MEMO

Optim Environmental Resources, Inc.
8 Triangle Park Drive, Suite 801
Cincinnati, Ohio 45246-3404

To:	David Weber	**Date:**	September 11, 2008
From:	Yatendra M. Shah	**cc:**	
Subject:	Air Permit Status Review for Oil Processing and Storage Tanks – Middletown, Ohio Facility		
File:	PN: 5039-08-005		

This memo documents the air permit review status for the processing and storage tanks at your Middletown, Ohio Facility. Emission calculations using U.S. EPA's TANKS 4.0.9d model indicate that the facility tanks are considered "de minimis" sources of air contaminants and are exempt from the air permitting requirements by the Ohio EPA.

Objective and Analysis Scope

The objective of the analysis was to estimate the emissions of Volatile Organic Compounds (VOC) from the subject tanks and determine if the estimated daily emissions from the tanks exempt them from the Ohio EPA's Permit-to-Install/Permit-to-Operate (PTIO) requirements.

Regulatory Basis

Ohio Administrative Code (OAC) 3745-31-03(A)(5) exempts "de minimis" sources of air contaminants from the Permit-to-Install/Permit-to-Operate (PTIO) requirements. The de minimis sources are defined under OAC 3745-15-05. Section (B) provides the definition of the de minimis source. The rule also requires consideration of emissions from all similar sources at the facility as required under Section (C). The relevant regulatory texts of these regulations are:

- OAC 3745-31-03(A)(5) – De minimis Exemption
  Air contaminant sources which meet the requirements of rule 3745-15-05 of the Administrative Code and section 3704.011 of the Revised Code are exempt from the requirements of Chapter 3745-31 (Chapter 3745-31 requires air contaminant sources to obtain permits).

- The 3745-15-05(B) – "De Minimis" Definition.
  Except as provided in paragraphs (C), (D) and (H) of this rule and division (B) of section 3704.011 of the Revised Code, any air contaminant source is exempt from Chapter 3704 of the Revised Code and rules adopted there under, unless the potential emissions of any one of the following exceeds ten pounds per day: particulate matter, sulfur dioxide, nitrogen oxides, organic compounds, carbon monoxide, lead or any other air contaminant.

- OAC 3745-31-03(A)(5) – De minimis Exemption
  Air contaminant sources which meet the requirements of rule 3745-15-05 of the Administrative Code and section 3704.011 of the Revised Code are exempt from the requirements of Chapter 3745-31 (Chapter 3745-31 requires air contaminant sources to obtain permits).

- OAC 3745-15-05(C)(4) – The source alone or in combination with similar sources at the same facility, would result in potential emissions of any air pollutant in excess of twenty-five tons per year. In determining the total emissions from a group of similar sources, an enforceable permit emission limit shall be used in lieu of the potential to emit for such source or sources; or

- OAC 3745-15-05(C)(5) – The source emits more than one ton per year of any hazardous air pollutants or combination of hazardous air pollutants.

Based on the above provisions, the three criteria that must be satisfied to qualify for the de minimis exemption are: 1) VOC emissions from each tank must be below 10 lb/day, 2) the total emissions from all tanks at the facility must be less than 25 tons per year, and 3) total hazardous air pollutant emissions from all tanks must be less than 1 ton per year.

Approach

The de minimis exemption review analysis required calculation of daily emissions for each tank to determine if the maximum daily emissions are below 10 lb/day and total annual facility emissions to determine if the annual facility VOC emissions are below 25 tons per year and the annual HAP emissions are less than 1 ton/yr.

U. S. EPA's TANKS Model generates VOC emissions based on the tank capacity and sizing parameters and ambient conditions. Based on our meeting discussions and past studies, one turnover per day was assumed for emission calculations. TANKS model allows estimation of VOC emissions by month; emissions for the month of July with the highest diurnal temperature was calculated and was used for estimating the daily emissions.

