Cardno ATC
Shaping the Future

917 1st Avenue North, Suite 3
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REMEDIATION PROGRESS REPORT
Second Quarter 2014

Phillips 66 Facility No. 255353
600 Westlake Avenue North
Seattle, Washington 98107

Submitted to:
Ed Ralston
Phillips 66 Company
Remediation Management
76 Broadway
Sacramento, California 95818

Submitted by:
Cardno
917 1st Avenue North, Suite 3
Billings, Montana 59101

Cardno ATC Job No. 76.75118.1396

August 22, 2014

Keith Fox Date: 2014.08.22 15:45:50 -06'00'

Keith Fox
Senior Project Engineer

Kyle Sattler
Senior Project Manager

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SITE INFORMATION

Cardno ATC Contact Person:	Kyle Sattler, Senior Project Manager
Department of Ecology Facility ID:	46445373
LUST Facility No.:	8463
Voluntary Cleanup Program No.	NW1714
Current Remediation Techniques:	Soil vapor extraction (SVE) and air sparging (AS)
Reporting Period:	4/1/14 through 6/30/14

REMEDIATION SYSTEM, UTILITIES, & PERMITS

Remediation Equipment:	SVE: Two Sutorbilt 10-HP blowers. AS: One Rietschle 10-HP compressor.
Utilities In Use:	Electrical Service, Seattle City Light, Meter # 849179
PSCAA Permit:	Registration No. 29548
KCIW Permit:	Discharge Authorization No. 4262-01

SVE SYSTEM OPERATIONAL DATA

Mercer-Westlake (Blower #B-701)		**Terry-Valley (Blower #B-801)**	
Hours Operated This Period:	1,810.5	Hours Operated This Period:	1,833.5
Percent Runtime This Period:	82.9%	Percent Runtime This Period:	83.9%
Cumulative Operating Hours:	3866.5	Cumulative Operating Hours:	3,889.5
Cumulative Percent Runtime:	86.6%	Cumulative Percent Runtime:	87.1%

AS SYSTEM OPERATIONAL DATA

Hours Operated This Period:	2,029.5
Percent Runtime This Period:	92.9%
Cumulative Operating Hours:	4,083.5
Cumulative Percent Runtime:	91.5%

ESTIMATED REMOVAL RATES

TPHg Removed This Period:	969.35 pounds
TPHg Removal Rate This Period:	0.57 pounds per hour, average for the period
TPHg Removal Rate Previous Period:	0.69 pounds per hour, average for the period
Cumulative TPHg Removed:	2,655.77 pounds

Benzene Removed This Period:	0.37 pounds	Ethylbenzene Removed This Period:	6.99 pounds
Cumulative Benzene Removed:	1.62 pounds	Cumulative Ethylbenzene Removed:	21.54 pounds
Toluene Removed This Period:	5.87 pounds	Xylenes Removed Rate This Period:	88.54 pounds
Cumulative Toluene Removed:	16.24 pounds	Cumulative Xylenes Removed:	200.37 pounds

Comments:

The (SVE) system consists of two blowers that extract soil vapors from a total of 36 vertical wells (19 in Mercer Street, 17 in Terry Avenue) and 16 horizontal wells (7 in Valley Street, 9 in Westlake Avenue). The locations of the SVE and AS wells are shown on Figure 1. The AS system supplies compressed air to a total of 62 air sparge wells (27 in Mercer Street, 14 in Valley Street, 21 in Westlake Avenue). The SVE blowers discharge vapors to an off-gas treatment system that uses GAC to reduce air emissions to permitted levels. Water from SVE moisture separators is also treated with GAC before discharging to the King County sewer system. The system layout is shown on Figure 2.

System start-up was completed on December 27, 2013. The Mercer-Westlake SVE blower went offline on April 29 due to high blower outlet temperature. The alarm set point was adjusted to compensate, but remains below the temperature limit of the PVC pipe. The Mercer-Westlake SVE blower was brought back on line on April 30. The entire system went offline on May 26 due to operator error resulting in a SVE knock-out water transfer pump being shut off. The error was corrected and the system was brought back on line on May 27. The entire system was taken offline on April 4 and June 25 following 10% breakthrough detected in the primary vapor carbon vessels. The system was brought back on line on April 11 and July 1, respectively.

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Compliance samples per a PSCAA permit (Authorization #4262-01, Expiration: 6/30/2018) were collected on April 16, May 8, and June 25. Laboratory analytical reports are included in Appendix A, and results are summarized in Table 1. Sample port locations are shown on Figure 2. Total petroleum hydrocarbon (TPH) concentrations at the inlets to the GAC vessels are below the permit threshold of 200 ppmv, above which control efficiency of 97% must be demonstrated. Carbon in the three primary off-gas treatment vessels was replaced on April 11. Documentation for the 3,000 pounds of spent GAC removed during the April change out is included in Appendix B. Prior to the carbon change, the primary vessels showed breakthrough exceeding 10% of the influent concentration, but less than 10 ppmv, the higher limit set by the PSCAA permit. The carbon change out related to the June 25 breakthrough was completed in July and will be documented in the third quarter remediation progress report. In June, Cardno began discussion with PSCAA regarding modifications to the permit aimed at reducing the frequency of discharge compliance monitoring and setting the limits at which the treatment system can be turned off.

Compliance samples per the KCIW permit (Registration #429548) were collected on April 16, May 8, and June 25. Laboratory analytical reports are included in Appendix A, and results are summarized in Table 2. Sample port locations are shown on Figure 2. All samples demonstrated compliance with permit limits. BTEX results were below detection limits, with the exception of total xylenes detected in the influent sample collected on April 16, 2014. A total of 5,718 gallons of treated water were discharged to the King County sewer system during the period.

Steps taken to optimize the system during the period included varying the on-time of the AS wells and experimenting with assigning AS wells to different zones to maximize flow around SVE wells with measurable concentrations. Certain SVE wells were also shut down in an attempt to maximize vacuum to SVE wells with measurable concentrations. The adjustments did not produce measurable effects, i.e. vapor concentrations did not change significantly, and the system was eventually returned to a basic configuration with maximum vacuum applied at the SVE blowers (80” water +/- 5”) and sparge intervals of 15 minutes at all AS wells. Select low-concentration SVE wells remain closed to maintain the vacuum on wells with higher vapor concentrations. The average calculated removal rate for the period was 0.57 pounds TPHg per hour, a 17% decrease compared to the rate from the previous period; total estimated TPHg removal was 969.35 pounds.

Recommendations:
Cardno recommends continued optimization through adjustments to the system, such as:

- Qualitative evaluation of maximizing system flows while the water table is low vs. continued extraction of low-concentration vapors.
- Evaluate improved extraction rates/efficiency through pulsing, or alternating, segments that are online.
- Collect pre-adjustment and post-adjustment PID data to gauge optimization success.

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Table 1: Vapor Phase Analytical Results Summary

Sample Location	Sample Date	Work Order No.	Analytical Vapor Results (EPA Method TO-15 for VOCs)(µg/m3)					
			THCg	Benzene	Toluene	Ethylbenzene	m&p Xylenes	o-Xylenes
V1 Influent	04/16/14	10263855	156,000	119	2,050	1,430	9,170	3,630.0
V1 Intermediate			ND<1220	ND<6.5	32	ND<17.6	ND<35.2	ND<17.6
V1 Effluent			ND<1220	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V1 Influent	05/08/14	10266625	107,000	28	483	745	7,240	2,720.0
V1 Intermediate			4,120	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V1 Effluent			5,110	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V1 Influent	06/25/14	10272237	55,200	ND<76	309	277	5,840	2,280
V1 Intermediate			9,600	19.3	231	148	773	38
V1 Effluent			ND<2040	20.6	36.5	ND<29.6	ND<59.1	ND<29.6
V2 Influent	04/16/14	10263855	162,000	85	1,420	988	5,510	2,530
V2 Intermediate			ND<1220	ND<6.5	22.9	ND<17.6	ND<35.2	ND<17.6
V2 Effluent			ND<1220	ND<6.5	30.3	ND<17.6	ND<35.2	ND<17.6
V2 Influent	05/08/14	10266625	103,000	ND<16.2	435	711	8,340	2,660.0
V2 Intermediate			3,310	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V2 Effluent			5,620	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V2 Influent	06/25/14	10272237	23,200	ND<73.4	ND<174	ND<199	2,820	1,070
V2 Intermediate			12,900	19.4	143	34	ND<61.2	ND<30.6
V2 Effluent			ND<2040	12	ND<25.9	ND<29.6	ND<59.1	ND<29.6
V3 Influent	04/16/14	10263855	167,000	78	1,320	882	6,860	2,290
V3 Intermediate			ND<1220	ND<6.5	18	ND<17.6	ND<35.2	ND<17.6
V3 Effluent			ND<1220	ND<6.5	30.8	ND<17.6	ND<35.2	ND<17.6
V3 Influent	05/08/14	10266625	134,000	33	641	1,060	11,600	3,690.0
V3 Intermediate			9,300	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V3 Effluent			3,970	ND<6.5	ND<15.4	ND<17.6	ND<35.2	ND<17.6
V3 Influent	06/25/14	10272237	ND<28400	ND<152	ND<360	ND<412	3,140	1,130
V3 Intermediate			19,100	24.5	188	130	944	207
V3 Effluent			ND<2120	ND<11.3	ND<26.8	ND<30.6	ND<61.2	ND<30.6

Notes:
There are three sets (or trains) of two vapor phase carbon units (for a total of six) used to treat extracted vapors. The two carbon units associated with each train are plumbed in series. Samples V1 Influent, V1 Intermediate, and V1 Effluent were collected from sample ports associated with the first train of vapor phase carbon units. Samples V2 Influent, V2 Intermediate, and V2 Effluent were collected from sample ports associated with the second train of vapor phase carbon units. Samples V3 Influent, V3 Intermediate, and V3 Effluent were collected from sample ports associated with the third train of vapor phase carbon units. The influent sample ports for each train are located prior to the first carbon units. The intermediate sample ports for each train are located between the first and second carbon units. The effluent sample ports for each train are located after the second (and last) carbon units. The sample port locations are shown on Figure 2.

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Table 2: Liquid Phase Analytical Results Summary

Sample Location	Sample Date	Work Order No.	Analytical Water Results (NWTPH-Gx/8021 for THCg and EPA Method 8260 for VOCs) (µg/L)				
			THCg	Benzene	Toluene	Ethylbenzene	Total Xylenes
W-DSCHG	04/16/14	10264021	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-OUT-WC1	04/16/14	10264021	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-INF-WS1	04/16/14	10264021	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	5.5
W-DSCHG	05/08/14	10266764	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-OUT-WC1	05/08/14	10266764	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-INF-WS1	05/08/14	10266764	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-DSCHG	06/25/14	10272335	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-OUT-WC1	06/25/14	10272335	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)
W-INF-WS1	06/25/14	10272335	ND (<100)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<3.0)

Notes:
There are a total of two liquid phase carbon units plumbed in series to treat water. Samples W-INF and W-INF-WS1 were collected from a sample port located prior to the first liquid phase carbon unit. Samples W-INT and W-OUT-WC1 were collected from a sample port located between the first and second liquid phase carbon units. Samples W-DSCHG were collected from the sample port located after the second (and final) liquid phase carbon unit. The sample port locations are shown on Figure 2.

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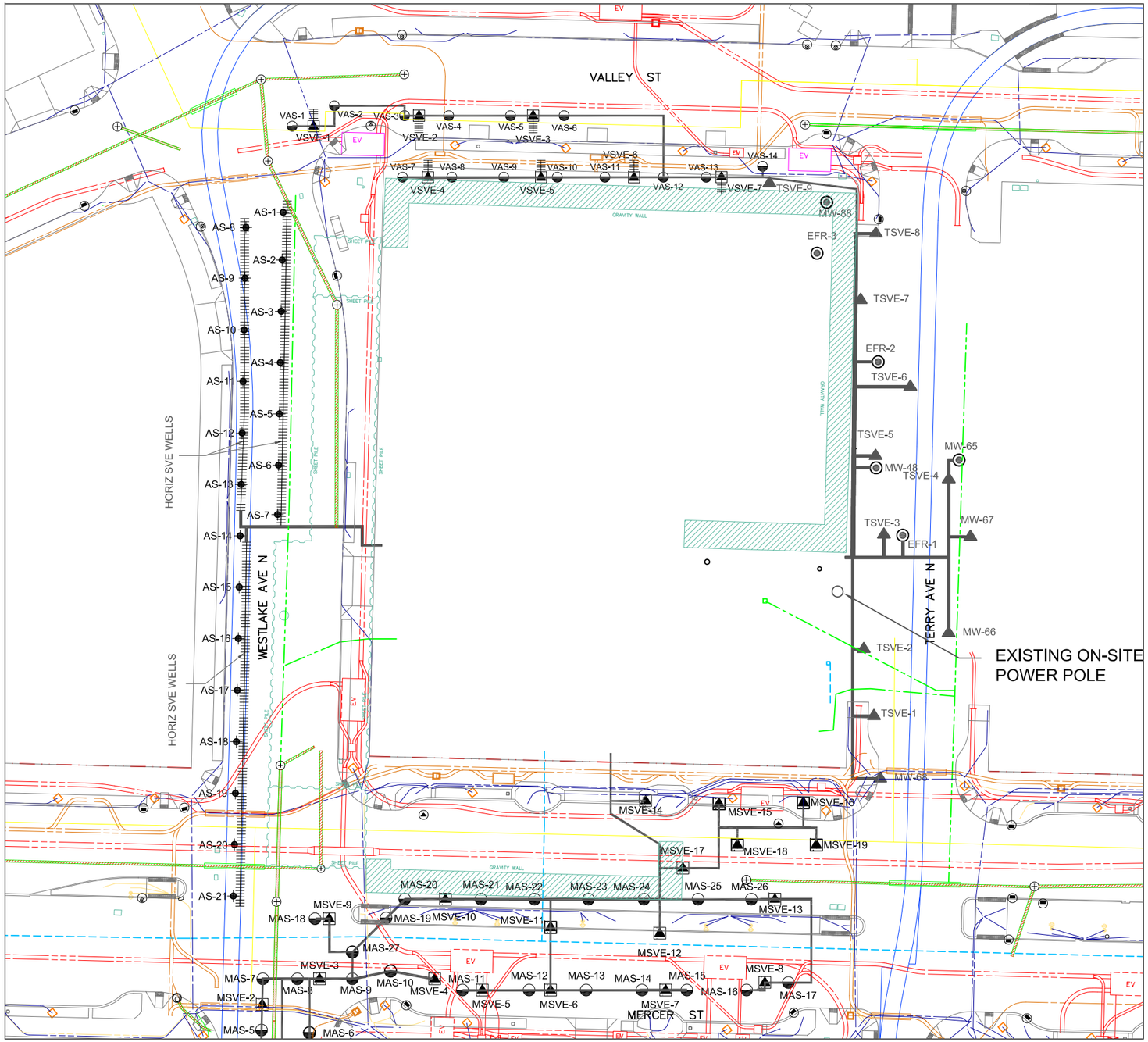
ATTACHMENTS
Acronym List
Figure I – Site Layout Diagram
Figure 2 – Remediation System Layout
Remediation System Operational Data Summary
Cumulative TPHg and BTEX Removal Graph
SVE PID Data Summary
AS Flow Data Summary
O&M Log Field Notes
Appendix A- Laboratory Analytical Reports and Chain of Custody Documents
Appendix B- Carbon Change Documentation

NOTES:

1. LOCATIONS OF SITE FEATURES CONSTRUCTED FOR THE P-66 REMEDIATION SYSTEM (REMEDIATION COMPOUND, ON-SITE TRENCHES, TERRY AVE. TRENCH EXTENSION) HAVE NOT BEEN SURVEYED AND ARE APPROXIMATE.

2. LOCATIONS OF ALL OTHER SITE AND AREA FEATURES ARE BASED ON PLANS SUPPLIED BY SDOT, AND HAVE NOT BEEN VERIFIED BY THE PROJECT ENGINEER.



