Shell Chemical Appalachia LLC
300 Frankfort Rd
Monaca, PA 15061

September 27, 2023

Mark Gorog P.E., Regional Manager Air Quality Program
Pennsylvania Department of Environmental Protection (PADEP)
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

RE: PA-04-00740C Recovered Oil and Equalization Wastewater Storage Tanks (Source ID 401) Excess Emissions Malfunction Report

Dear Mr. Gorog,

Shell Chemical Appalachia LLC ("Shell") located in Beaver, Co is submitting this malfunction report to the Pennsylvania Department of Environmental Protection (PADEP) for excess emissions from the flow equalization and oil removal (FEOR) A and B and recovered oil storage tanks between September 1 and September 2, 2023.

This malfunction did not pose an imminent and substantial danger to the public health and safety or the environment.

- **Name and location of the facility**
  Shell Polymers Monaca
  300 Frankfort Road, Monaca PA, 15061

- **Nature and cause of the incident**
  On September 1, 2023 at 17:21, the blower that routes the FEOR A and B and Recovered Oil storage tanks vapor space to the Spent Caustic Thermal Oxidizer[1] (SCTO) tripped offline. Operations initiated troubleshooting and discovered that the blower had experienced an electrical fault and could not be restarted. While the blower was offline, the FEOR and Recovered Oil tanks intermittently vented to atmosphere through the relief valves.

- **Time when the malfunction or breakdown was first observed**
  September 1, 2023 at 17:21

- **The date and time that the malfunction started and ended**
  Started on September 1, 2023 at 17:21 and ended on September 2, 2023 at 01:02 when the blower was put back in service.

- **An estimate of the emissions associated with the malfunction**

[1] Identified as Spent Caustic Vent Incinerator (Source ID C206) in PA-04-00740C

Pollutant	Emissions (lbs)
Total VOC	0.031
Benzene	0.003
Toluene	0.022
Total HAP	0.030

- **The calculations that were used to determine that quantity**
  For reference, the blower for the FEOR A and B and Recovered Oil tanks routes any tank vapors to a closed vent system, where they are incinerated in the SCTO. When the blower is down, the FEOR and Recovered Oil tanks periodically vent to atmosphere through relief valves. Excess emissions from the storage tanks were modeled using Pro-Max equations of state for flashing, breathing, and working losses. Inputs into the model include the storage tank and internal floating roof physical characteristics, measured liquid throughputs using liquid level indicators, measured tank liquid temperatures, pressure of input liquid streams, and representative tank sample data.

- **The steps, if any, that the facility took to limit the duration and/or quantity of emissions associated with the malfunction**
  Emissions were minimized by escalation of the blower downtime to the electrical group and getting the blower maintained as soon as possible. Emissions were also minimized through design and operation of the storage tank internal floating roofs and nitrogen blankets.

- **A detailed analysis that sets forth the Root Cause of the malfunction, to the extent determinable**
  Shortly after the blower trip, site electricians were contacted to start troubleshooting the issue.

  The electricians discovered a bad fuse and a loose relay. Both issues were addressed, and the blower was able to be put back in service.

- **An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of a malfunction resulting from the same Root Cause or contributing causes in the future**
  No action items stemmed from the result of this investigation.

- **To the extent that investigations of the causes and/or possible corrective action(s) still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report will be submitted**
  No follow up report is anticipated.

- **Corrective action is final or timeline for implementation**
  N/A

If you have any questions regarding this matter, please contact me at (724) 709-2467 or kimberly.kaal@shell.com.

Sincerely,

Kimberly Kaal Digitally signed by Kimberly Kaal
DN: cn=Kimberly Kaal
Date: 2023.09.27 15:09:44 -04'00'

Kimberly Kaal
Environmental Manager, Attorney-in-Fact

CC:
Scott Beaudway, Air Quality Specialist

Kristin Goddard, Air Quality District Supervisor
Beth Speicher, Environmental Group Manager

Attachment A
Pro-Max Model Inputs and Outputs

Table 1 Downtime Internal Floating Roof Tank Emissions Calculations, ProMax Input Summary
Shell Chemical Applachia LLC, Monaca Cracker Plant

Timeframe of Analysis

Timeframe start	9/1/2023 17:21	*Tank Throughput Calculator FEOR ROT and SC.xlsx*
Timeframe end	9/2/2023 1:02	*Tank Throughput Calculator FEOR ROT and SC.xlsx*
Time	7.7	hours
	461	minutes

