2020	1.36	639	259	8
7/26/2020	1.58	664	542	9
7/27/2020	1.42	648	281	8
7/28/2020	1.22	657	149	0
7/29/2020	1.37	620	230	7
7/30/2020	1.36	624	233	7
7/31/2020	1.30	618	184	6
8/1/2020	1.30	623	210	5
8/2/2020	1.32	631	214	8
8/3/2020	1.40	627	309	8
8/4/2020	1.36	641	197	12
8/5/2020	1.30	630	103	10
8/6/2020	1.29	604	218	8
8/7/2020	1.36	664	213	21
8/8/2020	1.27	633	137	18
8/9/2020	1.28	645	157	11
8/10/2020	1.36	638	275	11
8/11/2020	1.58	679	483	9
8/12/2020	1.84	692	779	15
8/13/2020	1.77	753	482	148
8/14/2020	1.96	767	689	149
8/15/2020	1.82	775	719	47
8/16/2020	1.65	702	560	41
8/17/2020	2.02	948	509	137
8/18/2020	1.90	655	1035	24
8/19/2020	2.15	669	1356	18
8/20/2020	2.19	689	1005	18
8/21/2020	1.94	656	985	28
8/22/2020	1.67	697	572	14
8/23/2020	1.76	776	460	13
8/24/2020	1.81	699	682	89
8/25/2020	1.93	722	822	61
8/26/2020	1.68	698	515	21
8/27/2020	1.57	625	505	16
8/28/2020	1.80	664	647	32

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	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
8/29/2020	1.62	646	350	26
8/30/2020	1.51	644	220	16
8/31/2020	1.84	791	266	18
9/1/2020	2.20	911	248	25
9/2/2020	2.30	964	436	52
9/3/2020	2.07	838	393	30
9/4/2020	2.64	766	400	22
9/5/2020	2.03	664	542	8
9/6/2020	1.96	603	795	7
9/7/2020	2.06	614	704	0
9/8/2020	1.68	614	411	0
9/9/2020	1.57	663	202	0
9/10/2020	1.87	742	221	0
9/11/2020	1.73	652	293	2
9/12/2020	1.68	570	311	2
9/13/2020	1.76	654	322	0
9/14/2020	1.75	721	328	0
9/15/2020	1.64	628	331	0
9/16/2020	2.01	730	556	3
9/17/2020	2.10	742	366	83
9/18/2020	2.60	864	394	24
9/19/2020	2.55	782	537	42
9/20/2020	1.84	668	293	25
9/21/2020	2.20	755	263	0
9/22/2020	3.15	1131	341	0
9/23/2020	3.15	1119	370	1
9/24/2020	1.96	670	319	2
9/25/2020	1.78	679	248	0
9/26/2020	1.86	688	243	0
9/27/2020	1.55	612	225	0
9/28/2020	2.49	847	284	8
9/29/2020	2.93	1025	247	5
9/30/2020	2.94	1083	199	2
10/1/2020	2.55	950	184	0
10/2/2020	3.23	1101	188	8
10/3/2020	3.03	1030	179	43
10/4/2020	3.13	1064	161	0
10/5/2020	3.24	1072	185	2
10/6/2020	3.01	1056	179	6
10/7/2020	3.03	1088	209	3
10/8/2020	2.98	981	245	6

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	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
10/9/2020	2.85	833	271	22
10/10/2020	2.83	929	354	28
10/11/2020	2.61	907	381	43
10/12/2020	0.96	547	176	33
10/13/2020	1.97	858	195	4
10/14/2020	2.21	797	229	0
10/15/2020	2.73	878	395	4
10/16/2020	1.66	652	277	2
10/17/2020	1.30	516	298	0
10/18/2020	0.85	465	174	1
10/19/2020	1.06	573	165	4
10/20/2020	1.66	759	248	54
10/21/2020	1.90	764	198	3
10/22/2020	2.62	976	184	1
10/23/2020	2.76	990	146	0
10/24/2020	2.01	795	120	0
10/25/2020	1.67	659	119	0
10/26/2020	1.26	522	99	0
10/27/2020	1.00	449	134	0
10/28/2020	2.68	671	215	0
10/29/2020	1.13	403	126	0
10/30/2020	0.79	399	101	0
10/31/2020	0.91	439	129	0
11/1/2020	0.96	403	343	8
11/2/2020	0.91	391	359	8
11/3/2020	0.90	404	265	7
11/4/2020	0.92	440	262	8
11/5/2020	1.10	556	231	11
11/6/2020	1.11	571	257	8
11/7/2020	1.02	471	363	6
11/8/2020	1.13	466	586	6
11/9/2020	1.01	530	179	5
11/10/2020	1.22	672	169	7
11/11/2020	0.97	556	144	6
11/12/2020	1.08	623	154	6
11/13/2020	0.88	505	181	5
11/14/2020	1.14	606	335	7
11/15/2020	1.33	697	441	9
11/16/2020	1.09	527	431	7
11/17/2020	1.28	599	579	8
11/18/2020	0.79	378	357	6