Vapor pressure of the material in the tank is a key parameter affecting the VOC emissions. The vapor pressure data for the Middletown tanks were derived from the study for the Sharonville Facility supporting the June 22, 2004 Response to Clean Air Act Section 114(a) Request for Information. Table 1 provides the tanks parameters and the VOC emission data generated using TANKS 4.0.9d for the tanks at the Middletown Facility. The highest daily emissions for the month of July are estimated to be well below 10 lb/day for each individual tank. The total facility VOC emissions are estimated to be less than 1.5 tons/yr.

The HAP emissions are estimated using data from U.S.EPA's AP-42 publication. The AP-42 document indicates the total HAP content for distillate oil at 0.04 percent. Based on this factor the total HAP emissions at less than 0.0006 tons/yr.

Conclusions

The worst-case VOC emission rates for the largest tanks selected for the analysis are estimated to be less than 0.92 lb/day (Tank 1 – 28.45 lbs for July), which is well below the Ohio EPA PTIO de minimis threshold of 10 lbs/day. Total facility VOC and HAP emissions are well below the Ohio EPA facility de minimis threshold values of 25 tons/yr and 1 ton/yr, respectively. This analysis shows that the Middletown Facility tanks are exempt from Ohio EPA's PTIO requirements.

TABLE 2. TANKS INVENTORY AND VOC EMISSION DATA

TANK #	Material Stored	Tank Type (Horizantal/Vertical)	Shell Height/Length (ft)	Shell Diameter (ft)	Capacity (Gal)	Calculated Volume (Gal)	Maximum Liquid Height (ft)	Average Liquid Height (ft)	Turnovers Per Year	Heated (Y/N)	Temp. (°F)	Roof Height (ft)	Roof Radius (ft)	Vapor Pressure (psia)	Molecular Weight (g/mol)	July Emissions (lbs)	Annual Emissions (lbs)	TANKS 4.0.9d Run ID
Tank 1	Oily Water	Vertical Fixed Roof	13.6	8	5,000	5,114	12.24	10.88	365	Yes	150-180	13.6	4	0.2556	18.0068	4.13	49.52	UWW Tank 1-5
Tank 2	Oily Water	Vertical Fixed Roof	13.6	8	5,000	5,114	12.24	10.88	365	Yes	150-180	13.6	4	0.2556	18.0068	4.13	49.52	UWW Tank 1-5
Tank 3	Oily Water	Vertical Fixed Roof	13.6	8	5,000	5,114	12.24	10.88	365	Yes	150-180	13.6	4	0.2556	18.0068	4.13	49.52	UWW Tank 1-5
Tank 4	Oily Water	Vertical Fixed Roof	13.6	8	5,000	5,114	12.24	10.88	365	Yes	150-180	13.6	4	0.2556	18.0068	4.13	49.52	UWW Tank 1-5
Tank 5	Oily Water	Vertical Fixed Roof	13.6	8	5,000	5,114	12.24	10.88	365	Yes	150-180	13.6	4	0.2556	18.0068	4.13	49.52	UWW Tank 1-5
Tank 6	Water (<5% Oil)	Vertical Fixed Roof	9.4	10	5,500	5,523	8.93	7.99	365	No		9.4	5	0.2569	18	6.55	72.9	UWW Tank 6
Tank 7	Water (<5% Oil)	Vertical Fixed Roof	10	8.4	3,500	4,146	9.5	8.5	365	No		10	4.2	0.2569	18	5.09	55.81	UWW Tank 7
Tank 101	Oil	Vertical Fixed Roof	34	10	20,000	19,976	32.3	28.9	365	No		34	5	0.0064	200	18.15	177.13	UWW Tank 101
Tank 102	UF Supply	Vertical Fixed Roof	34	10	20,000	19,976	32.3	28.9	365	No		34	5	0.2569	18	28.45	308.37	UWW Tank 102
Tank 103	Oil	Vertical Fixed Roof	26.4	8	10,000	9,927	25.08	22.44	365	No		26.4	4	0.0064	200	8.81	86.11	UWW Tank 103,104
Tank 104	Incoming, low CL oil	Vertical Fixed Roof	26.4	8	10,000	9,927	25.08	22.44	365	No		26.4	4	0.0064	200	8.81	86.11	UWW Tank 103,104
Tank 105	Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 105-108
Tank 106	Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 105-108
Tank 107	Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 105-108
Tank 108	Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 105-108
Tank 109	Oil	Vertical Fixed Roof	15.5	10	10,000	9,107	14.725	13.175	365	No		15.5	5	0.0064	200	3.89	41.3	UWW Tank 109