Tank Data/Sample Data

Tank Name	Tank ID	Contents	Length/ Height (ft)	Diameter (ft)	Temp (C)	Pressure (barg)	Throughput (gal)	Flow Rate (gpm)	Samples Used
FEOR B Tank	T-59707B	Waste Water, sheen of oil	47.9	55.8	26.74	0.01	491.96	1.07	Average of 8/22/2023, 8/29/2023, 9/5/2023, Balance Water
FEOR A Tank	T-59707A	Waste Water, sheen of oil	47.9	55.8	30.02	0.01	46,152.61	100.11	Average of 8/22/2023, 8/29/2023, 9/5/2023, Balance Water
Recovered Oil Tank	T-59708	Slop Oil/water mixture	48	43	28.87	0.01	1,148.20	2.49	5/24/2023, Balance Water
Data source/ assumption			2/2/23 email from A. Binder	2/2/23 email from A. Binder		2/1/2023 email with note from O. Omisakin			

Sample Data

	8/22/2023 FEOR B		8/29/2023 FEOR B		9/5/2023 FEOR B		**Average FEOR B**	8/22/2023 FEOR A		8/29/2023 FEOR A		9/5/2023 FEOR A		**Average FEOR A**	5/24/2023	**Recovered Oil Tank**
Constituent	mg/L	%	mg/L	%	mg/L	%	%	mg/L	%	mg/L	%	mg/L	%	%	mg/L	%
Benzene	2.8	0.00028	3.3	0.00033	2.2	0.00022	0.00027667	0.084	0.0000084	0.22	0.000022	0.47	0.000047	0.00002580	24.2	0.00242
Ethylbenzene		0	0.36	0.000036		0	0.00001200	0.063	0.0000063	0.11	0.000011	0.067	0.0000067	0.00000800	32	0.0032
Styrene		0	0.44	0.000044	0.25	0.000025	0.00002300	0.066	0.0000066	0.12	0.000012	0.084	0.0000084	0.00000900	19.2	0.00192
Toluene	2.6	0.00026	3.9	0.00039	2.5	0.00025	0.00030000	0.35	0.000035	0.72	0.000072	0.65	0.000065	0.00005733	181	0.0181
Xylenes		0		0		0	0.00000000		0	0.086	0.0000086	0.061	0.0000061	0.00000490	25.51	0.002551
1,2,4-Trimethylbenzene		0		0		0	0.00000000		0		0		0	0.00000000	1.16	0.000116
n-Propyl Benzene		0		0		0	0.00000000		0		0		0	0.00000000	16	0.0016
Butylbenzene		0		0		0	0.00000000		0		0		0	0.00000000	1.85	0.000185
2-Methylnaphthalene		0		0		0	0.00000000		0		0		0	0.00000000	10.7	0.00107
Acenaphthene	0.0049	0.00000049	0.0048	0.00000048	0.0098	0.00000098	0.00000065	0.0023	0.00000023	0.0052	0.00000052	0.0094	0.00000094	0.00000056		0
Acenaphthylene		0	0.0025	0.00000025	0.0087	0.00000087	0.00000037	0.0019	0.00000019	0.0046	0.00000046	0.013	0.0000013	0.00000065		0
Anthracene		0		0		0	0.00000000		0		0	0.0026	0.00000026	0.00000009	0.0866	0.00000866
Fluoranthene		0		0		0	0.00000000		0		0	0.0028	0.00000028	0.00000009	0.14	0.000014
Fluorene	0.005	0.00000046	0.0042	0.00000042	0.009	0.0000009	0.00000059	0.003	0.00000025	0.0057	0.00000057	0.01	0.000001	0.00000061	0.529	0.0000529
Naphthalene	0.43	0.000043	0.44	0.000044	0.44	0.000044	0.00004367	0.0071	0.00000071	0.15	0.000015	0.22	0.000022	0.00001257	25.4	0.00254
Phenanthrene	0.0047	0.00000047	0.0043	0.00000043	0.012	0.0000012	0.00000070	0.0038	0.00000038	0.0083	0.00000083	0.021	0.0000021	0.00000110	0.77	0.000077
Phenol	0.09	0.000009	0.0945	0.00000945	0.097	0.0000097	0.00000938		0	0.018	0.0000018	0.031	0.0000031	0.00000163		0
Pyrene		0		0		0	0.00000000		0	0.0018	0.00000018	0.006	0.0000006	0.00000026	0.21	0.000021
Water	Balance	99.99940658	Balance	99.99914497	Balance	99.99944735	99.99933297	Balance	99.99994194	Balance	99.99985504	Balance	99.99983522	99.99987740	Balance	99.96612444