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	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
11/19/2020	0.85	412	341	5
11/20/2020	0.96	473	392	5
11/21/2020	0.95	484	383	5
11/22/2020	0.90	483	282	5
11/23/2020	0.80	431	265	5
11/24/2020	0.80	447	264	5
11/25/2020	0.77	419	257	5
11/26/2020	0.80	452	244	4
11/27/2020	0.80	445	289	5
11/28/2020	1.09	587	390	6
11/29/2020	1.17	588	534	6
11/30/2020	1.12	630	343	6
12/1/2020	1.10	627	314	6
12/2/2020	0.96	564	276	5
12/3/2020	0.73	392	247	4
12/4/2020	0.91	442	426	5
12/5/2020	0.81	408	357	4
12/6/2020	0.73	381	288	5
12/7/2020	0.72	367	282	5
12/8/2020	0.73	385	255	4
12/9/2020	0.85	462	253	5
12/10/2020	0.82	432	293	5
12/11/2020	0.92	524	254	5
12/12/2020	1.04	556	365	6
12/13/2020	0.82	463	225	4
12/14/2020	0.75	459	150	4
12/15/2020	0.79	496	136	4
12/16/2020	1.02	564	259	5
12/17/2020	0.83	489	207	5
12/18/2020	0.78	509	107	4
12/19/2020	0.71	474	77	3
12/20/2020	0.73	502	58	3
12/21/2020	0.80	537	63	3
12/22/2020	0.79	502	92	4
12/23/2020	0.72	474	71	3
12/24/2020	0.67	441	75	3
12/25/2020	0.64	426	73	3
12/26/2020	0.64	404	112	4
12/27/2020	0.67	425	94	3
12/28/2020	0.70	455	85	4
12/29/2020	0.67	442	61	3

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	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
12/30/2020	0.81	516	77	4
12/31/2020	1.21	491	183	7
1/1/2021	0.85	450	109	4
1/2/2021	0.70	461	68	4
1/3/2021	0.69	454	66	4
1/4/2021	0.71	460	77	4
1/5/2021	0.71	453	72	4
1/6/2021	0.71	466	60	3
1/7/2021	0.72	467	70	4
1/8/2021	0.63	413	64	3
1/9/2021	0.67	414	50	3
1/10/2021	0.63	393	44	3
1/11/2021	0.62	406	51	3
1/12/2021	0.71	460	64	4
1/13/2021	0.80	481	82	5
1/14/2021	0.77	442	75	5
1/15/2021	0.73	446	62	4
1/16/2021	0.79	478	78	6
1/17/2021	0.79	468	79	6
1/18/2021	0.86	528	90	7
1/19/2021	0.64	446	64	4
1/20/2021	0.71	476	51	4
1/21/2021	0.76	518	55	4
1/22/2021	0.73	497	49	4
1/23/2021	0.68	453	51	4
1/24/2021	0.65	440	44	3
1/25/2021	0.65	453	45	3
1/26/2021	0.74	510	46	3
1/27/2021	0.70	469	45	4
1/28/2021	0.67	450	44	3
1/29/2021	0.70	472	47	4
1/30/2021	0.68	465	52	3
1/31/2021	0.66	438	59	4
2/1/2021	0.61	433	55	4
2/2/2021	0.59	434	48	3
2/3/2021	0.61	449	46	3
2/4/2021	0.60	448	44	3
2/5/2021	0.64	474	53	4
2/6/2021	0.57	430	48	3
2/7/2021	0.55	407	49	3
2/8/2021	0.58	426	50	3