LEGEND:

- LAMP POST LOCATION
- WATER LINE LOCATION
- PROPERTY LINES
- TRENCH ROUTES
- AS-1 — AIR SPARGE WELL ON WESTLAKE AVENUE
- HORIZONTAL SVE WELL
- TSVE-1 — SVE WELLS ON TERRY AVENUE
- MW-67 — MONITORING WELL
- EFR-1 — ENHANCED FLUID RECOVERY WELL
- MAS-1 — AS WELL ON MERCER
- MSVE-7 — SVE WELLS ON MERCER
- VAS-13 — VALLEY STREET AS WELL
- VSVE-7 — VALLEY STREET HORIZONTAL SVE WELL
- ELECTRICAL LINE LOCATION FOR STREET LIGHTS
- SANITARY/ STORM SEWER LOCATION
- STORM SEWER MANHOLE/CATCH BASIN LOCATION
- ELECTRICAL LINE LOCATION (SCL)
- COMMUNICATION LINE LOCATION
- GAS LINE LOCATION
- STREET CAR LINE LOCATION

APPROXIMATE SCALE

0 60 120 Feet

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SITE LAYOUT DIAGRAM

PHILLIPS 66 Facility No. 255353
600 Westlake Avenue North
Seattle, Washington

EXPLANATION:

- SHEET PILE LOCATION
- GRAVITY WALL LOCATION

PROJECT NO.
03132603

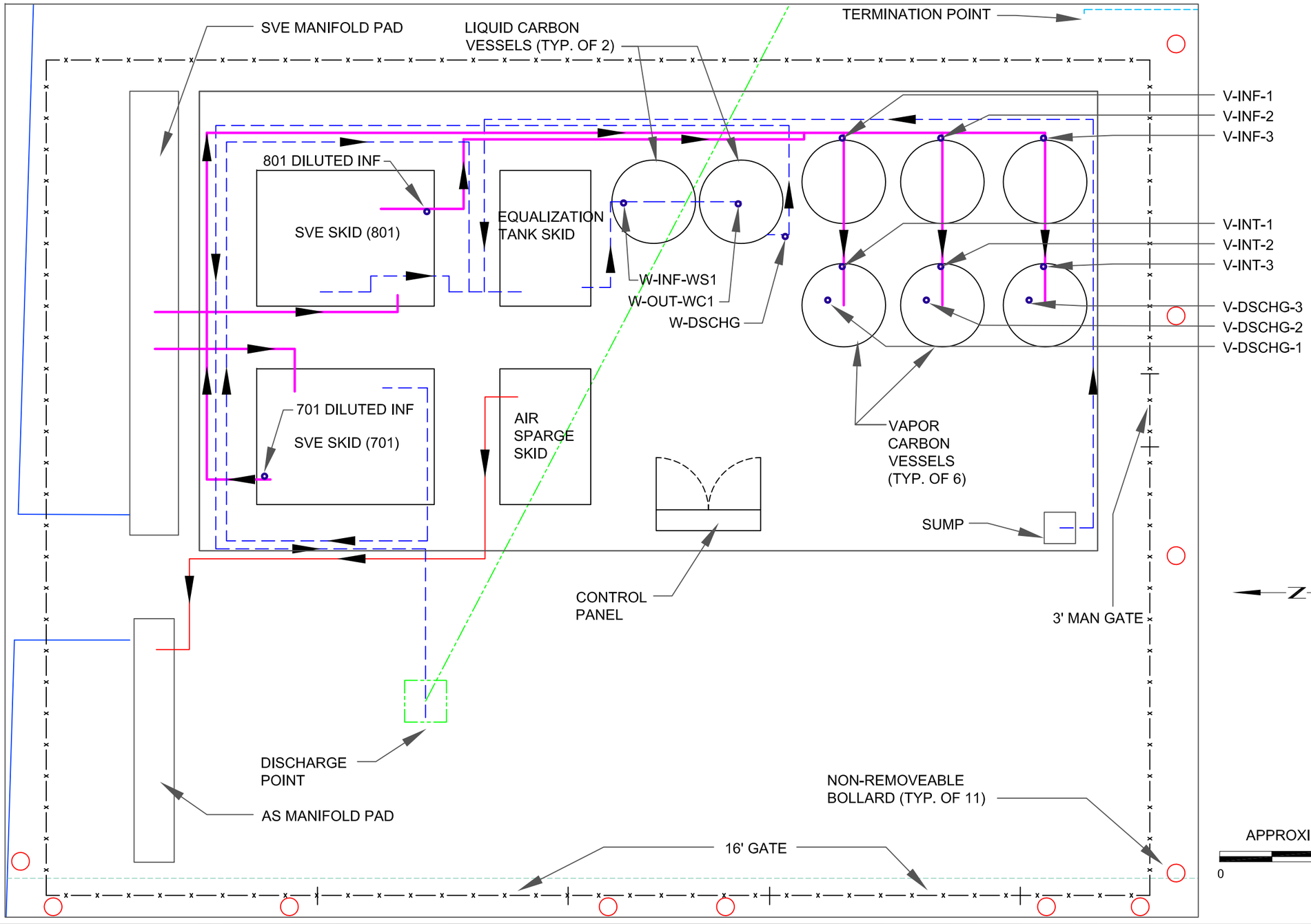
PLATE
1

EJB: 04/29/14

NOTES:

1. LOCATIONS OF SITE FEATURES CONSTRUCTED FOR THE P-66 REMEDIATION SYSTEM (REMEDIATION COMPOUND, ON-SITE TRENCHES) HAVE NOT BEEN SURVEYED AND ARE APPROXIMATE.

2. LOCATIONS OF ALL OTHER SITE AND AREA FEATURES ARE BASED ON PLANS SUPPLIED BY SDOT, AND HAVE NOT BEEN VERIFIED BY THE PROJECT ENGINEER.



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REMEDIATION SYSTEM LAYOUT

PHILLIPS 66 Facility No. 255353
600 Westlake Avenue North
Seattle, Washington

EXPLANATION:

- SVE TRENCHING
- APPROXIMATE SANITARY/ STORM SEWER LOCATION
- AIR SPARGE REMEDIATION PIPING
- COMPOUND FENCE LOCATION
- VAPOR REMEDIATION PIPING
- WATER REMEDIATION PIPING
- APPROXIMATE WATER UTILITIES LOCATION
- BOLLARD LOCATION

PROJECT NO.
03132603

FIGURE
2

EJB: 07/11/14

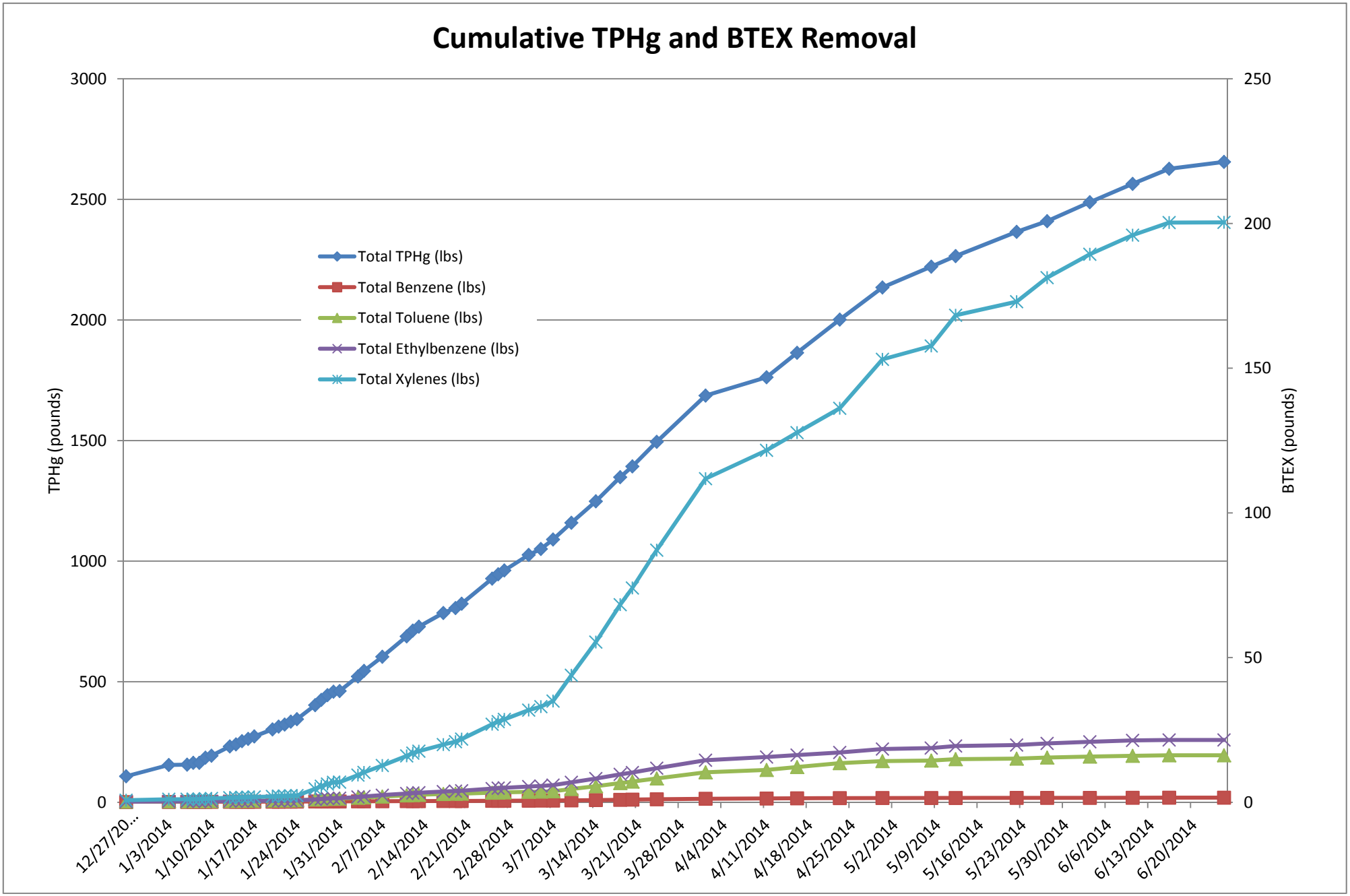
Remediation System Operational Data Summary
PHILLIPS 66 FACILITY #255353

	SVE System								AS System		Off-gas Treatment System									System Totals		
	Mercer-Westlake Wells				Valley-Terry Wells						VPC-1			VPC-2			VPC-3					
Date	Period Operating Hours	Wells On-line (count)	Applied Vaccum (in. H_2O)	Pre-dilution Discharge Conc. (ppm)	Period Operating Hours	Wells On-line (count)	Applied Vaccum (in. H_2O)	Pre-dilution Discharge Conc. (ppm)	Period Operating Hours	Applied Pressure (psi)	Flow Rate (scfm)	Influent Conc. ($\mu g/m^3$)	Estimated TPHg Removed (lbs.)	Flow Rate (scfm)	Influent Conc. ($\mu g/m^3$)	Estimated TPHg Removed (lbs.)	Flow Rate (scfm)	Influent Conc. ($\mu g/m^3$)	Estimated TPHg Removed (lbs.)	Estimated TPHg Removed (lbs.)	Estimated TPHg Removal Rate (lbs./hr)	Cumulative TPHg Removed (lbs.)
4/1/14	194	19	73	37.1	194	23	74	22.1	194	15.1	399.25		52.51	428.93		68.26	468.17		71.10	191.87	0.99	1686.41
4/11/14	71	21	71	17.8	70	25	73	15.9	71	15.4	434.40		20.91	478.15		35.87	503.76		27.61	101.27	0.85	1863.65
4/16/14	118	22	72	38.2	119	26	74	19.5	118	12.5	406.84	156000	28.05	496.74	162000	47.39	501.69	167000	37.34	137.95	0.82	2001.59
4/23/14	168	23	62	47	168	27	74	20	168	12.6	406.20		39.88	464.92		47.68	482.21		50.67	133.31	0.82	2134.90
4/30/14	146	24	73	48.3	169	28	73	18.2	170	12.6	406.20		34.65	464.92		25.78	482.21		50.98	86.10	0.45	2221.00
5/8/14	190	25	73	36	190	29	75	8	190	13	336.33	107000	25.61	351.75	103000	13.16	363.86	134000	34.70	43.93	0.43	2264.93
5/12/14	102	26	73	37	102	30	74	7.9	102	13.4	319.88		13.08	334.30		30.11	345.68		17.70	100.37	0.43	2365.30
5/22/14	235	27	74	39.1	234	31	74	6.6	234	12.5	318.18		29.97	333.56		13.11	343.06		40.29	44.30	0.44	2409.60
5/27/14	100	28	76	30.7	101	32	75	6	100	12.7	325.05		13.03	336.54		24.42	358.27		18.16	78.63	0.47	2488.24
6/3/14	168	29	77	32	168	33	68	5.5	169	13.3	333.45		22.45	376.74		23.82	376.67		31.76	76.13	0.46	2564.37
6/10/14	166	30	79	29.4	166	34	82	5.4	165	13.8	321.35		21.38	371.88		18.71	371.30		30.94	62.56	0.44	2626.93
6/16/14	144	31	80	30.4	143	35	85	7.2	144	12.7	323.85		18.69	339.19		6.48	350.53		25.16	28.57	0.13	2655.50
6/25/14	213	32	78	NM	214	36	85	NM	214	10.7	316.85	55200	13.95	348.40	23200	0.06	357.32	28400	8.13	0.27	0.13	2655.77

Notes:

SVE = Soil Vapor Extraction
AS = Air Sparge
VPC = Vapor Phase Carbon
in. H_2O = inches of water
psi = pounds per square inch
scfm = standard cubic feet per minute
ppm = parts per million
($\mu g/m^3$) = micrograms per cubic meter
TPHg = Total Petroleum Hydrocarbons (Gasoline)

Remediation System Removal Data
PHILLIPS 66 FACILITY #255353



SVE PID Data Summary
PHILLIPS 66 FACILITY #255353

Date	Westlake SVE Wells - PID Readings (ppm)								
	WC1	WC2	WC3	WB3	WB2	WB1	WA3	WA2	WA1
4/16/2014	69	225	210	135	32	225	64	210	115
6/3/2014	--	--	--	--	--	--	--	--	--

Date	Mercer SVE Wells - PID Readings (ppm)																		
	M6	M7	M10	M9	M8	M1	M2	M3	M4	M5	M14	M13	M15	M12	M11	M16	M17	M18	M19
4/16/2014	--	0.4	0.1	2.6	49.3	1.6	0.3	0.2	0.1	0.1	1.1	0.1	0.1	0.1	183	8.3	154	118	8.5
6/3/2014	0.1	0	0.2	0.8	8	0	0	0.1	0.1	--	1.1	0	0	0.1	124	12.5	74.5	31	0.8

Date	Terry SVE Wells - PID Readings (ppm)														
	TSVE3	TEFR1 AIR	TMW65 AIR	TSVE4	TSVE11-MW67	TSVE10 - MW66	TSVE2	TSVE1	TSVE7	TSVE12-MW68	TSVE5	TSVE6	TEFR2 AIR	TSVE8	TMW48 AIR
4/16/2014	3.2	1.5	0.8	0.2	2.5	45	1.8	1	0.2	0.3	0.2	0.1	0	0.1	16.1
6/3/2014	0.8	0.5	0.3	0.2	0.6	30.7	1.3	0.4	0.1	0.1	0	0	0.1	0	0.3

Date	Valley SVE Wells - PID Readings (ppm)							
	V9	V7	V1	V6	V2	V5	V3	V4
4/16/2014	0.1	0.1	0.1	0.1	--	81.1	--	0.1
6/3/2014	0	0	0.1	0	0	22.8	--	0.1

Notes:

SVE	=	Soil Vapor Extraction
PID	=	Photo Ionization Detector
ppm	=	parts per million
--	=	Not Measured/Offline

AS Flow Data Summary
PHILLIPS 66 FACILITY #255353

Date	Westlake AS Wells - Flow Rate Readings (scfm)																			
	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	W-11	W-12	W-13	W-14	W-15	W-16	W-17	W-21	W-20	W-19	W-18
5/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Date	Mercer AS Wells - Flow Rate Readings (scfm)																										
	M-8	M-20	M-26	M-2	M-27	M-16	M-3	M-9	M-17	M-5	M-19	M-15	M-7	M-10	M-14	M-18	M-6	M-13	M-4	M-22	M-12	M-1	M-23	M-11	M-25	M-24	M-21
5/27/2014	14	25	0	0	0	6.5	7	7	10	15	6.5	8	7	25	25	0	16	5	11	11.5	6	16	1	1	25	9	0

Date	Valley AS Wells - Flow Rate Readings (scfm)													
	V-6	V-7	V-8	V-9	V-10	V-5	V-11	V-4	V-12	V-3	V-13	V-2	V-14	V-1
5/27/2014	1	18	5	3	8	0	17	2	3	8	8	12	0	6

Notes:
AS = Air Sparge
SCFM = Standard Cubic Feet per Minute
-- = Not Measured/Offline

Operation and Maintenance Log Field Notes
PHILLIPS 66 FACILITY #255353

Date	Time	Name	Comments
4/1/14	12:00 PM	NAG	System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
4/4/14	10:00 AM	EJB	System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
4/11/14	1:00 PM	NAG	System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
4/16/14	11:15 AM	EJB	System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected (NO FOG SAMPLES COLLECTED).
4/23/14	11:00 AM	EJB	System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
4/30/14	12:30 PM	NAG	701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. NOTE: Anemometer was not functioning properly for flow measurements.
5/8/14	10:45 AM	EJB	System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. (Including FOG samples). NOTE: Rented anemometer was used for this visit.
5/12/14	4:30 PM	EJB	System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. NOTE: Rented anemometer was used for this visit.
5/22/14	10:55 AM	EJB	System operational upon arrival/departure. Belts on B-701 and B-801 were tightened. Photos were taken of potential new monitoring well locations. Vac gauges on blower intakes need to be replaced. NOTE: New Dwyer anemometer was used for this visit.
5/27/14	11:00 AM	EJB	System down upon arrival. Alarms found onsite: PAH-2501 XCH @ 18:11 5/25/14, LAHH-501 VLS @ 14:39 5/26/14, LAHT-501 VLS @ 14:49 5/26/14. B-701 was increased to 55%. Air sparge time was increased to 15min on all groups. First cartridge water filter replaced. Vac gauges on blower intakes need to be replaced. System operational upon departure.
6/3/14	11:00 AM	EJB	System operational upon arrival/departure. B-701 was increased to 60% and 4 Mercer street wells were closed but caused a VFD shutdown after about 1.5hrs, so B-701 was moved to 53% and wells M2 and M15 were closed. Air sparge time was increased to 40min on zones D and E and air sparge time was decreased to 5min on zones A,B and C. PID readings were taken.
6/10/14	10:30 AM	EJB	System operational upon arrival/departure. Air sparge time was increased to 10min on zones A,B and C.
6/16/14	10:40 AM	EJB	System operational upon arrival/departure. Air sparge time was increased to 45min on zones D and E. AS wells in zone D MAS-17, MAS-16, MAS-22, MAS-23, MAS-25 and MAS-26. Zone D wells VAS-3, VAS-6 and VAS-12 were moved to zone B.
6/25/14	9:00 AM	NAG	System operational upon arrival. Monthly vapor and water samples taken. Both cartridge water filters were replaced. Due to >10% concentration exiting the primary carbons, the system was LOTO until the next carbon changeout.