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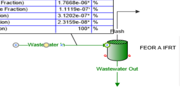
Table 2 Downtime Internal Floating Roof Tank Emissions Calculations, Emissions Calculations
Shell Chemical Applachia LLC, Monaca Cracker Plant

	FEOR A Tank Emissions					FEOR B Tank Emissions					Recovered Oil Tank Emissions					Total (3 Tanks)	
	Rim Seal Losses (lb/event)	Deck Fitting Losses (lb/event)	Deck Seam Losses (lb/event)	Withdrawal Losses (lb/event)	Total Losses (lb/event)	Rim Seal Losses (lb/event)	Deck Fitting Losses (lb/event)	Deck Seam Losses (lb/event)	Withdrawal Losses (lb/event)	Total Losses (lb/event)	Rim Seal Losses (lb/event)	Deck Fitting Losses (lb/event)	Deck Seam Losses (lb/event)	Withdrawal Losses (lb/event)	Total Losses (lb/event)	Total Losses (lb/event)	Total Losses (tons/event)
Total VOC	1.099E-04	3.978E-05	0.000E+00	2.849E-07	1.500E-04	6.129E-04	2.217E-04	0.000E+00	1.657E-08	8.346E-04	1.846E-02	1.181E-02	0.000E+00	2.542E-06	3.027E-02	0.03125	0.00002
Benzene	2.165E-05	7.829E-06	0.000E+00	5.997E-08	2.954E-05	2.322E-04	8.398E-05	0.000E+00	6.874E-09	3.162E-04	1.506E-03	9.635E-04	0.000E+00	1.816E-07	2.470E-03	0.00282	0.00000
Ethylbenzene	9.543E-06	3.451E-06	0.000E+00	1.859E-08	1.301E-05	1.431E-05	5.176E-06	0.000E+00	2.981E-10	1.949E-05	1.769E-03	1.132E-03	0.000E+00	2.400E-07	2.901E-03	0.00293	0.00000
Styrene	3.251E-06	1.176E-06	0.000E+00	2.092E-08	4.447E-06	8.306E-06	3.005E-06	0.000E+00	5.714E-10	1.131E-05	4.103E-04	2.625E-04	0.000E+00	1.441E-07	6.730E-04	0.00069	0.00000
Toluene	6.395E-05	2.313E-05	0.000E+00	1.332E-07	8.721E-05	3.347E-04	1.210E-04	0.000E+00	7.453E-09	4.557E-04	1.302E-02	8.336E-03	0.000E+00	1.358E-06	2.136E-02	0.02190	0.00001
Xylenes	3.957E-06	1.431E-06	0.000E+00	1.139E-08	5.400E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.015E-03	6.495E-04	0.000E+00	1.914E-07	1.665E-03	0.00167	0.00000
1,2,4-Trimethylbenzene	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.677E-05	1.713E-05	0.000E+00	8.705E-09	4.390E-05	0.00004	0.00000
n-Propyl Benzene	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.695E-04	3.644E-04	0.000E+00	1.200E-07	9.340E-04	0.00093	0.00000
Butylbenzene	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.761E-05	1.766E-05	0.000E+00	1.388E-08	4.528E-05	0.00005	0.00000
2-Methylnaphthalene	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.188E-05	7.603E-06	0.000E+00	8.029E-08	1.956E-05	0.00002	0.00000
Acenaphthene	4.270E-07	1.544E-07	0.000E+00	1.302E-09	5.827E-07	4.957E-07	1.793E-07	0.000E+00	1.615E-11	6.749E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.00000	0.00000
Acenaphthylene	1.279E-13	4.626E-14	0.000E+00	1.511E-09	1.511E-09	7.282E-14	2.634E-14	0.000E+00	9.189E-12	9.288E-12	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.00000	0.00000
Anthracene	5.574E-08	2.016E-08	0.000E+00	2.092E-10	7.611E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.528E-09	9.773E-10	0.000E+00	6.496E-10	3.155E-09	0.00000	0.00000
Fluoranthene	4.249E-07	1.537E-07	0.000E+00	2.092E-10	5.788E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.803E-10	1.793E-10	0.000E+00	1.050E-09	1.510E-09	0.00000	0.00000
Fluorene	6.077E-14	2.197E-14	0.000E+00	1.418E-09	1.418E-09	5.879E-14	2.126E-14	0.000E+00	1.466E-11	1.474E-11	4.068E-12	2.603E-12	0.000E+00	3.968E-09	3.975E-09	0.00000	0.00000
Naphthalene	6.579E-06	2.380E-06	0.000E+00	2.922E-08	8.988E-06	2.286E-05	8.267E-06	0.000E+00	1.085E-09	3.113E-05	9.474E-05	6.060E-05	0.000E+00	1.905E-07	1.555E-04	0.00020	0.00000
Phenanthrene	7.633E-08	2.761E-08	0.000E+00	2.557E-09	1.065E-07	4.857E-08	1.756E-08	0.000E+00	1.739E-11	6.616E-08	5.769E-09	3.692E-09	0.000E+00	5.776E-09	1.524E-08	0.00000	0.00000
Phenol	3.026E-10	1.094E-10	0.000E+00	3.789E-09	4.201E-09	1.742E-09	6.298E-10	0.000E+00	2.330E-10	2.605E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.00000	0.00000
Pyrene	6.811E-08	2.463E-08	0.000E+00	6.043E-10	9.334E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.247E-11	4.637E-11	0.000E+00	1.575E-09	1.694E-09	0.00000	0.00000
Total POM (minus Naphthalene)	1.052E-06	3.805E-07	0.000E+00	7.809E-09	1.440E-06	5.442E-07	1.968E-07	0.000E+00	5.739E-11	7.411E-07	1.189E-05	7.608E-06	0.000E+00	9.331E-08	1.959E-05	0.00002	0.00000
Total HAP	1.100E-04	3.977E-05	0.000E+00	2.849E-07	1.500E-04	6.129E-04	2.216E-04	0.000E+00	1.657E-08	8.346E-04	1.783E-02	1.141E-02	0.000E+00	2.399E-06	2.924E-02	0.03023	0.00002