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
2/9/2021	0.54	400	42	3
2/10/2021	0.55	401	98	3
2/11/2021	0.56	414	44	3
2/12/2021	0.56	424	45	3
2/13/2021	0.56	415	46	3
2/14/2021	0.55	422	39	3
2/15/2021	0.59	435	45	3
2/16/2021	0.61	453	46	3
2/17/2021	0.59	434	45	3
2/18/2021	0.59	439	47	3
2/19/2021	0.57	426	40	3
2/20/2021	0.57	423	46	3
2/21/2021	0.61	458	49	4
2/22/2021	0.71	478	141	5
2/23/2021	0.64	418	137	5
2/24/2021	0.61	446	53	4
2/25/2021	0.65	478	53	4
2/26/2021	0.57	419	46	3
2/27/2021	0.55	423	43	3
2/28/2021	0.57	424	47	3
3/1/2021	0.58	431	49	4
3/2/2021	0.64	464	52	4
3/3/2021	0.55	411	41	3
3/4/2021	0.50	373	39	3
3/5/2021	0.50	366	44	3
3/6/2021	0.46	347	45	3
3/7/2021	0.48	356	41	3
3/8/2021	0.45	334	38	2
3/9/2021	0.46	344	37	2
3/10/2021	0.49	353	36	2
3/11/2021	0.48	355	38	2
3/12/2021	0.48	347	44	3
3/13/2021	0.44	330	38	3
3/14/2021	0.43	317	37	2
3/15/2021	0.48	355	35	2
3/16/2021	0.51	369	43	3
3/17/2021	0.47	336	51	2
3/18/2021	0.51	348	60	3
3/19/2021	0.41	285	46	3
3/20/2021	0.42	295	52	3
3/21/2021	0.49	326	63	3

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
3/22/2021	0.37	266	45	2
3/23/2021	0.40	293	40	3
3/24/2021	0.43	310	49	3
3/25/2021	0.44	320	45	3
3/26/2021	0.40	292	43	3
3/27/2021	0.38	285	46	3
3/28/2021	0.33	254	46	3
3/29/2021	0.35	265	42	3
3/30/2021	0.41	293	56	3
3/31/2021	0.31	239	96	3
4/1/2021	0.32	243	46	3
4/2/2021	0.25	183	20	2
4/3/2021	0.24	205	27	2
4/4/2021	0.27	215	29	2
4/5/2021	0.31	241	29	2
4/6/2021	0.36	268	33	2
4/7/2021	0.42	297	39	3
4/8/2021	0.35	247	28	2
4/9/2021	0.26	221	23	2
4/10/2021	0.47	293	49	4
4/11/2021	0.43	246	42	1
4/12/2021	0.42	298	42	2
4/13/2021	0.43	308	43	3
4/14/2021	0.35	270	29	2
4/15/2021	0.40	295	34	3
4/16/2021	0.40	298	32	3
4/17/2021	0.29	240	25	3
4/18/2021	0.45	308	39	5
4/19/2021	0.45	318	37	4
4/20/2021	0.48	339	35	4
4/21/2021	0.35	275	30	3
4/22/2021	0.36	271	27	2
4/23/2021	0.33	261	26	2
4/24/2021	0.22	205	19	1
4/25/2021	0.28	230	24	2
4/26/2021	0.32	254	27	2
4/27/2021	0.45	323	36	3
4/28/2021	0.44	321	34	4
4/29/2021	0.38	284	31	4
4/30/2021	0.44	316	31	4
5/1/2021	0.36	256	25	3