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No. 03132603B

Date	Time	Name	VPC Array																			DPE System Skid (B-701)							DPE System Skid (B-801)					
			Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg
			VPC-1 °F	VPC-1 ft/min	VPC-1 SCFM	VPC-2 °F	VPC-2 ft/min	VPC-2 SCFM	VPC-3 °F	VPC-3 ft/min	VPC-3 SCFM	INF-1 ppmv	INF-2 ppmv	INF-3 ppmv	INT-1 ppmv	INT-2 ppmv	INT-3 ppmv	DSCHG-1 ppmv	DSCHG-2 ppmv	DSCHG-3 ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F	"H_2O
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78	35
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78	35
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73	35
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78	37
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	79	36
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76	35
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79	36
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83	36
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82	36
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84	36
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77	36
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85	32
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82	33
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89	31
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81	34
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80	33
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80	33
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77	32
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81	32
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90	28
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88	28
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76	30
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78	30
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81	30
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86	27
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95	32
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91	31
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90	31
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88	32
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85	32
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93	32
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92	24
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95	22
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94	21
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96	20
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	26.4	32.4	0.32	67	71	102	22.5
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100	22
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100	25
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100	24
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99	24.5
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	28.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106	24
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105	23
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109	23.5
		gp	94.2	4700		95.3	5760		94.6	5800		440	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	√		0.19	72	--	102	23	18.2	401	0.32	74	--	102	23.5

4/16

V-DSCHG-1 @ 1235
V-DSCHG-2 @ 1240
V-DSCHG-3 @ 1245

V-INT-1 @ 1310
V-INT-2 @ 1300
V-INT-3 @ 1250

V-INF-1 @ 1320
V-INF-2 @ 1325
V-INF-3 @ 1330

W-DSCHG @ 1200
W-OUT-WCL @ 1215
W-INF-WSI @ 1230

Conversions 6.24E+11 lbs/ft^3 = 1 $microgram/m^3$

$microgram/m3 = 40.9 \times ppmv \times M$ (STP)

Constant 100, molecular weight , TPHg

Air Sparge Skid																		
Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
							B-701	B-801	C-2201	P-401	P-501	P-5501						
ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
NM	15.7	126	6	50	6.5	5.0	568	532	566	1	1	1	2,430	NM	NM	9.9		
NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken, Individual well PID Readings completed. Baker tank picked up.
NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells.
24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 50% from 65%. Sparge compressor increased from 25% to 50%.
22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
17.5	7.9	141	8	47	7	9.0	1386	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC**
9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC device does not recognize PLC, all settings are locked by admin.**Skid Readings taken from PLC**
8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the inlervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M10, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. Skid Readings taken from PLC from now on.
22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
19.5	16.2	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,098	NM	NM	5.9		

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System operational upon arrival/depart. Sparge readings, PID, Monthly Samples collected

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No. 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1 °F	VPC-1 ft/min	VPC-1 SCFM	VPC-2 °F	VPC-2 ft/min	VPC-2 SCFM	VPC-3 °F	VPC-3 ft/min	VPC-3 SCFM	INF-1 ppmv	INF-2 ppmv	INF-3 ppmv	INT-1 ppmv	INT-2 ppmv	INT-3 ppmv	DSCHG-1 ppmv	DSCHG-2 ppmv	DSCHG-3 ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	456.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	26.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23	1 1100	JB	91.3	4600		93.0	5350		93.1	5550		46	40	31	0	0	0	0	0	0			0.20	62	–	100	24	47	50	0.30	74	--	108

Conversions 8.24E-11 lbs/ft^3 = 1 microgram/m^3

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight, TPHg

3-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
"H_2O	ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	6	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,904	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slighlty on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slighlty on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells.
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 66% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High. This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slighlty on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priviseldges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin. **Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. **Skid Readings taken from PLC from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED).**
4/23 24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	--	--	6.2		System operational upon arrival/departure. Sparge readings taken. Skid in blowers topped off

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1 °F	VPC-1 ft/min	VPC-1 SCFM	VPC-2 °F	VPC-2 ft/min	VPC-2 SCFM	VPC-3 °F	VPC-3 ft/min	VPC-3 SCFM	INF-1 ppmv	INF-2 ppmv	INF-3 ppmv	INT-1 ppmv	INT-2 ppmv	INT-3 ppmv	DSCHG-1 ppmv	DSCHG-2 ppmv	DSCHG-3 ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	28	31	80	37	NM	18.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.6	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	26.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	406.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/14	1045	EJB	98.8	3920		100.2	4110		100.0	4250		25.2	21.0	20.4	6.0	5.0	0.3	0.0	0.0	0.0	Y		.45	73	74	109	23	36.0	36.5	.30	75	76	110

V-DSCHG-1 @ 1115
V-DSCHG-2 @ 1120
V-DSCHG-3 @ 1125

V-INT-1 @ 1150
V-INT-2 @ 1145
V-INT-3 @ 1135

V-INF-1 @ 1200
V-INF-2 @ 1205
V-INF-3 @ 1210

W-DSCHG @ 1230
W-OUT-WS1 @ 1240
W-INF-WS1 @ 1250

FOR

W-DSCHG @ 1300
W-DSCHG @ 1305
W-DSCHG @ 1310

Conversions 6.24E-11 lbs/ft^3 = 1 microgram/m^3

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight , TPHg

B-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
"H_2O	ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operatinnal upon arrival, individual well PID Readings taken for 3/4 wells.
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High.This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priviledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.0 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC device does not recognize PLC, all settings are locked by admin.**Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the orkstrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M5, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. Skid **Readings taken from PLC from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED)**
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	68	12.6	16.0	2843	2829	2864	2	30	12	14,987	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	33	8.1	190	13	64	13	9.0	3038	3019	3054	2	30	13	15628			8.1		SVS operational upon arrival/departure. Vac gauges need replaced. Monthly samples collected — Rented anemometer — ? Fog

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No. 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1	VPC-1	VPC-1	VPC-2	VPC-2	VPC-2	VPC-3	VPC-3	VPC-3	INF-1	INF-2	INF-3	INT-1	INT-2	INT-3	DSCHG-1	DSCHG-2	DSCHG-3													
			°F	ft/min	SCFM	°F	ft/min	SCFM	°F	ft/min	SCFM	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.8	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.8	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	28.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	98
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	28.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	406.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	336.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.0	36.5	0.30	75	76	110
5/12/14	16:30	AS	113.3	3825		115.1	4010		114.9	4145		26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.40	73	73	124	23	37.0	37.0	0.22	74	75	124

Conversions 6.24E-11 lbs/ft^3 = 1 $microgram/m^3$

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight , TPHg

B-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
"H_2O	ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure reading.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed pre-dilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival, Individual well PID Readings taken for 3/4 wells
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High.This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin.**Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steady. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&O documents. Sparge readings were taken. Skid Readings taken from PLC
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 56%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. Skid Readings taken from PLC **from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected (NO FOG SAMPLES COLLECTED).
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	88	12.6	16.0	2843	2829	2864	2	30	12	14,967	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	64	13	9.0	3033	3019	3054	2	30	13	15,623	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(including FOG samples).**
5/12 23	7.9	8.0	210	13	89	12.4	8.5	3135	3121	3156	2	30	13	15,830			8.4		11 11 Anemometer used for visit

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No. 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1	VPC-1	VPC-1	VPC-2	VPC-2	VPC-2	VPC-3	VPC-3	VPC-3	INF-1	INF-2	INF-3	INT-1	INT-2	INT-3	DSCHG-1	DSCHG-2	DSCHG-3													
			°F	ft/min	SCFM	°F	ft/min	SCFM	°F	ft/min	SCFM	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.08	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	28	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/18/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	78	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	50	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	18.3	0.1	0.4	0.5	n		0.14	48	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	436.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	58.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.0	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	50	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	78
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	48	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	88
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	58	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.8	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	58	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.16	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.0	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	88.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	66	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	88.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.8	0.25	67	73	98
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.28	52	56	98	24	28.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	28	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.8	90.8	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	498	31.4	26.3	26.3	0.0	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	108
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	8.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	408.2	93.0	5350	464.9	93.1	5550	482	48	40	31	0	0	0	0	0	0	n		0.20	82	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	30.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	338.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.0	36.5	0.30	75	76	110
5/12/2014	16:30	EJB	113.3	3825	319.9	115.1	4010	334.3	114.9	4145	348	26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.40	73	73	124	23	37.0	37.2	0.22	74	75	124
5/22	1055		112.6	3800		113.5	3990		113.0	4100		27.8	20.4	20.7	0.3	0.4	1.8	0.1	0.1	0.2	n		0.38	74	73	121	23	33.1	34.3	0.30	74	75	120

Conversions 4.24E-11 lbs/ft³ = 1 microgram/m³
microgram/m3 = 40.9 x ppmv x M (STP)
Constant 100 molecular weight, TPHg

3-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
"H_2O	ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801) PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells.
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	16.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High. This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin. **Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. ***Skid Readings taken from PLC***
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. **Skid Readings taken from PLC from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	28.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED).**
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	88	12.6	16.0	2843	2829	2864	2	30	12	14,967	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	64	13	9.0	3033	3019	3054	2	30	13	15,623	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(Including FOG samples). NOTE: Rented anemometer was used for this visit.**
23	7.9	8.0	210	13	89	13.4	8.5	3135	3121	3156	2	30	13	15,830	NM	NM	8.4		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. **NOTE: Rented anemometer was used for this visit.**
5/22 23	6.6	6.8	198	13	75	12.5	9.0	3370	3355	3390	2	30	13	15,861	—	—	12.1		Sys. on Arrival & depart. New anemometer used model – Belts on B-701 & B-801 were tightened. Photos of new MW locations were taken

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
800 Westlake Avenue
ERI Job No 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1	VPC-1	VPC-1	VPC-2	VPC-2	VPC-2	VPC-3	VPC-3	VPC-3	INF-1	INF-2	INF-3	INT-1	INT-2	INT-3	DSCHG-1	DSCHG-2	DSCHG-3													
			°F	ft/min	SCFM	°F	ft/min	SCFM	°F	ft/min	SCFM	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.0	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	28	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	495.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	78
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	28	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	38.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5080	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	58.6	0.10	32	50	80
1/24/2013	17:30	EJB	78.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	408.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	80	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	58	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	48	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.8	0.15	51	58	88
2/12/2014	10:45	NAG	87.4	4900	436.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.18	47	62	94	32.5	34.9	38.1	0.15	51	58	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.6	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	58	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	28.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	68	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	28.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.6	4450	389	21.3	18.6	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.28	52	58	96	24	26.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	98.0	4900	423.5	97.8	5500	473.8	97.6	5750	498	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	108
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	28.8	8.5	1.8	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	408.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	336.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.0	36.5	0.30	75	76	110
5/12/2014	16:30	EJB	113.3	3825	319.9	115.1	4010	334.3	114.9	4145	346	26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.40	73	73	124	23	37.0	37.2	0.22	74	75	124
5/22/2014	10:55	EJB	112.6	3800	318.2	113.5	3900	333.6	113.0	4100	343	27.8	20.4	20.7	0.3	0.4	1.8	0.1	0.1	0.2	n		0.38	74	73	121	23	39.1	39.3	0.30	74	75	120
5/27	11:00	EJB	111.0	3800		111.5	4000		110.4	4250		22.0	17.0	17.5	0.4	0.4	1.7	0.1	0.1	0.2	n		.45	76	75	120	24.5	35.7	39.5	.30	75	75	117

Conversions 6.24E-11 lbs/ft^3 = 1 $microgram/m^3$

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight, TPHg

3-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
$^{\circ}H_2O$	ppmv	ppmv	°F	PSI	°F	PSI	$^{\circ}H_2O$	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	486	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken
34	NM	14.8	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	6	48	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	6	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings
28	NM	18.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	126	9	45	7	5.5	983	926	980	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed pre-dilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	986	929	983	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken, Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 80% from 65%. Sparge compressor increased from 25% to 50%
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High. This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,081	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,081	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,081	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for privileges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin **Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 80%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. Skid Readings taken from PLC from now on.
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.0	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,003	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED)**
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,662	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	68	12.6	16.0	2843	2829	2864	2	30	12	14,987	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	64	13	9.0	3033	3010	3054	2	30	13	15,623	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(Including FOG samples). NOTE: Rented anemometer was used for this visit.**
23	7.9	8.0	210	13	69	13.4	8.5	3135	3121	3156	2	30	13	15,830	NM	NM	8.4		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. **NOTE: Rented anemometer was used for this visit.**
23	8.6	8.8	188	13	75	12.5	9.0	3370	3355	3390	2	30	13	15,861	NM	NM	12.1		System operational upon arrival/departure. Bolts on B-701 and B-801 were tightened. Photos were taken of potential new monitoring well locations. Vac gauges on blower intakes need to be replaced. **NOTE: New Dwyer anemometer was used for this visit.**
5/27	24	6.060	190	13	70	12.7	8.5	3470	3456	3490	2	30	13	16058	-	-	5.2		

Alarms: PAH-2501 XCH 18:11 5.25.14
LAHH-501 VLS 14:39 5.26.14
LAHT-501 VLS 14:49 5.26.14

System down upon arrival. Replaced water filters
B-701 VFD was increased to 55% AS flow increased to 15 scfm
System operational upon depart.

SYSTEM LOG SHEET
PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (			
Date	Time	Name	Stack Air Temp VPC-1 °F	Stack Air Velocity VPC-1 ft/min	Flowrate VPC-1 SCFM	Stack Air Temp VPC-2 °F	Stack Air Velocity VPC-2 ft/min	Flowrate VPC-2 SCFM	Stack Air Temp VPC-3 °F	Stack Air Velocity VPC-3 ft/min	Flowrate VPC-3 SCFM	HC Into 1st VPC1 INF-1 ppmv	HC Into 1st VPC2 INF-2 ppmv	HC Into 1st VPC3 INF-3 ppmv	HC Into 2nd VPC1 INT-1 ppmv	HC Into 2nd VPC2 INT-2 ppmv	HC Into 2nd VPC3 INT-3 ppmv	HC out Stack 1 DSCHG-1 ppmv	HC out Stack 2 DSCHG-2 ppmv	HC out Stack 3 DSCHG-3 ppmv	Samples Collected? Y/N	VPC Line Drain Qty gal	Magnahelic Gauge "H₂O	Vac into VLS "H₂O	Vac into Blower "H₂O	Temp Blower Dischg °F	Press Blower Dischg "H₂O	Blower Inlet HC (pre-dil) ppmv	Blower Outlet HC ppmv	Magnahelic Gauge "H₂O	Vac into VLS "H₂O	Vac into Blower "H₂O	Temp Blower Dischg °F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	48	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.6	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	26.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	408.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	338.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.0	36.5	0.30	75	76	110
5/12/2014	16:30	EJB	113.3	3825	319.9	115.1	4010	334.3	114.9	4145	346	26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.40	73	73	124	23	37.0	37.2	0.22	74	75	124
5/22/2014	10:55	EJB	112.6	3800	318.2	113.5	3900	333.6	113.0	4100	343	27.8	20.4	20.7	0.3	0.4	1.8	0.1	0.1	0.2	n		0.38	74	73	121	23	39.1	39.3	0.30	74	75	120
5/27/2014	11:00	EJB	111.0	3880	325.0	111.5	4000	336.5	110.4	4250	358	22.0	17.0	17.5	0.4	0.4	1.7	0.1	0.1	0.2	n		0.45	76	75	120	24.5	30.7	28.5	0.30	75	75	117
6/3/14	11:00	[illegible]	107.5	3940		107.3	4450		107.4	4450		23.5	17.0	17.4	0.5	0.6	1.9	0.0	0.0	0.1	n		0.40	77	76	119	24	320	31.3	.35	68	69	112

Conversions 8.24E-11 lbs/ft^3 = 1 microgram/m^3

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight , TPHg

3-801)			Air Sparge Skid					1										
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
$^{\circ}H_2O$	ppmv	ppmv	°F	PSI	°F	PSI	$^{\circ}H_2O$	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	8	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	8	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
38	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
38	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.5	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
28	NM	NM	128	9	45	7	5.5	983	926	980	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken, Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival, Individual well PID Readings taken for 3/4 wells.
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High High.This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	148	9.5	58	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1538	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	168	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.8 to 14.0. **Skid Readings taken from PLC**
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin Skid Readings taken from PLC
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. **Skid Readings taken from PLC from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2528	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED)**
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	88	12.6	16.0	2843	2829	2864	2	30	12	14,967	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	64	13	0.0	3033	3019	3054	2	30	13	15,623	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(including FOG samples). NOTE: Rented anemometer was used for this visit.**
23	7.9	8.0	210	13	89	13.4	8.5	3135	3121	3158	2	30	13	15,830	NM	NM	8.4		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. **NOTE: Rented anemometer was used for this visit.**
24	6.6	6.8	198	13	75	12.5	9.0	3370	3355	3390	2	30	13	15,861	NM	NM	12.1		System operational upon arrival/departure. Belts on B-701 and B-801 were tightened. Photos were taken of potential new monitoring well locations. Vac gauges on blower intakes need to be replaced. NOTE: New Dwyer model 471B-1 anemometer was used for this visit and will be used from now on.
24	6.0	6.0	190	13	70	12.7	8.5	3470	3456	3490	2	30	13	16,056	NM	NM	5.0		System down upon arrival. Alarms found onsite; PAH-2501 XCH @ 18:11 5/25/14, LAHH-501 VLS @ 14:39 5/26/14, LAHT-501 VLS @ 14:49 5/26/14. B-701 was increased to 55%. Air sparge time was increased to 15min on all groups. First cartridge water filter replaced. Vac gauges on blower intakes need to be replaced. System operational upon departure.
6/3 23.5	5.5	5.5	193	14	66	13.3	9.0	3638	3624	3659	2	30	14	16,351	—	—	4.5		sys operational upon arrival/departure. B-701 increased to 60% & 4 wells closed, b.t shutdown after 1.5hrs. B-701 vfd went to 53% wells M2 & M5 closed. AS zones D&E increased to 40%. AS zones A&C decreased to 5%. PID readings taken.