Tank 110	Oil	Vertical Fixed Roof	13.3	8.5	5,500	5,646	12.635	11.305	365	No		13.3	4.25	0.0064	200	2.39	25.28	UWW Tank 110
Tank 111	Oil	Vertical Fixed Roof	13.5	8	5,000	5,076	12.825	11.475	365	No		13.5	4	0.0064	200	2.21	23.24	UWW Tank 111
Tank 112	Incoming Oil	Horizontal	24.5	9.5	10,000	12,991			365	No				0.0064	200	3.02	34.05	UWW Tank 112
Tank 113	High Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 114	High Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 115	High Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 116	High Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 117	Low Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 118	Low CL Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 119	Low Cl Oil	Vertical Fixed Roof	16	8	6,000	6,016	15.2	13.6	365	No		16	4	0.0064	200	3.09	31.86	UWW Tank 113-119
Tank 201	Oily Water	Vertical Fixed Roof	13	11.5	10,500	10,101	12.35	11.05	365	Yes	160	13	5.75	0.2556	18.0068	8.4	100.73	Tank 201-204
Tank 202	Oily Water	Vertical Fixed Roof	13	11.5	10,500	10,101	12.35	11.05	365	Yes	160	13	5.75	0.2556	18.0068	8.4	100.73	Tank 201-204
Tank 203	Oily Water	Vertical Fixed Roof	13	11.5	10,500	10,101	12.35	11.05	365	Yes	160	13	5.75	0.2556	18.0068	8.4	100.73	Tank 201-204
Tank 204	Oily Water	Vertical Fixed Roof	13	11.5	10,500	10,101	12.35	11.05	365	Yes	160	13	5.75	0.2556	18.0068	8.4	100.73	Tank 201-204
Tank 205	Oily Water	Vertical Fixed Roof	15	11	10,000	10,663	14.25	12.75	365	No		15	5.5	0.2556	18.0068	13.3	145.62	Tank 205-208
Tank 206	Oily Water	Vertical Fixed Roof	15	11	10,000	10,663	14.25	12.75	365	No		15	5.5	0.2556	18.0068	13.3	145.62	Tank 205-208
Tank 207	Oily Water	Vertical Fixed Roof	15	11	10,000	10,663	14.25	12.75	365	No		15	5.5	0.2556	18.0068	13.3	145.62	Tank 205-208
Tank 208	Oily Water	Vertical Fixed Roof	15	11	10,000	10,663	14.25	12.75	365	No		15	5.5	0.2556	18.0068	13.3	145.62	Tank 205-208
Tank 209	Solids	Vertical Fixed Roof	15.2	8.6	6,000	6,605	14.44	12.92	365	No		15.2	4.3					
Tank 210	Water (<5% Oil)	Vertical Fixed Roof	13	8.8	5,000	5,915	12.35	11.05	365	No		13	4.4	0.2556	18.0068	7.99	87.18	Tank 210
Tank 211	Oil	Vertical Fixed Roof	15.2	8.6	9,000	6,605	14.44	12.92	365	No		15.2	4.3	0.0064	200	3.06	31.93	Tank 211
															Total	**239.86**	**2612.87**	

TANKS MODEL INPUT AND OUTPUT

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 1-5	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tanks 1-5 at the Middletown Facility. Used for treating Oily Water.	
Tank Dimensions		
Shell Height (ft):		13.60
Diameter (ft):		8.00
Liquid Height (ft) :		12.24
Avg. Liquid Height (ft):		10.88
Volume (gallons):		4,602.40
Turnovers:		365.00
Net Throughput(gal/yr):		1,679,876.42
Is Tank Heated (y/n):	Y	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		13.60
Radius (ft) (Dome Roof)		4.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 1-5 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oily Water	All	180.00	180.00	180.00	180.00	0.2556	0.1810	0.3559	18.0068			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 1-5 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	3.7079
Vapor Space Volume (cu ft):	1,795.6171
Vapor Density (lb/cu ft):	0.0007
Vapor Space Expansion Factor:	0.0125
Vented Vapor Saturation Factor:	0.6739
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,795.6171
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	35.7227
Tank Shell Height (ft):	13.6000
Average Liquid Height (ft):	10.8800
Roof Outage (ft):	33.0027
Roof Outage (Dome Roof)	
Roof Outage (ft):	33.0027
Dome Radius (ft):	4.0000
Shell Radius (ft):	4.0000