Table 3 Downtime Internal Floating Roof Tank Emissions Calculations, ProMax Inputs, FEOR A Tank
Shell Chemical Applachia LLC, Monaca Cracker Plant

FEOR A Tank

Temperature	30.02*	°C
Pressure	0.01*	bar (g)
Std Liquid Volumetric Flow	100.11*	sgpm
Benzene(Mole Fraction)	5.9504e-06*	%
Ethylbenzene(Mole Fraction)	1.3575e-06*	%
Styrene(Mole Fraction)	1.5568e-06*	%
Toluene(Mole Fraction)	1.1209e-05*	%
o-Xylene(Mole Fraction)	8.3149e-07*	%
1,2,4-Trimethylbenzene(Mole Fraction)	0*	%
n-Propylbenzene(Mole Fraction)	0*	%
Butylbenzene(Mole Fraction)	0*	%
2-Methylnaphthalene(Mole Fraction)	0*	%
Acenaphthene(Mole Fraction)	6.5422e-08*	%
Acenaphthylene(Mole Fraction)	7.6942e-08*	%
Anthracene(Mole Fraction)	9.0971e-09*	%
Fluoranthene(Mole Fraction)	8.0167e-09*	%
Fluorene(Mole Fraction)	6.6114e-08*	%
Naphthalene(Mole Fraction)	1.7668e-06*	%
Phenanthrene(Mole Fraction)	1.1119e-07*	%
Phenol(Mole Fraction)	3.1202e-07*	%
Pyrene(Mole Fraction)	2.3159e-08*	%
Water(Mole Fraction)	100*	%