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No. 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1	VPC-1	VPC-1	VPC-2	VPC-2	VPC-2	VPC-3	VPC-3	VPC-3	INF-1	INF-2	INF-3	INT-1	INT-2	INT-3	DSCHG-1	DSCHG-2	DSCHG-3													
			°F	ft/min	SCFM	°F	ft/min	SCFM	°F	ft/min	SCFM	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	78
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	28	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	76
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	28	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	546.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4780	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	76.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.6	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.0	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	76
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	76.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.6	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.8	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	56	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.6	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	56	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.3	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5600	499.7	88.6	5530	493	20.6	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/26/2014	14:00	NAG	86.1	4150	365.2	86.8	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	419	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3860	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	56	96	24	26.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	78	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.6	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	78	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	26.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	76	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	498.7	94.6	5800	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	406.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	338.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.0	36.5	0.30	75	76	110
5/12/2014	16:30	EJB	113.3	3825	319.9	115.1	4010	334.3	114.9	4145	346	26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.40	73	73	124	23	37.0	37.2	0.22	74	75	124
5/22/2014	10:55	EJB	112.6	3800	318.2	113.5	3990	333.6	113.0	4100	343	27.8	20.4	20.7	0.3	0.4	1.8	0.1	0.1	0.2	n		0.38	74	73	121	23	39.1	39.3	0.30	74	75	120
5/27/2014	11:00	EJB	111.0	3860	325.0	111.5	4000	336.5	110.4	4250	358	22.0	17.0	17.5	0.4	0.4	1.7	0.1	0.1	0.2	n		0.45	76	75	120	24.5	30.7	28.5	0.30	75	75	117
6/3/2014	11:00	EJB	107.5	3940	333.4	107.3	4450	376.7	107.4	4450	377	23.5	17.0	17.4	0.5	0.6	1.9	0.0	0.0	0.1	n		0.40	77	76	119	24	32.0	31.3	0.35	68	69	112

6/10/14 109.6 3820 110.8 4430 110.4 4420 25.0 12.0 17.9 0.9 1.0 2.3 0.0 0.0 0.0 ! 0.40 79 78 118 23 29.4 33.9 0.37 82 82 118

Conversions 6.24E-11 lbs/ft^3 = 1 microgram/m^3

microgram/m3 = 10 9 x ppmv x M (STP)

Constant 100 molecular weight , TPHg

3-801)			Air Sparge Skid					1											
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-5501						
"H_2O	ppmv	ppmv	°F	PSI	°F	PSI	"H_2O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	5	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	566	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
38	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
28	NM	16.5	125	9	50	8.5	5.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank).
28	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801). PID was not operating properly.
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells.
30	24.9	13	118	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found *running dry. Resumed=OK. Plumbing was modified to even out [ ] to VPCs.*
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	18.2	11.1	141	8	49	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1368	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump in still losing its prime.
32	9.8	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD *for blower 801 nominal motor amp rating increased from 11.8 to 14.0.* ***Skid Readings taken from PLC***
22.5	9.2	7.4	171	12	65	11.9	16.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC; all settings are locked by admin **Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 8 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for A&OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 58%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. Skid Readings taken from PLC from now on.
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		System operational upon arrival. System LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED)**.
24	20	22	175	13	60	12.6	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	88	12.6	16.0	2843	2829	2864	2	30	12	14,967	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 129°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	64	13	9.0	3033	3019	3054	2	30	13	15,823	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(including FOG samples). NOTE: Rented anemometer was used for this visit.**
23	7.9	8.0	210	13	89	13.4	8.5	3135	3121	3156	2	30	13	15,830	NM	NM	8.4		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. **NOTE: Rented anemometer was used for this visit.**
23	6.8	6.8	198	13	75	12.5	9.0	3370	3355	3390	2	30	13	15,861	NM	NM	12.1		System operational upon arrival/departure. Belts on B-701 and B-801 were tightened. Photos were taken of potential new monitoring well locations. Vac gauges on blower intakes need to be replaced. NOTE: **New Dwyer model 471B-1 anemometer was used for this visit and will be used from now on.**
24	6.0	6.0	190	13	70	12.7	8.5	3470	3456	3490	2	30	13	16,058	NM	NM	5.0		System down upon arrival. Alarms found onsite: PAH-2501 XCH @ 18:11 5/25/14, LAHH-501 VLS @ 14:39 5/26/14, LAHT-501 VLS @ 14:49 5/26/14. B-701 was increased to 55%. Air sparge time was increased to 15min on all groups. First cartridge water filter replaced. Vac gauges on blower intakes need to be replaced. System operational upon departure.
23.5	5.5	5.5	193	14	68	13.3	9.0	3638	3624	3659	2	30	14	16,351	NM	NM	4.5		System operational upon arrival/departure. B-701 was increased to 60% and 4 Mercer street wells were closed but caused a VFD shutdown after about 1.5hrs, so B-701 was moved to 53% and wells M2 and M15 were closed. Air sparge time was increased to 40min on zones D and E and air sparge time was decreased to 5min on zones A,B and C. PID readings were taken.

6/10

22.5 / 5.4 ; 5.0 / 18.5 ; 15 ; 6.4 ; 13.8 ; 9.0 / 3804 ; 3790 ; 2 / 3824 ; 31 ; 14 ; 16,926 ; 4.6

Sys operation upon arrival & departure
As time increased to 40 zones A,B,C

SYSTEM LOG SHEET

PHILLIPS 66 FACILITY #255353
600 Westlake Avenue
ERI Job No 03132603B

			VPC Array																			DPE System Skid (B-701)							DPE System Skid (I			
Date	Time	Name	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	Stack Air Temp	Stack Air Velocity	Flowrate	HC Into 1st VPC1	HC Into 1st VPC2	HC Into 1st VPC3	HC Into 2nd VPC1	HC Into 2nd VPC2	HC Into 2nd VPC3	HC out Stack 1	HC out Stack 2	HC out Stack 3	Samples Collected?	VPC Line Drain Qty	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg	Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Magnahelic Gauge	Vac into VLS	Vac into Blower	Temp Blower Dischg
			VPC-1	VPC-1	VPC-1	VPC-2	VPC-2	VPC-2	VPC-3	VPC-3	VPC-3	INF-1	INF-2	INF-3	INT-1	INT-2	INT-3	DSCHG-1	DSCHG-2	DSCHG-3													
			°F	ft/min	SCFM	°F	ft/min	SCFM	°F	ft/min	SCFM	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	ppmv	Y/N	gal	"H_2O	"H_2O	"H_2O	°F	"H_2O	ppmv	ppmv	"H_2O	"H_2O	"H_2O	°F
12/27/2013	12:00	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0.1	0.0	0.0	0.0	y		0.08	26	29	78	37	NM	29.9	0.07	26	25	78
1/3/2014	12:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.4	0.5	0.5	0.0	0.0	0.0	n		0.06	26	31	80	37	NM	16.0	0.06	26	26	76
1/6/2014	16:45	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	na	na	na	na	na	na	n		0.06	28	32	78	37	NM	21.1	0.07	26	25	73
1/7/2014	11:30	EJB	72.0	5400	503.1	72.0	5210	485.4	71.1	4980	464.7	NM	NM	NM	0.3	0.5	0.4	0.0	0.0	0.0	n		0.03	18	22	78	38	NM	19.3	0.06	25	26	78
1/8/2014	16:30	EJB	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.2	0.3	0.4	0.0	0.0	0.0	n		0.04	18	21	77	38	NM	25.4	0.06	26	26	78
1/9/2014	16:00	EJB	71.0	5540	515.9	69.0	5310	496.4	68.0	5300	496.4	NM	NM	NM	0.2	0.3	1.0	0.0	0.0	0.0	n		0.04	22	25	76	38	NM	34.1	0.07	26	27	78
1/10/2014	9:30	EJB	75.8	5600	517.4	73.3	5410	502.2	73.0	5690	528.5	NM	NM	NM	1.6	2.1	3.1	0.2	0.3	0.5	n		0.05	22	26	79	38	NM	20.6	0.07	27	29	79
1/13/2014	16:40	EJB	80.2	5560	509.0	77.1	5780	532.2	76.2	5950	548.7	NM	NM	NM	1.0	1.4	3.2	0.5	0.8	0.9	n		0.05	22	26	82	37	NM	21.5	0.08	26	30	83
1/14/2014	11:30	EJB	79.8	5430	497.4	77.0	5690	524.0	76.5	6000	553.0	NM	NM	NM	0.0	0.1	0.6	0.0	0.0	0.0	n		0.05	22	26	82	37	NM	20.2	0.08	27	32	82
1/15/2014	15:20	EJB	81.3	5610	512.5	78.2	5590	513.6	77.1	5840	537.7	NM	NM	NM	0.0	0.5	3.6	0.4	0.7	0.6	n		0.04	23	27	83	37	NM	22.5	0.07	27	33	84
1/16/2014	10:15	NAG	72.9	5800	538.2	72.9	5750	533.6	72.8	5800	538.3	NM	NM	NM	0.0	0.0	0.0	0.0	0.0	0.0	n		0.04	24	28	76	37	NM	14.8	0.07	28	36	77
1/17/2013	12:15	NAG	80.7	4850	441.1	77.3	4600	421.0	74.6	5050	464.5	NM	NM	NM	0.0	0.4	3.9	0.1	0.2	0.2	n		0.08	34	37	80	36	NM	36.5	0.12	44	51	85
1/20/2014	9:00	EJB	79.6	5000	456.7	76.2	4920	452.2	74.2	4940	455.7	NM	NM	NM	0.0	0.8	6.5	0.2	0.0	0.1	n		0.08	33	37	79	37	NM	37.9	0.11	44	59	82
1/21/2014	14:15	NAG	87.2	4800	429.9	83.2	5100	460.1	80.9	5150	466.6	NM	NM	NM	3.1	7.8	16.3	0.1	0.4	0.5	n		0.14	46	50	91	34	NM	42.8	0.17	53	65	89
1/22/2014	10:30	EJB	80.0	4950	451.8	79.3	5060	462.4	81.1	5500	500.9	NM	NM	NM	0.0	2.2	11.5	0.0	0.1	0.2	n		0.14	42	48	88	36	NM	53.2	0.10	33	52	81
1/23/2014	16:30	EJB	75.5	4560	418.2	74.8	4770	438.1	76.0	5150	471.9	NM	NM	NM	0.0	2.5	12.5	0.1	0.2	0.2	n		0.14	40	48	85	34	NM	56.6	0.10	32	50	80
1/24/2013	17:30	EJB	76.4	4720	432.2	75.5	4790	439.3	77.3	5250	479.9	NM	NM	NM	0.0	2.6	14.0	0.3	0.2	0.1	n		0.14	41	49	85	34	NM	52.5	0.09	32	100	80
1/27/2014	12:00	EJB	74.4	4710	431.9	74.2	4700	431.1	78.0	5200	475.4	NM	NM	NM	0.0	3.2	14.7	0.0	0.0	0.1	y		0.12	41	50	84	33	NM	52.8	0.09	31	100	77
1/28/2014	13:15	EJB	78.8	4830	439.5	77.8	4840	441.0	79.1	5230	475.4	NM	NM	NM	0.1	4.1	15.5	0.0	0.2	0.3	n		0.12	40	51	88	33	NM	43.5	0.09	31	50	81
1/29/2014	10:40	EJB	85.1	5050	450.9	79.6	4510	406.8	77.5	5020	454.6	NM	NM	NM	0.2	4.4	13.9	0.1	0.1	0.1	n		0.14	44	55	88	31	NM	41.5	0.13	59	60	90
1/30/2014	14:45	NAG	83.4	5050	452.3	79.1	4800	433.3	76.6	4900	444.4	NM	NM	NM	0.1	3.1	10.1	0.0	0.0	0.0	y		0.15	44	54	85	31	NM	NM	0.17	56	61	88
1/31/2014	11:30	NAG	73.7	4700	429.6	71.2	4500	413.2	70.1	4500	414.1	14.2	19.7	25.8	0.0	1.9	7.6	0.0	0.0	0.0	n		0.15	46	57	80	31	34.4	27.3	0.13	47	56	78
2/3/2014	9:00	EJB	77.3	5100	464.1	74.1	4700	430.2	74.2	5060	463.1	NM	NM	NM	0.0	3.7	10.3	0.0	0.0	0.0	n		0.12	40	53	78	33	NM	45.1	0.12	46	52	78
2/4/2014	13:00	NAG	77.3	4400	399.9	76.0	4625	421.4	78.0	4925	449	11.5	23.3	35.0	0.0	4.6	12.0	0.0	0.3	0.2	n		0.15	46	57	83	32	35.9	33.1	0.13	48	54	81
2/11/2014	11:00	NAG	90.0	5100	449.7	85.8	5000	444.3	82.9	5050	451	14.7	25.0	35.5	0.1	10.4	17.2	0.0	0.0	0.0	n		0.17	50	62	87	29	35.5	37.0	0.15	51	58	86
2/12/2014	10:45	NAG	87.4	4900	438.4	87.7	5400	482.9	86.5	5400	484	29.3	24.5	24.5	0.1	13.1	21.0	0.0	0.0	0.0	n		0.16	47	62	94	32.5	34.9	36.1	0.15	51	58	95
2/13/2014	13:30	NAG	82.7	4700	422.9	84.0	4600	413.0	83.6	5100	458	24.7	22.8	21.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.18	48	62	90	31	29.8	31.1	0.15	51	58	91
2/17/2014	14:45	NAG	81.1	4600	415.2	82.5	4750	427.6	82.7	5000	450	22.3	18.5	19.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	51	66	90	31	28.7	27.1	0.15	52	58	90
2/19/2014	12:00	NAG	82.9	4800	432.5	82.9	5200	468.6	82.3	5400	487	19.5	15.9	16.4	0.0	0.0	0.0	0.0	0.0	0.0	y		0.19	49	63	89	31.5	25.6	26.0	0.14	49	55	88
2/20/2014	9:45	NAG	81.4	4800	434.0	81.4	5075	458.8	81.4	5500	497	22.3	17.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	64	87	32	26.8	30.4	0.18	49	58	85
2/25/2014	12:00	EJB	88.8	4920	438.8	88.6	5800	499.7	88.6	5530	493	20.8	16.2	17.2	0.0	0.0	0.0	0.0	0.0	0.0	n		0.17	48	66	94	32	31.5	29.1	0.19	46	54	93
2/28/2014	14:00	NAG	86.1	4150	365.2	86.6	4500	395.5	86.5	4675	411	24.3	20.0	19.7	0.0	0.0	0.1	0.0	0.0	0.0	n		0.19	49	68	91	24	25.9	32.4	0.23	53	57	92
2/27/2014	12:30	NAG	86.8	4100	359.1	88.3	4475	390.8	88.3	4800	410	23.2	19.1	19.8	0.0	0.1	0.1	0.0	0.0	0.0	n		0.20	50	70	90	23	26.1	31.3	0.30	63	70	95
3/3/2014	14:00	NAG	85.2	3925	344.0	87.4	4375	381.8	86.8	4450	389	21.3	18.8	18.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.74	50	53	90	22	24.3	27.5	0.32	62	65	94
3/5/2014	12:00	EJB	85.8	3880	339.2	87.6	4250	370.4	87.4	4300	375	25.3	19.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.19	50	53	91	22	30.4	34.6	0.25	67	73	96
3/7/2014	13:00	NAG	92.2	4800	417.0	94.6	5475	473.6	94.0	5700	494	23.6	20.1	19.4	0.0	0.0	0.0	0.0	0.0	0.0	n		0.26	52	58	98	24	28.4	32.4	0.32	67	71	102
3/10/2014	15:30	NAG	89.5	4325	376.5	90.1	4775	415.2	89.5	4950	431	32.7	24.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	y		0.34	65	68	97	22	31.2	44.7	0.34	71	74	100
3/14/2014	10:15	NAG	90.5	4580	400.7	91.0	4900	428.3	90.4	5300	464	31.4	23.8	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	70	73	99	25	34.3	38.4	0.47	73	77	100
3/18/2014	13:45	NAG	91.9	4700	410.2	92.2	5075	442.7	91.5	5300	463	29.2	23.5	23.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.58	74	71	100	26	24.5	38.8	0.45	75	80	100
3/20/2014	10:30	NAG	90.1	4750	416.6	90.6	5000	438.2	90.8	5350	469	31.4	26.0	26.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.63	71	75	99	27	31.4	34.9	0.48	74	79	99
3/24/2014	10:00	NAG	96.0	4900	423.5	97.8	5500	473.8	97.8	5750	496	31.4	26.3	26.3	0.9	0.1	0.7	0.0	0.0	0.0	n		0.40	75	76	105	24	34.8	44.3	0.30	77	80	106
4/1/2014	12:00	NAG	92.4	4600	399.2	93.3	4950	428.9	93.0	5400	468	33.2	27.1	28.8	6.5	1.6	4.7	0.1	0.0	0.0	n		0.35	73	76	105	23	37.1	49.5	0.44	74	77	105
4/4/2014	10:00	EJB	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--
4/11/2014	13:00	NAG	101.1	5075	434.4	102.5	5600	478.1	102.5	5900	504	18.2	16.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.48	71	74	108	24	17.8	21.8	0.40	73	78	109
4/16/2014	11:15	EJB	94.2	4700	406.8	95.3	5750	496.7	94.6	5600	502	44.0	35.0	35.3	0.0	0.0	0.0	0.0	0.0	0.0	Y		0.18	72	--	102	23	38.2	40.1	0.32	74	--	102
4/23/2014	11:00	EJB	91.3	4660	406.2	93.0	5350	464.9	93.1	5550	482	46	40	31	0	0	0	0	0	0	n		0.20	62	--	100	24	47	50	0.30	74	--	108
4/30/2014	12:30	NAG	113.5	NM	NC	114.2	NM	NC	114.0	NM	NC	39.4	32.3	32.7	0.0	0.0	0.0	0.0	0.0	0.0	n		0.59	73	74	119	24	48.3	53.1	0.23	73	75	118
5/8/2014	10:45	EJB	98.8	3920	336.3	100.2	4110	351.8	100.0	4250	364	25.2	21.0	20.4	0.0	0.0	0.3	0.0	0.0	0.0	Y		0.45	73	74	109	23	36.9	36.5	0.30	75	78	110
5/12/2014	16:30	EJB	113.3	3625	319.9	115.1	4010	334.3	114.9	4145	346	26.0	20.5	21.0	0.0	0.0	0.0	0.0	0.0	0.0	n		0.40	73	73	124	23	37.0	37.2	0.22	74	75	124
5/22/2014	10:55	EJB	112.6	3800	318.2	113.5	3990	333.6	113.0	4100	343	27.8	20.4	20.7	0.3	0.4	1.8	0.1	0.1	0.2	n		0.38	74	73	121	23	39.1	39.3	0.30	74	75	120
5/27/2014	11:00	EJB	111.0	3860	325.0	111.5	4000	336.5	110.4	4250	358	22.0	17.0	17.5	0.4	0.4	1.7	0.1	0.1	0.2	n		0.45	76	75	120	24.5	30.7	28.5	0.30	75	75	117
6/3/2014	11:00	EJB	107.5	3940	333.4	107.3	4450	376.7	107.4	4450	377	23.5	17.0	17.4	0.5	0.6	1.9	0.0	0.0	0.1	n		0.40	77	76	119	24	32.0	31.3	0.35	68	69	112
6/10/2014	10:30	EJB	109.6	3820	321.3	110.8	4430	371.9	110.4	4420	371	25.0	18.0	17.9	0.9	1.0	2.3	0.0	0.0	0.0	n		0.40	79	78	118	23	29.4	33.9	0.37	82	82	118