Vapor Density

UWW Tanks 1-5

Vapor Density (lb/cu ft):	0.0007
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Daily Avg. Liquid Surface Temp. (deg. R):	639.6700
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	639.6700
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0125
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.1749
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1810
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3559
Daily Avg. Liquid Surface Temp. (deg R):	639.6700
Daily Min. Liquid Surface Temp. (deg R):	639.6700
Daily Max. Liquid Surface Temp. (deg R):	639.6700
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.6739
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2556
Vapor Space Outage (ft):	35.7227
Working Losses (lb):	45.8118
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Annual Net Throughput (gal/yr.):	1,679,876.4194
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	4,602.4011
Maximum Liquid Height (ft):	12.2400
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	49.5197

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 1-5 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oily Water	45.81	3.71	49.52

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 6	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #6 at the Middletown Facility. Used for Storing Water.	
Tank Dimensions		
Shell Height (ft):		9.40
Diameter (ft):		10.00
Liquid Height (ft) :		8.93
Avg. Liquid Height (ft):		7.99
Volume (gallons):		5,246.56
Turnovers:		365.00
Net Throughput(gal/yr):		1,914,993.93
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		9.40
Radius (ft) (Dome Roof)		5.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 6 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Water	All	60.09	50.61	69.56	54.73	0.2569	0.1819	0.3576	18.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 6 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	20.4276
Vapor Space Volume (cu ft):	914.7710
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0855
Vented Vapor Saturation Factor:	0.8631
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	914.7710
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	11.6472
Tank Shell Height (ft):	9.4000
Average Liquid Height (ft):	7.9900
Roof Outage (ft):	10.2372
Roof Outage (Dome Roof)	
Roof Outage (ft):	10.2372
Dome Radius (ft):	5.0000
Shell Radius (ft):	5.0000
Vapor Density	

UWW Tank 6

Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0855
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.1757
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1819
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3576
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8631
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2569
Vapor Space Outage (ft):	11.6472
Working Losses (lb):	52.4695
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Annual Net Throughput (gal/yr.):	1,914,993.9270
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	5,246.5587
Maximum Liquid Height (ft):	8.9300
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	72.8971

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 6 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Water	52.47	20.43	72.90

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 7	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #7 at the Middletown Facility. Used for Storing Water.	
Tank Dimensions		
Shell Height (ft):		10.00
Diameter (ft):		8.40
Liquid Height (ft) :		9.50
Avg. Liquid Height (ft):		8.50
Volume (gallons):		3,701.97
Turnovers:		365.00
Net Throughput(gal/yr):		1,351,219.71
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		10.00
Radius (ft) (Dome Roof)		4.20
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

UWW Tank 7

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 7 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Water	All	60.09	50.61	69.56	54.73	0.2569	0.1819	0.3576	18.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 7 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	18.7867
Vapor Space Volume (cu ft):	883.8138
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0855
Vented Vapor Saturation Factor:	0.8216
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	883.8138
Tank Diameter (ft):	8.4000
Vapor Space Outage (ft):	15.9482
Tank Shell Height (ft):	10.0000
Average Liquid Height (ft):	8.5000
Roof Outage (ft):	14.4482
Roof Outage (Dome Roof)	
Roof Outage (ft):	14.4482
Dome Radius (ft):	4.2000
Shell Radius (ft):	4.2000
Vapor Density	