Working and Breathing Parameters

Property	Value	Units
Process Stream	Wastewater In	
Tank Geometry	Internal Floating Roof Tank	
Shell Length	47.9	ft
Shell Diameter	55.8	ft
Number of Storage Tanks Employed	1	
Location	Pittsburgh, PA	
Time Frame	September	
Report Components	Non-exempt VOC	
Set Bulk Temperature to Stream Temperature?	☐	
Use AP42 Raoult's Vapor Pressure?	☐	
Maximum Fraction Fill of Tank	90	%
Average Fraction Fill of Tank	50	%
Minimum Fraction Fill of Tank	10	%
Material Category	Light Organics	
Insulation	Uninsulated	
Tank Color	White	
Tank Condition	Light Rust	
Shell Paint Condition	Average	
Operating Pressure	0	psig
Breather Vent Pressure	0.03	psig
Breather Vacuum Pressure	-0.03	psig
Roof Type	Dome	
Radius of Domed Roof		ft
Slope of Coned Roof	0.0625	
Roof Color	White	
Roof Paint Condition	Average	
Flashing Temperature	71.4	°F
Maximum Average Temperature	73.9	°F
Minimum Average Temperature	54.8	°F
Average Absolute Pressure	14.1	psia
Daily Solar Insolation	1,306	Btu/ft^2/day
Average Wind Speed	6.3	mi/h
Underground Tank?	☐	
Bolted or Riveted Construction?	☐	
Known Sum of Increases in Liquid Level?	☐	
Sum of Increases in Liquid Level		ft/yr
Vapor Balanced Tank?	☐	
Calculate Loading Losses?	☐	
Output Loading Losses?	☐	
Output Flashing Losses?	☑	
Output Working/Breathing Losses?	☑	

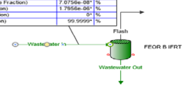
Floating Roof Fittings

Property	Value
Floating Roof Type	Pontoon
Tank Construction	Welded
Primary Seal	Mechanical Shoe
Secondary Seal Type #1	None
Secondary Seal Type #2	None
Seal Fitting Tightness	Tight
Self Supported Roof?	☑
Deck Construction	Sheet
Construction Type for Continuous Sheet Style Deck	5 feet wide
Construction Type for Panel Style Deck	5 x 7.5 feet
Number of Columns	0
Effective Column Diameter	Default
Construction Type of Internal Floating Roof Tank	Welded
Access hatch type	Bolted cover, gasketed
Access hatch quantity	1
Fixed roof support column well type	N/A
Fixed roof support column well quantity	0
Unslotted guide-pole and well type	N/A
Unslotted guide-pole and well quantity	0
Slotted guide-pole/sample well type	Gasketed sliding cover, with pole sleeve
Slotted guide-pole/sample well quantity	2
Gauge-float well type	N/A
Gauge-float well quantity	1
Gauge-hatch/sample port type	Weighted mechanical actuation, gasketed
Gauge-hatch/sample port quantity	1
Vacuum breaker type	Weighted mechanical actuation, gasketed
Vacuum breaker quantity	1
Deck drain type	N/A
Deck drain quantity	0
Stub drain quantity	0
Center Deck leg type	N/A
Center Deck leg quantity	16
Pontoon Deck leg type	N/A
Pontoon Deck leg quantity	0
Rim vent type	N/A
Rim vent quantity	0
Ladder well type	N/A
Ladder well quantity	0
Ladder-slotted guidepole combination well type	N/A
Ladder well quantity	0
Reset fittings to defaults	☐

Table 4 Downtime Internal Floating Roof Tank Emissions Calculations, ProMax Inputs, FEOR B Tank
Shell Chemical Applachia LLC, Monaca Cracker Plant

FEOR B Tank

Temperature	26.74*	°C
Pressure	0.01*	bar (g)
Std Liquid Volumetric Flow	1.07*	sgpm
Benzene(Mole Fraction)	6.381e-05*	%
Ethylbenzene(Mole Fraction)	2.0363e-06*	%
Styrene(Mole Fraction)	3.9785e-06*	%
Toluene(Mole Fraction)	5.8658e-05*	%
o-Xylene(Mole Fraction)	0*	%
1,2,4-Trimethylbenzene(Mole Fraction)	0*	%
n-Propylbenzene(Mole Fraction)	0*	%
Butylbenzene(Mole Fraction)	0*	%
2-Methylnaphthalene(Mole Fraction)	0*	%
Acenaphthene(Mole Fraction)	7.5936e-08*	%
Acenaphthylene(Mole Fraction)	4.3798e-08*	%
Anthracene(Mole Fraction)	0*	%
Fluoranthene(Mole Fraction)	0*	%
Fluorene(Mole Fraction)	6.3946e-08*	%
Naphthalene(Mole Fraction)	6.1382e-06*	%
Phenanthrene(Mole Fraction)	7.0756e-08*	%
Phenol(Mole Fraction)	1.7956e-06*	%
Pyrene(Mole Fraction)	0*	%
Water(Mole Fraction)	99.9999*	%