6/4/14 10/0 3830 4020 4150 30 20.4 1.5 1.4 2.3 0.0 0.1 0.0 0.39 80 80 112 22 30.4 36.0 85 86 115

105.7 106.9 106.3 19.9 0.35

Conversions 6.24E-11 lbs/ft³ = 1 microgram/m³

microgram/m3 = 40.9 x ppmv x M (STP)

Constant 100 molecular weight, TPHg

3-801)			Air Sparge Skid																
Press Blower Dischg	Blower Inlet HC (pre-dil)	Blower Outlet HC	Temp into HX	Pressure into HX	Temp out HX	Pressure out HX	Magnahelic gauge	Blower Hour Meter	Blower Hour Meter	Sparge Compressor Hour Meter	VLS Transfer Pump Hour Meter	VLS Transfer Pump Hour Meter	Tank Transfer Pump Hour Meter	Effluent Totalizer	LPC1 Water Pressure	LPC2 Water Pressure	Tank Transfer Pump Discharge Pressure	Estimated Hydrocarbons Removed (Vapor)	Comments
								B-701	B-801	C-2201	P-401	P-501	P-6501						
"H₂O	ppmv	ppmv	°F	PSI	°F	PSI	"H₂O	hrs	hrs	hrs	hrs	hrs	hrs	gal	psi	psi	psi	lbs	
35	NM	25.2	125	7	44	8	4.5	284	247	283	1	1	1	965	NM	NM	10.1		
35	NM	17.9	140	4	44	6.5	4.5	398	361	397	1	1	1	1,286	NM	NM	9.7		
35	NM	17.2	115	4	42	6	4.5	401	364	400	1	1	1	1,287	NM	NM	9.8		
37	NM	16.4	125	4	45	6	4.5	420	383	419	1	1	1	1,394	NM	NM	10		
36	NM	16.3	120	4	43	5	4.5	448	411	447	1	1	1	1,740	NM	NM	10		
35	NM	31.8	120	7	43	8	5.0	472	435	471	1	1	1	1,799	NM	NM	9.6		
36	NM	12.0	125	7	48	7.5	5.0	489	453	488	1	1	1	1,822	NM	NM	9.8		
36	NM	15.7	126	6	50	6.5	5.0	568	532	568	1	1	1	2,430	NM	NM	9.9		
36	NM	18.0	125	6	52	6.5	5.0	587	550	586	1	1	1	2,430	NM	NM	10		
36	NM	14.4	125	6	51	7.0	5.0	615	578	612	1	1	1	2,460	NM	NM	9.8		
36	NM	17.3	118	7.5	41	6.0	5.0	634	597	631	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.0	118	6.5	41	6.0	5.0	659	623	656	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings.
33	NM	12.8	120	6	42	6.5	5.0	728	692	725	1	1	1	2,462	NM	NM	NM		Insufficient water for pressure readings. PID Readings taken.
31	NM	15.9	123	6	44	5.5	5.0	757	721	754	1	1	1	2,501	NM	NM	11		Attempted to reduce dilution air further, but persistent VFDW-8101 alarms prevented this. PID Readings taken.
34	NM	14.6	125	6	48	6.5	5.0	777	740	774	1	1	2	2,501	NM	NM	NM		Insufficient water for pressure readings.
33	NM	16.2	125	8	46	8.5	5.0	807	770	804	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
33	NM	14.5	125	6	48	7.0	5.3	832	795	829	1	1	2	2,516	NM	NM	NM		Insufficient water for pressure readings.
32	NM	15.2	115	6	44	6.5	5.5	898	861	895	1	1	2	2,516	NM	NM	9.8		
32	NM	13.5	130	8	48	8.0	5.0	923	886	920	1	1	2	2,533	NM	NM	NM		Insufficient water for pressure readings.
26	NM	16.5	125	9	50	8.5	6.0	946	909	943	1	1	2	2,984	NM	NM	6.1		Reduced dilution air a bit on B-801. Tank trans pump press went down after switching discharge to direct drain (not to Baker tank)
26	NM	NM	128	9	45	7	5.5	963	926	960	1	1	2	3,309	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. Baker tank pumped out. Inf sample ports installed predilution for each blower. Samples taken. (V-INF-701, 801) PID was not operating properly
30	27.5	13.5	119	10	39	8.5	5.5	966	929	963	1	1	2	3,385	NM	NM	7		System down upon arrival, restarted, opened dilution slightly on 801. AS readings taken. Individual well PID Readings completed. Baker tank picked up.
30	NM	14.2	118	7	40	8.7	5.5	1035	998	1032	1	1	2	3,406	NM	NM	5.2		System operational upon arrival. Individual well PID Readings taken for 3/4 wells
30	24.9	13	116	8	38	8.0	5.5	1063	1026	1060	1	1	2	3,418	NM	NM	NM		System operational upon arrival/departure. PID readings completed. AS well readings taken.
27	25.7	15.2	142	8	49	6	8.0	1229	1192	1227	1	1	3	3,823	NM	NM	12		System operational upon arrival/departure. 701 & 801 blowers reduced to 60% from 65%. Sparge compressor increased from 25% to 50%.
32	22.8	13	145	7	56	6	8.5	1255	1218	1252	1	13	3	4,318	NM	NM	12		system operational upon arrival/departure. 801 PID Readings completed. Sparge readings completed. 801 VLS pump had lost its prime and was found running dry. Reprimed=OK. Plumbing was modified to even out [ ] to VPCs.
31	18.6	10.7	144	9	55	6	8.5	1274	1237	1272	2	13	3	4,352	NM	NM	12		System operational upon arrival/departure. Siemens carbon change for VPCs 1-1, 2-1, 3-1, & 3-2. 701 PID Readings completed. Precarbon water filter replaced.
31	16.2	11.1	141	8	40	7	8.5	1341	1304	1338	2	27	4	5,377	NM	NM	12		System down upon arrival due to 801-VLS High-High. This caused HT pump to stop, so the containment area was full as a result. Containment pumped out, system restarted. Sparge manifold readings completed.
32	17.5	7.9	141	8	47	7	9.0	1366	1329	1364	2	27	4	5,728	NM	NM	12		System down upon arrival due to a VFD-8202 PNL alarm. Dilution air was increased slightly on 801 blower. Compliance air samples were taken in addition to influent samples. 701 PID Readings completed.
32	10.7	6.2	144	9.5	47	9	9.0	1388	1351	1385	2	27	4	5,791	NM	NM	12		System operational upon arrival/departure. Monthly water samples were taken. 801 PID Readings were completed. NOTE: 801 VLS transfer pump is still losing its prime.
32	9.6	6.5	146	9.5	56	10	8.0	1510	1473	1507	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. 701 PID Readings were completed.
24	10.2	8.6	172	9	59	8.5	8.0	1536	1499	1533	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Blower VFDs were both reduced to 40%. Sparge VFD were increased to 80%. Dilution was decreased to both blowers. Sparge readings were taken.
22	11.8	10.4	169	10	58	9.0	8.0	1559	1522	1556	2	27	4	6,061	NM	NM	12		System operational upon arrival/departure. Dilution was closed for both blowers. 801 PID Readings completed.
21	10.7	10.8	165	10.5	57	8.0	8.0	1656	1619	1653	2	27	5	6,888	NM	NM	12		System operational upon arrival/departure. Sparge readings taken. Attempted unsuccessfully to upload program to the PLC-need to contact IT for priveledges. **Skid Readings taken from PLC**
20	9.8	9.1	165	11	61	12.2	7.5	1694	1657	1691	2	27	6	7,812	NM	NM	5.2		System down upon arrival due to a VFD-8202 PNL alarm (VFD alarm code OLF). System operational upon departure. 701 PID Readings were completed. VFD for blower 801 nominal motor amp rating increased from 11.6 to 14.0. **Skid Readings taken from PLC!**
22.5	9.2	7.4	171	12	65	11.9	10.0	1742	1705	1739	2	28	6	8,477	NM	NM	5.2		System operational upon arrival/departure. 801 PID Readings were completed. 701 was raised to 45% power, 801 was raised to 40%. Both motors are running at 9 Amps, with max peaks of 10.8 Amps. Attempted unsuccessfully to upload program to the PLC-device does not recognize PLC, all settings are locked by admin. **Skid Readings taken from PLC**
22	8	7.9	168	12	57	11.8	13.0	1816	1779	1813	2	28	7	10,088	NM	NM	5.2		System operational upon arrival/departure. The 9 lateral wells on the 701 manifold were closed 1/2 way. Monthly vapor and water compliance samples were taken. **Skid Readings taken from PLC**
25	9.4	9.2	171	14	58	13.4	13.0	1907	1869	1904	2	29	8	10,460	NM	NM	5.2		System operational upon arrival/departure. The lateral wells on 701 were closed 2/3 way. 701 was raised to 60%. 801 was raised to 50%. Both motors were running at 10.5 amps steadily. The sparge compressor was raised to 100% and the intervals were set to 10 minutes. Compliance punch list was completed with the exception of the unistrut caps (ran out). **Skid Readings taken from PLC**
24	9.4	10.2	176	13	54	12.6	15.5	2006	1969	2003	2	29	9	11,796	NM	NM	5.2		System operational upon arrival/departure. M9, M16, & M17 true union ball valves were tightened. Additional LOTO photos were taken for AS.OI documents. Sparge readings were taken. **Skid Readings taken from PLC**
24.5	10	9.7	167	13	48	12.3	18	2051	2013	2048	2	29	9	12,039	NM	NM	5.2		System operational upon arrival/departure. 701 & 801 PID Readings were completed. Additional LOTO pics taken. Waited for PSCAA, but they did not show up. **Skid Readings taken from PLC**
24	15.7	12.8	182	14	57	13.4	15.0	2146	2109	2143	2	30	9	12,420	NM	NM	5.2		System operational upon arrival/departure. Westlake SVE & Sparge wells were shut-off. 701 reduced to 50%, 801 elevated to 55%. Waited for PSCAA, but they did not show up. Small breakthrough through primary carbons. **Skid Readings taken from PLC from now on.**
23	22.1	16.1	193	15.5	62	15.1	14.5	2340	2303	2337	2	30	10	13,728	NM	NM	6.2		System operational upon arrival/departure. 801 reduced to 50% (now both 701 & 801 are @ 50%). Breakthrough has reached over 10% in carbon trains 1 & 3.
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		System operational upon arrival, system LOTO upon departure. System shut down for carbon replacement.
23.5	15.9	13.3	200	15.5	68	15.4	26.0	2411	2373	2408	2	30	11	14,011	NM	NM	5.8		System LOTO upon arrival. The tops were removed from the 3 primary carbon vessels. Evoqua changed out carbon and also removed the 4,000lbs. of carbon from the last changeout from the site. Upon Evoqua's departure, the tops were reinstalled and the system was restarted. The system was operational upon departure.
23.5	19.5	18.8	175	13	57	12.5	8.5	2529	2492	2526	2	30	11	14,093	NM	NM	5.9		System operational upon arrival/departure. Sparge readings were taken. PID readings were taken. Monthly vapor samples were collected, and water samples were collected **(NO FOG SAMPLES COLLECTED)**
24	20	22	175	13	60	12.8	9.0	2697	2660	2694	2	30	12	14,692	NM	NM	6.2		System operational upon arrival/departure. Sparge readings were taken. Oil topped off in B-801 and B-701. Vac gauges on blower intakes need to be replaced.
24	18.2	16.3	208	13	88	12.6	16.0	2843	2829	2864	2	30	12	14,967	NM	NM	6.2		701 blower down upon arrival for high blower outlet temp. Alarm setpoint was set at 120°F. The limiting factor for temperature extremes was the sched80 PVC, which has an upper limit of 140°F, which is what both the 701 & 801 alarm setpoints were set to. System was operational upon departure. **NOTE: Anemometer was not functioning properly for flow measurements.**
23	8.0	8.1	190	13	84	13	9.0	3033	3019	3054	2	30	13	15,623	NM	NM	8.1		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. Monthly vapor samples and water samples were collected. **(Including FOG samples). NOTE: Rented anemometer was used for this visit.**
23	7.9	8.0	210	13	89	13.4	8.5	3135	3121	3156	2	30	13	15,830	NM	NM	8.4		System operational upon arrival/departure. Vac gauges on blower intakes need to be replaced. **NOTE: Rented anemometer was used for this visit.**
23	6.6	6.8	168	13	75	12.5	9.0	3370	3355	3390	2	30	13	15,861	NM	NM	12.1		System operational upon arrival/departure. Bolts on B-701 and B-801 were tightened. Photos were taken of potential new monitoring well locations. Vac gauges on blower intakes need to be replaced. **NOTE: New Dwyer model 471B-1 anemometer was used for this visit and will be used from now on.**
24	6.0	6.0	190	13	70	12.7	8.5	3470	3456	3490	2	30	13	16,058	NM	NM	5.0		System down upon arrival. Alarms found onsite: PAH-2501 XCH @ 16:11 5/25/14, LAHH-501 VLS @ 14:39 5/26/14, LAHT-501 VLS @ 14:49 5/26/14. B-701 was increased to 55%. Air sparge time was increased to 15min on all groups. First cartridge water filter replaced. Vac gauges on blower intakes need to be replaced. System operational upon departure.
23.5	5.5	5.5	193	14	66	13.3	9.0	3638	3624	3659	2	30	14	16,351	NM	NM	4.5		System operational upon arrival/departure. B-701 was increased to 60% and 4 Mercer street wells were closed but caused a VFD shutdown after about 1.5hrs, so B-701 was moved to 53% and wells M2 and M15 were closed. Air sparge time was increased to 40min on zones D and E and air sparge time was decreased to 5min on zones A,B and C. PID readings were taken.
22.5	5.4	5.0	185	15	64	13.8	9.0	3804	3790	3824	2	31	14	16,926	NM	NM	4.6		System operational upon arrival/departure. Air sparge time was increased to 10min on zones A,B and C.
22	7.2	7.6	180	14	58	12.7	9	3948	3933	3968	2	31	15	17,746	"	"	5.0		" wells. drummed groups. AS [illegible] ↑ to 45min in Zones D & E