UWW Tank 7

Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0855
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.1757
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1819
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3576
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8216
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2569
Vapor Space Outage (ft):	15.9462
Working Losses (lb):	37.0225
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Annual Net Throughput (gal/yr.):	1,351,219.7147
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	3,701.9718
Maximum Liquid Height (ft):	9.5000
Tank Diameter (ft):	8.4000
Working Loss Product Factor:	1.0000
Total Losses (lb):	55.8092

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 7 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Water	37.02	18.79	55.81

UWW Tank 101

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 101	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #101 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		34.00
Diameter (ft):		10.00
Liquid Height (ft) :		32.30
Avg. Liquid Height (ft):		28.90
Volume (gallons):		18,976.91
Turnovers:		365.00
Net Throughput(gal/yr):		6,926,573.78
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		34.00
Radius (ft) (Dome Roof)		5.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 101 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 101 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	124.5929
Vapor Space Volume (cu ft):	22,315.2562
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9121
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	22,315.2562
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	284.1267
Tank Shell Height (ft):	34.0000
Average Liquid Height (ft):	28.9000
Roof Outage (ft):	279.0267
Roof Outage (Dome Roof)	
Roof Outage (ft):	279.0267
Dome Radius (ft):	5.0000
Shell Radius (ft):	5.0000
Vapor Density	

UWW Tank 101

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9121
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	284.1267
Working Losses (lb):	52.5329
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	6,926,573.7779
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	18,976.9145
Maximum Liquid Height (ft):	32.3000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	177.1258

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 101 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	52.53	124.59	177.13

UWW Tank 102

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 102	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #102 at the Middletown Facility. Used for UF Supply.	
Tank Dimensions		
Shell Height (ft):		34.00
Diameter (ft):		10.00
Liquid Height (ft) :		32.30
Avg. Liquid Height (ft):		28.90
Volume (gallons):		18,976.91
Turnovers:		365.00
Net Throughput(gal/yr):		6,926,573.78
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		34.00
Radius (ft) (Dome Roof)		5.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 102 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.2569	0.1819	0.3576	18.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 102 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	118.5857
Vapor Space Volume (cu ft):	22,315.2562
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0855
Vented Vapor Saturation Factor:	0.2054
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	22,315.2562
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	284.1267
Tank Shell Height (ft):	34.0000
Average Liquid Height (ft):	28.9000
Roof Outage (ft):	279.0267
Roof Outage (Dome Roof)	
Roof Outage (ft):	279.0267
Dome Radius (ft):	5.0000
Shell Radius (ft):	5.0000

Vapor Density

UWW Tank 102

Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0855
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.1757
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1819
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3576
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.2054
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2569
Vapor Space Outage (ft):	284.1267
Working Losses (lb):	189.7834
Vapor Molecular Weight (lb/lb-mole):	18.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2569
Annual Net Throughput (gal/yr.):	6,926,573.7779
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	18,976.9145
Maximum Liquid Height (ft):	32.3000
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	308.3691

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 102 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	189.78	118.59	308.37

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 103, 104	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tanks 103 and 104 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		26.40
Diameter (ft):		8.00
Liquid Height (ft) :		25.08
Avg. Liquid Height (ft):		22.44
Volume (gallons):		9,430.41
Turnovers:		365.00
Net Throughput(gal/yr):		3,442,099.72
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		26.40
Radius (ft) (Dome Roof)		4.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 103, 104 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 103, 104 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	60.0039
Vapor Space Volume (cu ft):	10,496.6391
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9339
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	10,496.6391
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	208.8240
Tank Shell Height (ft):	26.4000
Average Liquid Height (ft):	22.4400
Roof Outage (ft):	204.8640
Roof Outage (Dome Roof)	
Roof Outage (ft):	204.8640
Dome Radius (ft):	4.0000
Shell Radius (ft):	4.0000
Vapor Density	

UWW Tanks 103, 104

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9339
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	208.8240
Working Losses (lb):	26.1058
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	3,442,099.7219
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	9,430.4102
Maximum Liquid Height (ft):	25.0800
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	86.1096

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 103, 104 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	26.11	60.00	86.11