Working and Breathing Parameters

Property	Value	Units
Process Stream	Wastewater In	
Tank Geometry	Internal Floating Roof Tank	
Shell Length	47.9	ft
Shell Diameter	55.8	ft
Number of Storage Tanks Employed	1	
Location	Pittsburgh, PA	
Time Frame	September	
Report Components	Non-exempt VOC	
Set Bulk Temperature to Stream Temperature?	☐	
Use AP42 Raoult's Vapor Pressure?	☐	
Maximum Fraction Fill of Tank	90	%
Average Fraction Fill of Tank	50	%
Minimum Fraction Fill of Tank	10	%
Material Category	Light Organics	
Insulation	Uninsulated	
Tank Color	White	
Tank Condition	Light Rust	
Shell Paint Condition	Average	
Operating Pressure	0	psig
Breather Vent Pressure	0.03	psig
Breather Vacuum Pressure	-0.03	psig
Roof Type	Dome	
Radius of Domed Roof		ft
Slope of Coned Roof	0.0625	
Roof Color	White	
Roof Paint Condition	Average	
Flashing Temperature	71.4	°F
Maximum Average Temperature	73.9	°F
Minimum Average Temperature	54.8	°F
Average Absolute Pressure	14.1	psia
Daily Solar Insolation	1,306	Btu/ft^2/day
Average Wind Speed	6.3	mi/h
Underground Tank?	☐	
Bolted or Riveted Construction?	☐	
Known Sum of Increases in Liquid Level?	☐	
Sum of Increases in Liquid Level		ft/yr
Vapor Balanced Tank?	☐	
Calculate Loading Losses?	☐	
Output Loading Losses?	☐	
Output Flashing Losses?	☑	
Output Working/Breathing Losses?	☑	

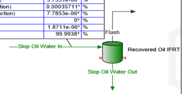
Floating Roof Fittings

Property	Value
Floating Roof Type	Pontoon
Tank Construction	Welded
Primary Seal	Mechanical Shoe
Secondary Seal Type #1	None
Secondary Seal Type #2	None
Seal Fitting Tightness	Tight
Self Supported Roof?	☑
Deck Construction	Sheet
Construction Type for Continuous Sheet Style Deck	5 feet wide
Construction Type for Panel Style Deck	5 x 7.5 feet
Number of Columns	0
Effective Column Diameter	Default
Construction Type of Internal Floating Roof Tank	Welded
Access hatch type	Bolted cover, gasketed
Access hatch quantity	1
Fixed roof support column well type	N/A
Fixed roof support column well quantity	0
Unslotted guide-pole and well type	N/A
Unslotted guide-pole and well quantity	0
Slotted guide-pole/sample well type	Gasketed sliding cover, with pole sleeve
Slotted guide-pole/sample well quantity	2
Gauge-float well type	N/A
Gauge-float well quantity	1
Gauge-hatch/sample port type	Weighted mechanical actuation, gasketed
Gauge-hatch/sample port quantity	1
Vacuum breaker type	Weighted mechanical actuation, gasketed
Vacuum breaker quantity	1
Deck drain type	N/A
Deck drain quantity	0
Stub drain quantity	0
Center Deck leg type	N/A
Center Deck leg quantity	16
Pontoon Deck leg type	N/A
Pontoon Deck leg quantity	0
Rim vent type	N/A
Rim vent quantity	0
Ladder well type	N/A
Ladder well quantity	0
Ladder-slotted guidepole combination well type	N/A
Ladder well quantity	0
Reset fittings to defaults	☐

Table 5 Downtime Internal Floating Roof Tank Emissions Calculations, ProMax Inputs, Recovered Oil Tank
Shell Chemical Applachia LLC, Monaca Cracker Plant