AS1 : Westlake			
Valve ID	No.	Zone	Well
SV- 2801	1	A	AS-1
SV- 2802	2	A	AS-6
SV- 2803	3	A	AS-10
SV- 2804	4	A	AS-17
SV- 2805	5	B	AS-4
SV- 2806	6	B	AS-8
SV- 2807	7	B	AS-13
SV- 2808	8	B	AS-16
SV- 2809	9	B	AS-21
SV- 2810	10	C	AS-2
SV- 2811	11	C	AS-7
SV- 2812	12	C	AS-11
SV- 2813	13	C	AS-18
SV- 2814	14	D	~~AS-5~~
SV- 2815	15	D	~~AS-9~~
SV- 2816	16	D	AS-14
SV- 2817	17	D	AS-19
SV- 2818	18	E	AS-3
SV- 2819	19	E	AS-12
SV- 2820	20	E	AS-15
SV- 2821	21	E	AS-20

AS2:Valley			
Valve ID		Zone	Well
SV- 2822	1	A	VAS-1
SV- 2823	2	A	VAS-4
SV- 2824	3	A	VAS-10
SV- 2825	4	B	VAS-9
SV- 2826	5	B	VAS-14
SV- 2827	6	C	VAS-2
SV- 2828	7	C	VAS-8
SV- 2829	8	C	VAS-11
SV- 2830	9	D	VAS-3
SV- 2831	10	D	VAS-6
SV- 2832	11	D	VAS-12
SV- 2833	12	E	VAS-5
SV- 2834	13	E	VAS-7
SV- 2835	14	E	VAS-13

AS3:Mercer			
Valve ID		Zone	Well
SV- 2836	1	A	MAS-1
SV- 2837	2	A	MAS-5
SV- 2838	3	A	MAS-11
SV- 2839	4	A	MAS-17
SV- 2840	5	A	MAS-18
SV- 2841	6	A	MAS-24
SV- 2842	7	B	MAS-3
SV- 2843	8	B	MAS-7
SV- 2844	9	B	MAS-10
SV- 2845	10	B	MAS-16
SV- 2846	11	B	MAS-22
SV- 2847	12	C	MAS-2
SV- 2848	13	C	MAS-9
SV- 2849	14	C	MAS-12
SV- 2850	15	C	MAS-20
SV- 2851	16	C	MAS-25
SV- 2852	17	D	MAS-6
SV- 2853	18	D	MAS-14
SV- 2854	19	D	MAS-21
SV- 2855	20	D	MAS-23
SV- 2856	21	D	MAS-26
SV- 2857	22	D	MAS-27
SV- 2858	23	E	MAS-4
SV- 2859	24	E	MAS-8
SV- 2860	25	E	MAS-13
SV- 2861	26	E	MAS-15
SV- 2862	27	E	MAS-19

Westlake-Mercer

4/30/14	VAC1	13.5/39.4ppm/0/0		@1230	701	801	SP
onsite @ 1100-1315		14.2/32.3ppm/0/0	14,967 gal	2/30/12	81 at	16.3 at	
		14.0/32.7ppm/0/0		2843	75"/73"	75"/73"	12.6/88°
701 down upon arrival, high blower outlet T.				2829	0.45-0.72	0.06-0.39	12-19
saw that is was set @ 120° (801 was running @ 118°)				2864			13/208°
sched 80 upper T limit is 140°, the blower limit is 250°+							
701+801 limits set @ 140°, 701 restarted).							

6/25/14	VLS	onsite @ 0715	17.1		701	801	SP
0800 →	2/32/16 HT		3/575				
sample	4161	0/4.0/23.1	3815	116.6°	78"/78"	85"/82"	73°/10.7
& all weeds	4147	0/3.9/17.3	4200	117.3°	0.32-0.59	0.14-0.38	13-21"
replaced 2 blows	4182-SP	0/6.3/17.1	4300	116.3	125°/23"	125°/22"	184°/11
	18824 gal	x+y=1			29.5ppm	6.5ppm	
x(.455)(29.5) + y(0.26)(6.5) =		29.5x + 6.5(1-x) = 19.0			23x = 12.5		

Dayton
3/4 hp
120v 3YU76A

Cardno ATC
Shaping the Future

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Acronym List

µg/L	Micrograms per liter
µs	Microsiemens
1,2-DCA	1,2-dichloroethane
acfm	Actual cubic feet per minute
AS	Air sparge
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
cfm	Cubic feet per minute
COC	Chain of Custody
CPT	Cone Penetration (Penetrometer) Test
DIPE	Di-isopropyl ether
DO	Dissolved oxygen
DOT	Department of Transportation
DPE	Dual-phase extraction
DTW	Depth to water
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
ESL	Environmental screening level
ETBE	Ethyl tertiary butyl ether
FID	Flame-ionization detector
fpm	Feet per minute
GAC	Granular activated carbon
gpd	Gallons per day
gpm	Gallons per minute
GWPTS	Groundwater pump and treat system
HVOC	Halogenated volatile organic compound
J	Estimated value between MDL and PQL (RL)
KCIW	King County Industrial Waste
LEL	Lower explosive limit
LPC	Liquid-phase carbon
LRP	Liquid-ring pump
LUFT	Leaking underground fuel tank
LUST	Leaking underground storage tank
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
MPE	Multi-phase extraction
MRL	Method reporting limit
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NAI	Natural attenuation indicators
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
ORP	Oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P&ID	Process & Instrumentation Diagram
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene or perchloroethylene
PID	Photo-ionization detector
PLC	Programmable logic control
POTW	Publicly owned treatment works
ppmv	Parts per million by volume
PQL	Practical quantitation limit
PSCAA	Puget Sound Clean Air Agency
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBSL	Risk-based screening levels
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
scfm	Standard cubic feet per minute
SSTL	Site-specific target level
STLC	Soluble threshold limit concentration
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
TCE	Trichloroethene
TOC	Top of well casing elevation; datum is msl
TOG	Total oil and grease
TPHd	Total petroleum hydrocarbons as diesel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
TPHs	Total petroleum hydrocarbons as stoddard solvent
TRPH	Total recoverable petroleum hydrocarbons
UCL	Upper confidence level
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VFD	Variable Frequency Drive
VOC	Volatile organic compound
VPC	Vapor-phase carbon

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Appendix A
Laboratory Data

May 16, 2014

Kyle Sattler
Cardno ATC
7070 SW Fir Loop
Suite 100
Portland, OR 97223

RE: Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Dear Kyle Sattler:
Enclosed are the analytical results for sample(s) received by the laboratory on May 10, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
Project Manager

Enclosures

cc: Keith Fox, Cardno ATC

CERTIFICATIONS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

SAMPLE SUMMARY

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10266625001	**V-DSCHG-1**	Air	05/08/14 11:15	05/10/14 09:40
10266625002	**V-DSCHG-2**	Air	05/08/14 11:20	05/10/14 09:40
10266625003	**V-DSCHG-3**	Air	05/08/14 11:25	05/10/14 09:40
10266625004	**V-INT-1**	Air	05/08/14 11:50	05/10/14 09:40
10266625005	**V-INT-2**	Air	05/08/14 11:45	05/10/14 09:40
10266625006	**V-INT-3**	Air	05/08/14 11:35	05/10/14 09:40
10266625007	**V-INF-1**	Air	05/08/14 12:00	05/10/14 09:40
10266625008	**V-INF-2**	Air	05/08/14 12:05	05/10/14 09:40
10266625009	**V-INF-3**	Air	05/08/14 12:10	05/10/14 09:40

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10266625001	**V-DSCHG-1**	TO-15	AH2	6	PASI-M
10266625002	**V-DSCHG-2**	TO-15	AH2	6	PASI-M
10266625003	**V-DSCHG-3**	TO-15	AH2	6	PASI-M
10266625004	**V-INT-1**	TO-15	AH2	6	PASI-M
10266625005	**V-INT-2**	TO-15	AH2	6	PASI-M
10266625006	**V-INT-3**	TO-15	AH2	6	PASI-M
10266625007	**V-INF-1**	TO-15	AH2	6	PASI-M
10266625008	**V-INF-2**	TO-15	AH2	6	PASI-M
10266625009	**V-INF-3**	TO-15	AH2	6	PASI-M

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Sample: V-DSCHG-1 **Lab ID: 10266625001** Collected: 05/08/14 11:15 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 16:20	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 16:20	100-41-4	
THC as Gas	**5110**	ug/m3	1220	20		05/10/14 16:20		IS
Toluene	ND	ug/m3	15.4	20		05/10/14 16:20	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 16:20	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 16:20	95-47-6	

Sample: V-DSCHG-2 **Lab ID: 10266625002** Collected: 05/08/14 11:20 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 16:42	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 16:42	100-41-4	
THC as Gas	**5620**	ug/m3	1220	20		05/10/14 16:42		
Toluene	ND	ug/m3	15.4	20		05/10/14 16:42	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 16:42	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 16:42	95-47-6	

Sample: V-DSCHG-3 **Lab ID: 10266625003** Collected: 05/08/14 11:25 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 17:04	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 17:04	100-41-4	
THC as Gas	**3970**	ug/m3	1220	20		05/10/14 17:04		
Toluene	ND	ug/m3	15.4	20		05/10/14 17:04	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 17:04	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 17:04	95-47-6	

Sample: V-INT-1 **Lab ID: 10266625004** Collected: 05/08/14 11:50 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 17:25	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 17:25	100-41-4	
THC as Gas	**4120**	ug/m3	1220	20		05/10/14 17:25		
Toluene	ND	ug/m3	15.4	20		05/10/14 17:25	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 17:25	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 17:25	95-47-6	

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Sample: V-INT-2 **Lab ID: 10266625005** Collected: 05/08/14 11:45 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 17:47	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 17:47	100-41-4	
THC as Gas	**3310**	ug/m3	1220	20		05/10/14 17:47		
Toluene	ND	ug/m3	15.4	20		05/10/14 17:47	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 17:47	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 17:47	95-47-6	

Sample: V-INT-3 **Lab ID: 10266625006** Collected: 05/08/14 11:35 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		05/10/14 18:08	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		05/10/14 18:08	100-41-4	
THC as Gas	**9300**	ug/m3	1220	20		05/10/14 18:08		
Toluene	ND	ug/m3	15.4	20		05/10/14 18:08	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		05/10/14 18:08	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		05/10/14 18:08	95-47-6	

Sample: V-INF-1 **Lab ID: 10266625007** Collected: 05/08/14 12:00 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**28.4**	ug/m3	16.2	50		05/10/14 18:30	71-43-2	
Ethylbenzene	**745**	ug/m3	44.0	50		05/10/14 18:30	100-41-4	
THC as Gas	**107000**	ug/m3	3040	50		05/10/14 18:30		
Toluene	**483**	ug/m3	38.5	50		05/10/14 18:30	108-88-3	
m&p-Xylene	**7240**	ug/m3	176	100		05/10/14 19:35	179601-23-1	
o-Xylene	**2720**	ug/m3	44.0	50		05/10/14 18:30	95-47-6	

Sample: V-INF-2 **Lab ID: 10266625008** Collected: 05/08/14 12:05 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	16.2	50		05/10/14 18:52	71-43-2	
Ethylbenzene	**711**	ug/m3	44.0	50		05/10/14 18:52	100-41-4	
THC as Gas	**103000**	ug/m3	3040	50		05/10/14 18:52		
Toluene	**435**	ug/m3	38.5	50		05/10/14 18:52	108-88-3	
m&p-Xylene	**8340**	ug/m3	176	100		05/10/14 19:56	179601-23-1	
o-Xylene	**2660**	ug/m3	44.0	50		05/10/14 18:52	95-47-6	

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Sample: V-INF-3 **Lab ID: 10266625009** Collected: 05/08/14 12:10 Received: 05/10/14 09:40 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**32.5**	ug/m3	16.2	50		05/10/14 19:13	71-43-2	
Ethylbenzene	**1060**	ug/m3	44.0	50		05/10/14 19:13	100-41-4	
THC as Gas	**134000**	ug/m3	3040	50		05/10/14 19:13		
Toluene	**641**	ug/m3	38.5	50		05/10/14 19:13	108-88-3	
m&p-Xylene	**11600**	ug/m3	176	100		05/10/14 20:18	179601-23-1	
o-Xylene	**3690**	ug/m3	44.0	50		05/10/14 19:13	95-47-6	

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

QC Batch: AIR/20229 Analysis Method: TO-15
QC Batch Method: TO-15 Analysis Description: TO15 MSV AIR Low Level
Associated Lab Samples: 10266625001, 10266625002, 10266625003, 10266625004, 10266625005, 10266625006, 10266625007, 10266625008, 10266625009

METHOD BLANK: 1677884 Matrix: Air
Associated Lab Samples: 10266625001, 10266625002, 10266625003, 10266625004, 10266625005, 10266625006, 10266625007, 10266625008, 10266625009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/m3	ND	0.32	05/10/14 13:25	
Ethylbenzene	ug/m3	ND	0.88	05/10/14 13:25	
m&p-Xylene	ug/m3	ND	1.8	05/10/14 13:25	
o-Xylene	ug/m3	ND	0.88	05/10/14 13:25	
THC as Gas	ug/m3	ND	60.8	05/10/14 13:25	
Toluene	ug/m3	ND	0.77	05/10/14 13:25	

LABORATORY CONTROL SAMPLE: 1677885

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/m3	32.5	34.3	106	69-134	
Ethylbenzene	ug/m3	44.2	43.0	97	73-139	
m&p-Xylene	ug/m3	44.2	42.5	96	73-139	
o-Xylene	ug/m3	44.2	45.0	102	71-138	
THC as Gas	ug/m3	3520	2750	78	65-136	
Toluene	ug/m3	38.3	34.7	90	67-133	

REPORT OF LABORATORY ANALYSIS

QUALIFIERS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

IS	The internal standard recovery associated with this result exceeds the lower control limit. The reported result should be considered an estimated value.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10266625

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10266625001	**V-DSCHG-1**	TO-15	AIR/20229		
10266625002	**V-DSCHG-2**	TO-15	AIR/20229		
10266625003	**V-DSCHG-3**	TO-15	AIR/20229		
10266625004	**V-INT-1**	TO-15	AIR/20229		
10266625005	**V-INT-2**	TO-15	AIR/20229		
10266625006	**V-INT-3**	TO-15	AIR/20229		
10266625007	**V-INF-1**	TO-15	AIR/20229		
10266625008	**V-INF-2**	TO-15	AIR/20229		
10266625009	**V-INF-3**	TO-15	AIR/20229		

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	10266025
Company:	Cardno ATC	Report To:	Kyle Sattler	Attention:	
Address:	7070 SW Fir Loop, Suite 100	Copy To:	Keith Fox	Company Name:	
	Tigard, OR 97223			Address:	
Email To:	kyle.sattler@cardno.com	Purchase Order No.	03132603B	Pace Quote Reference:	
Phone:	503 430 6696 Fax:	Client Project ID:	AOC 1396 - P66 Westlake/Mercer	Pace Project Manager:	Jenni Gross
Requested Due Date/TAT:	10 Day (Standard)	Container Order Number:		Pace Profile #:	33332, #2 AIR

Page : 1 Of 1

Regulatory Agency: PSCAA; State / Location: WA

ITEM#	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analysis Test: TO-15	Residual Chlorine (Y/N)	
1	V-DSCHG-1	AR	G			05/08/14	11:15		2	X								X		001
2	V-DSCHG-2	AR	G			05/08/14	11:20		2	X								X		002
3	V-DSCHG-3	AR	G			05/08/14	11:25		2	X								X		003
4	V-INT-1	AR	G			05/08/14	11:50		2	X								X		004
5	V-INT-2	AR	G			05/08/14	11:45		2	X								X		005
6	V-INT-3	AR	G			05/08/14	11:35		2	X								X		006
7	V-INF-1	AR	G			05/08/14	12:00		2	X								X		007
8	V-INF-2	AR	G			05/08/14	12:05		2	X								X		008
9	V-INF-3	AR	G			05/08/14	12:10		2	X								X		009
10																				
11																				
12																				

MATRIX CODES: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
					5-8-14	09:30	28 Y Y Y
				TN/Pace	5/9/14	940	N Y Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Edward Burmeister

SIGNATURE of SAMPLER: [signature] DATE Signed: 5.8.14

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Analytical	Document Name: Air Sample Condition Upon Receipt	Document Revised: 26Dec2013 Page 1 of 1
	Document No.: F-MN-A-106-rev.09	Issuing Authority: Pace Minnesota Quality Office

Air Sample Condition Upon Receipt

Client Name: Cardno ATC

Project #: WO#: 10266625

10266625

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5779 5331 5563

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ Foam ☒ None ☐ Other: **Temp Blank rec:** ☐ Yes ☒ No

Temp. (TO17 and TO13 samples only) (°C): TO-15 **Corrected Temp (°C):** — **Thermom. Used:** ☐ B88A912167504 ☐ B88A9132521491 ☐ 72337080 ☐ 80512447

Temp should be above freezing to 6°C **Correction Factor:**

Date & Initials of Person Examining Contents: JW for TN 05/12/14

Type of Ice Received ☐ Blue ☐ Wet ☒ None

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☐ Yes	☒ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No TN	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☐ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Media: Air bag				11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.