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
5/2/2021	0.38	246	28	3
5/3/2021	0.46	289	34	5
5/4/2021	0.43	277	32	5
5/5/2021	0.45	277	34	7
5/6/2021	0.50	269	25	6
5/7/2021	0.37	239	24	6
5/8/2021	0.42	264	29	9
5/9/2021	0.40	255	25	7
5/10/2021	0.41	255	28	6
5/11/2021	0.35	231	25	5
5/12/2021	0.38	244	26	5
5/13/2021	0.41	261	25	5
5/14/2021	0.44	277	26	6
5/15/2021	0.37	244	21	5
5/16/2021	0.40	260	23	4
5/17/2021	0.32	221	18	3
5/18/2021	0.26	186	16	3
5/19/2021	0.26	181	22	2
5/20/2021	0.24	176	15	2
5/21/2021	0.25	181	15	2
5/22/2021	0.19	146	12	2
5/23/2021	0.23	170	15	2
5/24/2021	0.26	182	17	2
5/25/2021	0.26	180	16	3
5/26/2021	0.35	224	18	4
5/27/2021	0.32	196	39	3
5/28/2021	0.49	281	46	5
5/29/2021	0.48	297	24	3
5/30/2021	0.36	241	24	4
5/31/2021	0.32	215	22	4
6/1/2021	0.33	235	21	4
6/2/2021	0.26	174	36	2
6/3/2021	0.33	216	22	4
6/4/2021	0.31	210	22	3
6/5/2021	0.28	188	21	3
6/6/2021	0.29	192	26	3
6/7/2021	0.28	189	17	2
6/8/2021	0.32	212	18	2
6/9/2021	0.30	204	15	2
6/10/2021	0.33	223	20	2
6/11/2021	0.30	212	19	2

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
6/12/2021	0.31	211	20	3
6/13/2021	0.32	219	20	3
6/14/2021	0.34	229	19	3
6/15/2021	0.34	220	18	3
6/16/2021	0.38	253	27	5
6/17/2021	0.39	251	28	6
6/18/2021	0.36	229	24	6
6/19/2021	0.25	179	18	3
6/20/2021	0.21	159	15	2
6/21/2021	0.26	187	18	2
6/22/2021	0.32	221	23	3
6/23/2021	0.29	203	19	3
6/24/2021	0.34	229	21	3
6/25/2021	0.24	176	16	2
6/26/2021	0.19	146	18	2
6/27/2021	0.21	159	15	2
6/28/2021	0.26	178	16	2
6/29/2021	0.30	206	22	3
6/30/2021	0.28	191	20	3
7/1/2021	0.21	176	17	2
7/2/2021	0.30	202	23	3
7/3/2021	0.22	161	17	2
7/4/2021	0.25	177	19	2
7/5/2021	0.24	175	19	2
7/6/2021	0.26	184	20	2
7/7/2021	0.46	285	28	5
7/8/2021	0.70	398	40	8
7/9/2021	0.32	215	24	4
7/10/2021	0.31	209	24	4
7/11/2021	0.26	181	22	3
7/12/2021	0.25	175	22	2
7/13/2021	0.24	173	19	2
7/14/2021	0.19	149	16	2
7/15/2021	0.30	206	22	3
7/16/2021	0.30	209	23	3
7/17/2021	0.28	195	21	3
7/18/2021	0.26	184	19	3
7/19/2021	0.30	206	21	3
7/20/2021	0.32	215	23	3
7/21/2021	0.30	203	21	3
7/22/2021	0.41	263	30	4

Table 1: Flows and Emissions per Calendar Day

DATE		P&P, VENT GAS EMISSIONS		
	VENT GAS		NON-	
	FLOW	METHANE	METHANE	SO2
	(MMSCF)	(LB/DAY)	(LB/DAY)	(LB/DAY)
7/23/2021	0.30	203	21	3
7/24/2021	0.27	189	19	3
7/25/2021	0.23	166	16	2
7/26/2021	0.19	148	12	2
7/27/2021	0.27	187	19	3
7/28/2021	0.28	193	19	3
7/29/2021	0.27	189	18	3
7/30/2021	0.24	172	16	2
7/31/2021	0.23	166	15	2
8/1/2021	0.22	181	15	2
8/2/2021	0.19	145	13	2
8/3/2021	0.23	168	17	2
8/4/2021	0.23	171	17	2
8/5/2021	0.27	189	18	2
8/6/2021	0.26	178	18	2
8/7/2021	0.22	160	16	2
8/8/2021	0.39	245	27	4
8/9/2021	0.25	175	16	2

Total	496.64	240418	92170	3971
	(MMSCF)	(LB)	(LB)	(LB)

Data is from monthly flare reports.

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