Recovered Oil Tank

Temperature	28.87*	°C
Pressure	0.01*	bar (g)
Std Liquid Volumetric Flow	2.49*	sgpm
Benzene(Mole Fraction)	0.00055829*	%
Ethylbenzene(Mole Fraction)	0.00054316*	%
Styrene(Mole Fraction)	0.00033221*	%
Toluene(Mole Fraction)	0.00354*	%
o-Xylene(Mole Fraction)	0.000433*	%
1,2,4-Trimethylbenzene(Mole Fraction)	1.7392e-05*	%
n-Propylbenzene(Mole Fraction)	0.00023989*	%
Butylbenzene(Mole Fraction)	2.4838e-05*	%
2-Methylnaphthalene(Mole Fraction)	0.0001356*	%
Acenaphthene(Mole Fraction)	0*	%
Acenaphthylene(Mole Fraction)	0*	%
Anthracene(Mole Fraction)	8.7559e-07*	%
Fluoranthene(Mole Fraction)	1.2474e-06*	%
Fluorene(Mole Fraction)	5.7351e-06*	%
Naphthalene(Mole Fraction)	0.00035711*	%
Phenanthrene(Mole Fraction)	7.7853e-06*	%
Phenol(Mole Fraction)	0*	%
Pyrene(Mole Fraction)	1.8711e-06*	%
Water(Mole Fraction)	99.9938*	%



Working and Breathing Parameters

Property	Value	Units
Process Stream	Slop Oil Water In	
Tank Geometry	Internal Floating Roof Tank	
Shell Length	48	ft
Shell Diameter	43	ft
Number of Storage Tanks Employed	1	
Location	Pittsburgh, PA	
Time Frame	September	
Report Components	Non-exempt VOC	
Set Bulk Temperature to Stream Temperature?	☐	
Use AP42 Raoult's Vapor Pressure?	☐	
Maximum Fraction Fill of Tank	90	%
Average Fraction Fill of Tank	50	%
Minimum Fraction Fill of Tank	10	%
Material Category	Light Organics	
Insulation	Uninsulated	
Tank Color	White	
Tank Condition	Light Rust	
Shell Paint Condition	Average	
Operating Pressure	0	psig
Breather Vent Pressure	0.03	psig
Breather Vacuum Pressure	-0.03	psig
Roof Type	Dome	
Radius of Domed Roof		ft
Slope of Coned Roof	0.0625	
Roof Color	White	
Roof Paint Condition	Average	
Flashing Temperature	71.41	°F
Maximum Average Temperature	73.9	°F
Minimum Average Temperature	54.8	°F
Average Absolute Pressure	14.1	psia
Daily Solar Insolation	1,306	Btu/ft^2/day
Average Wind Speed	6.3	mi/h
Underground Tank?	☐	
Bolted or Riveted Construction?	☐	
Known Sum of Increases in Liquid Level?	☐	
Sum of Increases in Liquid Level		ft/yr
Vapor Balanced Tank?	☐	
Calculate Loading Losses?	☐	
Output Loading Losses?	☐	
Output Flashing Losses?	☑	
Output Working/Breathing Losses?	☑	

Floating Roof Fittings

Property	Value
Floating Roof Type	Pontoon
Tank Construction	Welded
Primary Seal	Mechanical Shoe
Secondary Seal Type #1	None
Secondary Seal Type #2	None
Seal Fitting Tightness	Tight
Self Supported Roof?	☑
Deck Construction	Sheet
Construction Type for Continuous Sheet Style Deck	5 feet wide
Construction Type for Panel Style Deck	5 x 7.5 feet
Number of Columns	0
Effective Column Diameter	Default
Construction Type of Internal Floating Roof Tank	Welded
Access hatch type	Bolted cover, gasketed
Access hatch quantity	1
Fixed roof support column well type	N/A
Fixed roof support column well quantity	0
Unslotted guide-pole and well type	N/A
Unslotted guide-pole and well quantity	0
Slotted guide-pole/sample well type	Gasketed sliding cover, with pole sleeve
Slotted guide-pole/sample well quantity	3
Gauge-float well type	N/A
Gauge-float well quantity	1
Gauge-hatch/sample port type	Weighted mechanical actuation, gasketed
Gauge-hatch/sample port quantity	1
Vacuum breaker type	Weighted mechanical actuation, gasketed
Vacuum breaker quantity	1
Deck drain type	N/A
Deck drain quantity	0
Stub drain quantity	0
Center Deck leg type	N/A
Center Deck leg quantity	13
Pontoon Deck leg type	N/A
Pontoon Deck leg quantity	0
Rim vent type	N/A
Rim vent quantity	0
Ladder well type	N/A
Ladder well quantity	0
Ladder-slotted guidepole combination well type	N/A
Ladder well quantity	0
Reset fittings to defaults	☐