Samples Received: 18 Air bags (9 samples)

Canisters		Flow Controllers		Stand Alone G	
Sample Number	Can ID	Sample Number	Can ID	Sample Number	Can ID

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Jenn Ross **Date:** 5/12/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

April 23, 2014

Kyle Sattler
Cardno ATC
7070 SW Fir Loop
Suite 100
Portland, OR 97223

RE: Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Dear Kyle Sattler:
Enclosed are the analytical results for sample(s) received by the laboratory on April 18, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
Project Manager

Enclosures

cc: Keith Fox, Cardno ATC

CERTIFICATIONS

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

SAMPLE SUMMARY

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10263855001	**V-DSCHG-1**	Air	04/16/14 12:35	04/18/14 09:05
10263855002	**V-DSCHG-2**	Air	04/16/14 12:40	04/18/14 09:05
10263855003	**V-DSCHG-3**	Air	04/16/14 12:45	04/18/14 09:05
10263855004	**V-INT-1**	Air	04/16/14 13:10	04/18/14 09:05
10263855005	**V-INT-2**	Air	04/16/14 13:00	04/18/14 09:05
10263855006	**V-INT-3**	Air	04/16/14 12:50	04/18/14 09:05
10263855007	**V-INF-1**	Air	04/16/14 13:20	04/18/14 09:05
10263855008	**V-INF-2**	Air	04/16/14 13:25	04/18/14 09:05
10263855009	**V-INF-3**	Air	04/16/14 13:30	04/18/14 09:05

SAMPLE ANALYTE COUNT

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10263855001	**V-DSCHG-1**	TO-15	DR1	6	PASI-M
10263855002	**V-DSCHG-2**	TO-15	DR1	6	PASI-M
10263855003	**V-DSCHG-3**	TO-15	DR1	6	PASI-M
10263855004	**V-INT-1**	TO-15	DR1	6	PASI-M
10263855005	**V-INT-2**	TO-15	DR1	6	PASI-M
10263855006	**V-INT-3**	TO-15	DR1	6	PASI-M
10263855007	**V-INF-1**	TO-15	DR1	6	PASI-M
10263855008	**V-INF-2**	TO-15	DR1	6	PASI-M
10263855009	**V-INF-3**	TO-15	DR1	6	PASI-M

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Sample: V-DSCHG-1 **Lab ID: 10263855001** Collected: 04/16/14 12:35 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 17:10	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 17:10	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 17:10		
Toluene	ND	ug/m3	15.4	20		04/18/14 17:10	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 17:10	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 17:10	95-47-6	

Sample: V-DSCHG-2 **Lab ID: 10263855002** Collected: 04/16/14 12:40 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 17:32	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 17:32	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 17:32		
Toluene	**30.3**	ug/m3	15.4	20		04/18/14 17:32	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 17:32	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 17:32	95-47-6	

Sample: V-DSCHG-3 **Lab ID: 10263855003** Collected: 04/16/14 12:45 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 17:53	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 17:53	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 17:53		
Toluene	**30.8**	ug/m3	15.4	20		04/18/14 17:53	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 17:53	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 17:53	95-47-6	

Sample: V-INT-1 **Lab ID: 10263855004** Collected: 04/16/14 13:10 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 18:15	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 18:15	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 18:15		
Toluene	**31.5**	ug/m3	15.4	20		04/18/14 18:15	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 18:15	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 18:15	95-47-6	

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Sample: V-INT-2 **Lab ID: 10263855005** Collected: 04/16/14 13:00 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 18:37	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 18:37	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 18:37		
Toluene	**22.9**	ug/m3	15.4	20		04/18/14 18:37	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 18:37	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 18:37	95-47-6	

Sample: V-INT-3 **Lab ID: 10263855006** Collected: 04/16/14 12:50 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	6.5	20		04/18/14 18:58	71-43-2	
Ethylbenzene	ND	ug/m3	17.6	20		04/18/14 18:58	100-41-4	
THC as Gas	ND	ug/m3	1220	20		04/18/14 18:58		
Toluene	**17.8**	ug/m3	15.4	20		04/18/14 18:58	108-88-3	
m&p-Xylene	ND	ug/m3	35.2	20		04/18/14 18:58	179601-23-1	
o-Xylene	ND	ug/m3	17.6	20		04/18/14 18:58	95-47-6	

Sample: V-INF-1 **Lab ID: 10263855007** Collected: 04/16/14 13:20 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**119**	ug/m3	16.2	50		04/18/14 19:20	71-43-2	
Ethylbenzene	**1430**	ug/m3	44.0	50		04/18/14 19:20	100-41-4	
THC as Gas	**156000**	ug/m3	3040	50		04/18/14 19:20		
Toluene	**2050**	ug/m3	38.5	50		04/18/14 19:20	108-88-3	
m&p-Xylene	**9170**	ug/m3	176	100		04/19/14 22:26	179601-23-1	
o-Xylene	**3630**	ug/m3	44.0	50		04/18/14 19:20	95-47-6	

Sample: V-INF-2 **Lab ID: 10263855008** Collected: 04/16/14 13:25 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**84.8**	ug/m3	16.2	50		04/18/14 19:42	71-43-2	
Ethylbenzene	**988**	ug/m3	44.0	50		04/18/14 19:42	100-41-4	
THC as Gas	**162000**	ug/m3	3040	50		04/18/14 19:42		
Toluene	**1420**	ug/m3	38.5	50		04/18/14 19:42	108-88-3	
m&p-Xylene	**5510**	ug/m3	176	100		04/19/14 22:47	179601-23-1	
o-Xylene	**2530**	ug/m3	44.0	50		04/18/14 19:42	95-47-6	

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Sample: V-INF-3 **Lab ID: 10263855009** Collected: 04/16/14 13:30 Received: 04/18/14 09:05 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**78.2**	ug/m3	16.2	50		04/18/14 20:03	71-43-2	
Ethylbenzene	**882**	ug/m3	44.0	50		04/18/14 20:03	100-41-4	
THC as Gas	**167000**	ug/m3	3040	50		04/18/14 20:03		
Toluene	**1320**	ug/m3	38.5	50		04/18/14 20:03	108-88-3	
m&p-Xylene	**6860**	ug/m3	88.0	50		04/18/14 20:03	179601-23-1	
o-Xylene	**2290**	ug/m3	44.0	50		04/18/14 20:03	95-47-6	

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

QC Batch: AIR/19990 Analysis Method: TO-15
QC Batch Method: TO-15 Analysis Description: TO15 MSV AIR Low Level
Associated Lab Samples: 10263855001, 10263855002, 10263855003, 10263855004, 10263855005, 10263855006, 10263855007, 10263855008, 10263855009

METHOD BLANK: 1660318 Matrix: Air
Associated Lab Samples: 10263855001, 10263855002, 10263855003, 10263855004, 10263855005, 10263855006, 10263855007, 10263855008, 10263855009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/m3	ND	0.32	04/18/14 11:04	
Ethylbenzene	ug/m3	ND	0.88	04/18/14 11:04	
m&p-Xylene	ug/m3	ND	1.8	04/18/14 11:04	
o-Xylene	ug/m3	ND	0.88	04/18/14 11:04	
THC as Gas	ug/m3	ND	60.8	04/18/14 11:04	
Toluene	ug/m3	ND	0.77	04/18/14 11:04	

LABORATORY CONTROL SAMPLE: 1660319

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/m3	32.5	32.0	99	69-134	
Ethylbenzene	ug/m3	44.2	38.4	87	73-139	
m&p-Xylene	ug/m3	44.2	39.5	89	73-139	
o-Xylene	ug/m3	44.2	39.2	89	71-138	
THC as Gas	ug/m3	3520	3100	88	65-136	
Toluene	ug/m3	38.3	32.8	85	67-133	

SAMPLE DUPLICATE: 1660514

Parameter	Units	10262374001 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/m3	ND	ND		25	
Ethylbenzene	ug/m3	ND	1J		25	
m&p-Xylene	ug/m3	3.8	3.9	3	25	
o-Xylene	ug/m3	1.8	2.0	12	25	
THC as Gas	ug/m3	2890	2920	1	25	
Toluene	ug/m3	3.8	3.9	2	25	

REPORT OF LABORATORY ANALYSIS

QUALIFIERS

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AOC 1396 -P66 Westlake/Mercer
Pace Project No.: 10263855

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10263855001	**V-DSCHG-1**	TO-15	AIR/19990		
10263855002	**V-DSCHG-2**	TO-15	AIR/19990		
10263855003	**V-DSCHG-3**	TO-15	AIR/19990		
10263855004	**V-INT-1**	TO-15	AIR/19990		
10263855005	**V-INT-2**	TO-15	AIR/19990		
10263855006	**V-INT-3**	TO-15	AIR/19990		
10263855007	**V-INF-1**	TO-15	AIR/19990		
10263855008	**V-INF-2**	TO-15	AIR/19990		
10263855009	**V-INF-3**	TO-15	AIR/19990		

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10260 35555

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Cardno ATC	Report To:	Kyle Sattler	Attention:	
Address:	7070 SW Fir Loop, Suite 100	Copy To:	Keith Fox	Company Name:	
	Tigard, OR 97223			Address:	
Email To:	kyle.sattler@cardno.com	Purchase Order No.	03132603B	Pace Quote Reference:	
Phone:	503 430 6696 Fax:	Client Project ID:	AOC 1396 - P66 Westlake/Mercer	Pace Project Manager:	Jenni Gross
Requested Due Date/TAT:	10 Day (Standard)	Container Order Number:		Pace Profile #:	

Regulatory Agency
PSCAA
State / Location
WA

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM#	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test: TO-15	Residual Chlorine (Y/N)	
1	V-DSCHG-1	AR	G			04/16/14	12:35		2	X									X		-001
2	V-DSCHG-2	AR	G			04/16/14	12:40		2	X									X		-002
3	V-DSCHG-3	AR	G			04/16/14	12:45		2	X									X		-003
4	V-INT-1	AR	G			04/16/14	13:10		2	X									X		-004
5	V-INT-2	AR	G			04/16/14	13:00		2	X									X		-005
6	V-INT-3	AR	G			04/16/14	12:50		2	X									X		-006
7	V-INF-1	AR	G			04/16/14	13:20		2	X									X		-007
8	V-INF-2	AR	G			04/16/14	13:25		2	X									X		-008
9	V-INF-3	AR	G			04/16/14	13:30		2	X									X		-009
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
				PACE	4-17-14	1425	—	N	Y	Y
				/ PACE	4/18/14	905	Amb	n	n	y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Edward Bernucca

SIGNATURE of SAMPLER: [signature]

DATE Signed: 4/17/14

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical®	Document Name: Cooler Transfer Check List	Revised Date: 23Apr2013 Page 1 of 1
	Document Number: F-MN-C-120-rev.01	Issuing Authority: Pace Minnesota Quality Office

Cooler Transfer Check List

Client: Cardno ATC

Project Manager: Jenni Gross

Profile/Line #: _____

Received with Custody Seal: (Yes) No

Custody Seal Intact: (Yes) No NA

	Temp Read	Corrected Temp	Correction Factor
Temperature C:	Air	_____	_____

IR Gun # IR1 IR2

☐ Samples on ice, cooling process has begun

Rush/Short Hold: _____

Containers Intact: (Yes) No

Re-packed and Re-Iced: ✓

Temp Blank Included: Yes (No)

Shipped By/Date: MO 04-17-14

Notes:

Pace Analytical	Document Name: Air Sample Condition Upon Receipt	Document Revised: 26Dec2013 Page 1 of 1
	Document No.: F-MN-A-106-rev.09	Issuing Authority: Pace Minnesota Quality Office

Air Sample Condition Upon Receipt

Client Name: Cardno ATC

Project #: WO# : 10263855

10263855

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other:

Tracking Number: 5779 5331 4902

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No

Optional: Proj. Due Date: Proj. Name:

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [ ] Foam [X] None [ ] Other: **Temp Blank rec:** [ ] Yes [X] No

Temp. (TO17 and TO13 samples only) (°C): Amb **Corrected Temp (°C):** Amb **Thermom. Used:** [ ] B88A912167504 [ ] B88A9132521491 [ ] 72337080 [ ] 80512447

Temp should be above freezing to 6°C **Correction Factor:** Ambient **Date & Initials of Person Examining Contents:** CMB 4/18/14

Type of ice Received [ ] Blue [ ] Wet [X] None

				Comments:
Chain of Custody Present?	[X] Yes	[ ] No	[ ] N/A	1.
Chain of Custody Filled Out?	[X] Yes	[ ] No	[ ] N/A	2.
Chain of Custody Relinquished?	[ ] Yes	[X] No	[ ] N/A	3.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	4.
Samples Arrived within Hold Time?	[X] Yes	[ ] No	[ ] N/A	5.
Short Hold Time Analysis (<72 hr)?	[X] Yes	[ ] No	[ ] N/A	6. 1-2 hours left!
Rush Turn Around Time Requested?	[ ] Yes	[X] No	[ ] N/A	7.
Sufficient Volume?	[X] Yes	[ ] No	[ ] N/A	8.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	9.
-Pace Containers Used?	[ ] Yes	[X] No	[ ] N/A	
Containers Intact?	[X] Yes	[ ] No	[ ] N/A	10.
Media: Air bag				11.
Sample Labels Match COC?	[X] Yes	[ ] No	[ ] N/A	12.

Samples Received: 18 air bags (2 per sample)

Canisters		Flow Controllers		Stand Alone G	
Sample Number	Can ID	Sample Number	Can ID	Sample Number	Can ID

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: LC **Date:** 4/18/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

July 14, 2014

Kyle Sattler
Cardno ATC
7070 SW Fir Loop
Suite 100
Portland, OR 97223

RE: Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Dear Kyle Sattler:
Enclosed are the analytical results for sample(s) received by the laboratory on June 27, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
Project Manager

Enclosures

cc: Keith Fox, Cardno ATC

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #40770
Alabama Certification #40770
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #: Pace
Georgia Certification #: 959
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
Wisconsin Certification #: 999407970
West Virginia Certification #: 382
West Virginia TO-15 Approval
West Virginia DHHR #:9952C

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10272237001	**V-DSCHG-1**	Air	06/25/14 09:00	06/27/14 10:00
10272237002	**V-DSCHG-2**	Air	06/25/14 09:05	06/27/14 10:00
10272237003	**V-DSCHG-3**	Air	06/25/14 09:10	06/27/14 10:00
10272237004	**V-INT-1**	Air	06/25/14 09:15	06/27/14 10:00
10272237005	**V-INT-2**	Air	06/25/14 09:20	06/27/14 10:00
10272237006	**V-INT-3**	Air	06/25/14 09:25	06/27/14 10:00
10272237007	**V-INF-1**	Air	06/25/14 09:30	06/27/14 10:00
10272237008	**V-INF-2**	Air	06/25/14 09:35	06/27/14 10:00
10272237009	**V-INF-3**	Air	06/25/14 09:40	06/27/14 10:00

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10272237001	**V-DSCHG-1**	TO-15	DL1	6	PASI-M
10272237002	**V-DSCHG-2**	TO-15	DL1	6	PASI-M
10272237003	**V-DSCHG-3**	TO-15	DL1	6	PASI-M
10272237004	**V-INT-1**	TO-15	DL1	6	PASI-M
10272237005	**V-INT-2**	TO-15	DL1	6	PASI-M
10272237006	**V-INT-3**	TO-15	DL1	6	PASI-M
10272237007	**V-INF-1**	TO-15	DL1	6	PASI-M
10272237008	**V-INF-2**	TO-15	DL1	6	PASI-M
10272237009	**V-INF-3**	TO-15	DL1	6	PASI-M

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Sample: V-DSCHG-1 **Lab ID: 10272237001** Collected: 06/25/14 09:00 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**20.6**	ug/m3	10.9	33.6		07/13/14 17:08	71-43-2	A4
Ethylbenzene	ND	ug/m3	29.6	33.6		07/13/14 17:08	100-41-4	
THC as Gas	ND	ug/m3	2040	33.6		07/13/14 17:08		
Toluene	**36.5**	ug/m3	25.9	33.6		07/13/14 17:08	108-88-3	
m&p-Xylene	ND	ug/m3	59.1	33.6		07/13/14 17:08	179601-23-1	
o-Xylene	ND	ug/m3	29.6	33.6		07/13/14 17:08	95-47-6	

Sample: V-DSCHG-2 **Lab ID: 10272237002** Collected: 06/25/14 09:05 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**12.0**	ug/m3	10.9	33.6		07/13/14 17:29	71-43-2	A4
Ethylbenzene	ND	ug/m3	29.6	33.6		07/13/14 17:29	100-41-4	
THC as Gas	ND	ug/m3	2040	33.6		07/13/14 17:29		
Toluene	ND	ug/m3	25.9	33.6		07/13/14 17:29	108-88-3	
m&p-Xylene	ND	ug/m3	59.1	33.6		07/13/14 17:29	179601-23-1	
o-Xylene	ND	ug/m3	29.6	33.6		07/13/14 17:29	95-47-6	

Sample: V-DSCHG-3 **Lab ID: 10272237003** Collected: 06/25/14 09:10 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	11.3	34.8		07/13/14 17:51	71-43-2	A4
Ethylbenzene	ND	ug/m3	30.6	34.8		07/13/14 17:51	100-41-4	
THC as Gas	ND	ug/m3	2120	34.8		07/13/14 17:51		
Toluene	ND	ug/m3	26.8	34.8		07/13/14 17:51	108-88-3	
m&p-Xylene	ND	ug/m3	61.2	34.8		07/13/14 17:51	179601-23-1	
o-Xylene	ND	ug/m3	30.6	34.8		07/13/14 17:51	95-47-6	

Sample: V-INT-1 **Lab ID: 10272237004** Collected: 06/25/14 09:15 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**19.3**	ug/m3	11.3	34.8		07/13/14 18:12	71-43-2	A4,IS
Ethylbenzene	**148**	ug/m3	30.6	34.8		07/13/14 18:12	100-41-4	
THC as Gas	**9600**	ug/m3	2120	34.8		07/13/14 18:12		
Toluene	**231**	ug/m3	26.8	34.8		07/13/14 18:12	108-88-3	IS
m&p-Xylene	**773**	ug/m3	61.2	34.8		07/13/14 18:12	179601-23-1	
o-Xylene	**38.0**	ug/m3	30.6	34.8		07/13/14 18:12	95-47-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Sample: V-INT-2 **Lab ID: 10272237005** Collected: 06/25/14 09:20 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**19.4**	ug/m3	11.3	34.8		07/13/14 18:34	71-43-2	A4
Ethylbenzene	**34.0**	ug/m3	30.6	34.8		07/13/14 18:34	100-41-4	
THC as Gas	**12900**	ug/m3	2120	34.8		07/13/14 18:34		
Toluene	**143**	ug/m3	26.8	34.8		07/13/14 18:34	108-88-3	
m&p-Xylene	ND	ug/m3	61.2	34.8		07/13/14 18:34	179601-23-1	
o-Xylene	ND	ug/m3	30.6	34.8		07/13/14 18:34	95-47-6	

Sample: V-INT-3 **Lab ID: 10272237006** Collected: 06/25/14 09:25 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	**24.5**	ug/m3	11.3	34.8		07/13/14 18:55	71-43-2	IS
Ethylbenzene	**130**	ug/m3	30.6	34.8		07/13/14 18:55	100-41-4	
THC as Gas	**19100**	ug/m3	2120	34.8		07/13/14 18:55		
Toluene	**188**	ug/m3	26.8	34.8		07/13/14 18:55	108-88-3	IS
m&p-Xylene	**944**	ug/m3	61.2	34.8		07/13/14 18:55	179601-23-1	
o-Xylene	**207**	ug/m3	30.6	34.8		07/13/14 18:55	95-47-6	

Sample: V-INF-1 **Lab ID: 10272237007** Collected: 06/25/14 09:30 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	76.0	233.86		07/13/14 19:38	71-43-2	A4
Ethylbenzene	**277**	ug/m3	206	233.86		07/13/14 19:38	100-41-4	
THC as Gas	**55200**	ug/m3	14200	233.86		07/13/14 19:38		
Toluene	**309**	ug/m3	180	233.86		07/13/14 19:38	108-88-3	
m&p-Xylene	**5840**	ug/m3	412	233.86		07/13/14 19:38	179601-23-1	
o-Xylene	**2280**	ug/m3	206	233.86		07/13/14 19:38	95-47-6	

Sample: V-INF-2 **Lab ID: 10272237008** Collected: 06/25/14 09:35 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	73.4	225.79		07/13/14 20:00	71-43-2	A4
Ethylbenzene	ND	ug/m3	199	225.79		07/13/14 20:00	100-41-4	
THC as Gas	**23200**	ug/m3	13700	225.79		07/13/14 20:00		
Toluene	ND	ug/m3	174	225.79		07/13/14 20:00	108-88-3	
m&p-Xylene	**2820**	ug/m3	397	225.79		07/13/14 20:00	179601-23-1	
o-Xylene	**1070**	ug/m3	199	225.79		07/13/14 20:00	95-47-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Sample: V-INF-3 **Lab ID: 10272237009** Collected: 06/25/14 09:40 Received: 06/27/14 10:00 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR	Analytical Method: TO-15							
Benzene	ND	ug/m3	152	467.71		07/13/14 20:22	71-43-2	A4
Ethylbenzene	ND	ug/m3	412	467.71		07/13/14 20:22	100-41-4	
THC as Gas	ND	ug/m3	28400	467.71		07/13/14 20:22		
Toluene	ND	ug/m3	360	467.71		07/13/14 20:22	108-88-3	
m&p-Xylene	**3140**	ug/m3	823	467.71		07/13/14 20:22	179601-23-1	
o-Xylene	**1130**	ug/m3	412	467.71		07/13/14 20:22	95-47-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

QC Batch: AIR/20764 Analysis Method: TO-15
QC Batch Method: TO-15 Analysis Description: TO15 MSV AIR Low Level
Associated Lab Samples: 10272237001, 10272237002, 10272237003, 10272237004, 10272237005, 10272237006, 10272237007, 10272237008, 10272237009

METHOD BLANK: 1731507 Matrix: Air
Associated Lab Samples: 10272237001, 10272237002, 10272237003, 10272237004, 10272237005, 10272237006, 10272237007, 10272237008, 10272237009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/m3	ND	0.32	07/13/14 16:46	
Ethylbenzene	ug/m3	ND	0.88	07/13/14 16:46	
m&p-Xylene	ug/m3	ND	1.8	07/13/14 16:46	
o-Xylene	ug/m3	ND	0.88	07/13/14 16:46	
THC as Gas	ug/m3	ND	60.8	07/13/14 16:46	
Toluene	ug/m3	ND	0.77	07/13/14 16:46	

LABORATORY CONTROL SAMPLE: 1731508

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/m3	32.5	29.3	90	69-134	
Ethylbenzene	ug/m3	44.2	53.5	121	73-139	
m&p-Xylene	ug/m3	44.2	50.1	114	73-139	
o-Xylene	ug/m3	44.2	52.6	119	71-138	
THC as Gas	ug/m3	3520	3490	99	65-136	
Toluene	ug/m3	38.3	42.0	110	67-133	

SAMPLE DUPLICATE: 1731783

Parameter	Units	10272237006 Result	Dup Result	RPD	Max RPD	Qualifiers
Benzene	ug/m3	24.5	23.5	4	25	IS
Ethylbenzene	ug/m3	130	119	8	25	
m&p-Xylene	ug/m3	944	903	4	25	
o-Xylene	ug/m3	207	192	8	25	
THC as Gas	ug/m3	19100	13300	36	25	R1
Toluene	ug/m3	188	175	7	25	IS

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

SAMPLE QUALIFIERS

Sample: 10272237001

[1]	The internal standard recoveries associated with this sample exceed the lower control limit. The reported results should be considered estimated values.

Sample: 10272237002

[1]	The internal standard recoveries associated with this sample exceed the lower control limit. The reported results should be considered estimated values.

Sample: 10272237007

[1]	This result is reported from a serial dilution.

Sample: 10272237008

[1]	This result is reported from a serial dilution.

Sample: 10272237009

[1]	The internal standard recoveries associated with this sample exceed the lower control limit. The reported results should be considered estimated values.
[2]	This result is reported from a serial dilution.

ANALYTE QUALIFIERS

A4	Sample was transferred from a sampling bag into a Summa Canister within 48 hours of collection.
IS	The internal standard recovery associated with this result exceeds the lower control limit. The reported result should be considered an estimated value.
R1	RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AOC 1396-P66 Westlake/Mercer
Pace Project No.: 10272237

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10272237001	**V-DSCHG-1**	TO-15	AIR/20764		
10272237002	**V-DSCHG-2**	TO-15	AIR/20764		
10272237003	**V-DSCHG-3**	TO-15	AIR/20764		
10272237004	**V-INT-1**	TO-15	AIR/20764		
10272237005	**V-INT-2**	TO-15	AIR/20764		
10272237006	**V-INT-3**	TO-15	AIR/20764		
10272237007	**V-INF-1**	TO-15	AIR/20764		
10272237008	**V-INF-2**	TO-15	AIR/20764		
10272237009	**V-INF-3**	TO-15	AIR/20764		

7/14/14

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10272237

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Cardno ATC	Report To:	Kyle Sattler	Attention:	
Address:	7070 SW Fir Loop, Suite 100	Copy To:	Keith Fox	Company Name:	
	Tigard, OR 97223			Address:	
Email To:	kyle.sattler@cardno.com	Purchase Order No.	03132603B	Pace Quote Reference:	
Phone:	503 430 6696 Fax	Client Project ID:	AOC 1396 - P66 Westlake/Mercer	Pace Project Manager:	Jenni Gross
Requested Due Date/TAT:	10 Day (Standard)	Container Order Number:		Pace Profile #:	33372 #2

Regulatory Agency: PSCAA

State / Location: WA

Requested Analysis Filtered (Y/N)

ITEM#	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	TO-15	Residual Chlorine (Y/N)	
1	V-DSCHG-1	AR	G			06/25/14	9:00		2	X									X		-001
2	V-DSCHG-2	AR	G			06/25/14	9:05		2	X									X		-002
3	V-DSCHG-3	AR	G			06/25/14	9:10		2	X									X		-003
4	V-INT-1	AR	G			06/25/14	9:15		2	X									X		-004
5	V-INT-2	AR	G			06/25/14	9:20		2	X									X		-005
6	V-INT-3	AR	G			06/25/14	9:25		2	X									X		-006
7	V-INF-1	AR	G			06/25/14	9:30		2	X									X		-007
8	V-INF-2	AR	G			06/25/14	9:35		2	X									X		-008
9	V-INF-3	AR	G			06/25/14	9:40		2	X									X		-009
10																					
11																					
12																					

MATRIX: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		6/25/14	1615	Jenny Gross / Pace	6/25/14	16:15	-	N	N	Y
					06/27/14	1000	2mb	N	Y	Y

SAMPLER NAME AND SIGNATURE			TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Nicholas Gerkin					
SIGNATURE of SAMPLER:	DATE Signed: 6/25/14	1615				

Pace Analytical	Document Name: Air Sample Condition Upon Receipt	Document Revised: 26Dec2013 Page 1 of 1
	Document No.: F-MN-A-106-rev.09	Issuing Authority: Pace Minnesota Quality Office

Air Sample Condition Upon Receipt

Client Name: Cardno ATC

Project #: WO# : 10272237

10272237

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other:

Tracking Number: 5779 5331 7967, 7978

Optional: Proj. Due Date: Proj. Name:

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No Seals Intact? ☒ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ Foam ☒ None ☐ Other: Temp Blank rec: ☐ Yes ☒ No

Temp. (TO17 and TO13 samples only) (°C): amb Corrected Temp (°C): amb Thermom. Used: ☐ 888A912167504 ☐ 888A9132521491 ☐ 72337080 ☐ 80512447

Temp should be above freezing to 6°C Correction Factor: ambient Date & Initials of Person Examining Contents: CMB 6/27/14

Type of Ice Received ☐ Blue ☐ Wet ☒ None

	Yes	No	N/A	Comments:
Chain of Custody Present?	☒	☐	☐	1.
Chain of Custody Filled Out?	☒	☐	☐	2.
Chain of Custody Relinquished?	☒	☐	☐	3.
Sampler Name and/or Signature on COC?	☒	☐	☐	4.
Samples Arrived within Hold Time?	☒	☐	☐	5. Sampled 6/25/14 @ 9:00-9:40
Short Hold Time Analysis (<72 hr)?	☒	☐	☐	6.
Rush Turn Around Time Requested?	☐	☒	☐	7.
Sufficient Volume?	☒	☐	☐	8. * Bag 2 for V-DSCHG-2 has low volume 6/30/14
Correct Containers Used?	☒	☐	☐	9.
-Pace Containers Used?	☐	☒	☐	
Containers Intact?	☒	☐	☐	10.
Media: air bag				11.
Sample Labels Match COC?	☒	☐	☐	12.

Samples Received: 2 air bags per sample (18 total)

Canisters		Flow Controllers		Stand Alone G	
Sample Number	Can ID	Sample Number	Can ID	Sample Number	Can ID

CLIENT NOTIFICATION/RESOLUTION Field Data Required? ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

updated SCUR 6/30/14

Project Manager Review: [signature] Date: 6/30/14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Cardno ATC
Shaping the Future

917 1st Avenue North, Suite 3
Billings, Montana 59101
Telephone: 406-259-1033
Fax: 406-259-1099

Appendix B
Carbon Change Documentation

.κ Order Form

SR# 0

EVOQUA WATER TECHNOLOGIES

BILL TO:	0
Cardno ERI	
801 Second Ave	
Suite, 700	
Seattle, WA 98104	
Ordered By:	Mike Miller
Contact Phone #:	206-767-2360

SHIP TO:	1232153339
Phillips 66	
600 Westlake Ave North	
Seattle WA 98109	
0	
Site Contact:	Nick Gerkin
Contact Phone #:	206-510-7158

SR Image Y/N	NO
SR Image via	0
Freight Type:	Prepaid

PO #	03132603B
Requested Date	4/11/2014
Scheduled Date	04-11-14 close to 9am

Description	QTY	Pkg	Oracle Part Number
VSC1000 Change out service	3	0	W3TSP4133
VCNS	3000	0	W3T184304
Spent GAC	7000	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	gm

W140069NH 4/8/16

Profile #	0	Expiration Date	01/00/00
Profile #	0	Expiration Date	01/00/00

Customer Special Requests:	0
PPE:	0
Shop Notes:	0
Field Notes:	Change out (3) VSC1000 adsorbers with VCNS carbon, remove (4) bulk bags of spent GAc from previous service event.

notes from shop/field

fresh carbon movement:	lot #	type	mesh	weight	packaging	# used	by
	140409-1	~~VCNS~~	~~4x10~~	~~1243~~			
		VCNS	~~20~~4x10	3000	SS	3	TJ

DB

spent carbon movement:	profile #	type	mesh	weight	packaging	# used	location
	W140069NH	VCNS	4x10	1243	Dot	4	Plant
				1315			
				1690			
				~~1210~~			
				1215			
				1209			
				1196			

TO 5087 7298

SR Time Tracking

Vehicle	Name	Date	Mileage	Travel Time	Site Time	Sum Line
						0
						0
						0
						0
						0

Sum Mileage 0

Sum Time 0

V. 012014

Evoqua Water Technologies LLC -
2523 Mutahar Street - Box 3308
Parker, AZ 85344

Telephone: (928) 669-5758
Facsimile: (928) 669-5775

May 28, 2014

Ed Ralston
Phillips 66 Company
76 Broadway
Sacramento, CA 95818-

This is to certify the following spent carbon received at the Evoqua Water Technologies Carbon Reactivation facility was reactivated in accordance with 40 CFR Part 265 and Part 61 regulations:

Site Address:	Facility No. 255353 (AOC 1396) 600
Profile Number:	W140069NH
Shipping Document Number:	051514SL
Date Of Receipt:	May 19, 2014
Container Quantity - Type:	7 - Bag
Reactivation Date:	5/24/2014

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations, I verify the information contained above is true, accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification this information is true, accurate and complete.

Evoqua Water Technologies LLC
EPA ID No. AZD 982 441 263

Sincerely,

Monte McCue
Plant Manager