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 105-108	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tanks 105-108 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		16.00
Diameter (ft):		8.00
Liquid Height (ft) :		15.20
Avg. Liquid Height (ft):		13.60
Volume (gallons):		5,715.40
Turnovers:		365.00
Net Throughput(gal/yr):		2,086,121.04
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		16.00
Radius (ft) (Dome Roof)		4.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 105-108 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 105-108 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	16.0396
Vapor Space Volume (cu ft):	2,667.4216
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9823
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,667.4216
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	53.0667
Tank Shell Height (ft):	16.0000
Average Liquid Height (ft):	13.6000
Roof Outage (ft):	50.6667
Roof Outage (Dome Roof)	
Roof Outage (ft):	50.6667
Dome Radius (ft):	4.0000
Shell Radius (ft):	4.0000
Vapor Density	

UWW Tanks 105-108

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9823
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	53.0667
Working Losses (lb):	15.8217
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	2,086,121.0438
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	5,715.4001
Maximum Liquid Height (ft):	15.2000
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	31.8613

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 105-108 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	15.82	16.04	31.86

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 109	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #109 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		15.50
Diameter (ft):		10.00
Liquid Height (ft) :		14.73
Avg. Liquid Height (ft):		13.18
Volume (gallons):		8,930.31
Turnovers:		365.00
Net Throughput(gal/yr):		3,259,564.13
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		15.50
Radius (ft) (Dome Roof)		5.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 109 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 109 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	16.5831
Vapor Space Volume (cu ft):	2,741.1050
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9883
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,741.1050
Tank Diameter (ft):	10.0000
Vapor Space Outage (ft):	34.9008
Tank Shell Height (ft):	15.5000
Average Liquid Height (ft):	13.1750
Roof Outage (ft):	32.5758
Roof Outage (Dome Roof)	
Roof Outage (ft):	32.5758
Dome Radius (ft):	5.0000
Shell Radius (ft):	5.0000

Vapor Density

UWW Tank 109

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9883
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	34.9008
Working Losses (lb):	24.7214
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	3,259,564.1308
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	8,930.3127
Maximum Liquid Height (ft):	14.7250
Tank Diameter (ft):	10.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	41.3045

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 109 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	24.72	16.58	41.30

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 110	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #110 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		13.30
Diameter (ft):		8.50
Liquid Height (ft) :		12.64
Avg. Liquid Height (ft):		11.31
Volume (gallons):		5,363.35
Turnovers:		365.00
Net Throughput(gal/yr):		1,957,622.91
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		13.30
Radius (ft) (Dome Roof)		4.25
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

UWW Tank 110

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 110 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 110 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	10.4360
Vapor Space Volume (cu ft):	1,722.3985
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9898
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,722.3985
Tank Diameter (ft):	8.5000
Vapor Space Outage (ft):	30.3533
Tank Shell Height (ft):	13.3000
Average Liquid Height (ft):	11.3050
Roof Outage (ft):	28.3583
Roof Outage (Dome Roof)	
Roof Outage (ft):	28.3583
Dome Radius (ft):	4.2500
Shell Radius (ft):	4.2500
Vapor Density	

UWW Tank 110

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9898
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	30.3533
Working Losses (lb):	14.8471
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	1,957,622.9139
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	5,363.3504
Maximum Liquid Height (ft):	12.6350
Tank Diameter (ft):	8.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	25.2832

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 110 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	14.85	10.44	25.28

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 111	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tank #111 at the Middletown Facility. Used for Storing Oil.	
Tank Dimensions		
Shell Height (ft):		13.30
Diameter (ft):		8.00
Liquid Height (ft) :		12.64
Avg. Liquid Height (ft):		11.31
Volume (gallons):		4,750.93
Turnovers:		365.00
Net Throughput(gal/yr):		1,734,088.12
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		13.30
Radius (ft) (Dome Roof)		4.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 111 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 111 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	10.0872
Vapor Space Volume (cu ft):	1,666.3829
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9889
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,666.3829
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	33.1516
Tank Shell Height (ft):	13.3000
Average Liquid Height (ft):	11.3050
Roof Outage (ft):	31.1566
Roof Outage (Dome Roof)	
Roof Outage (ft):	31.1566
Dome Radius (ft):	4.0000
Shell Radius (ft):	4.0000

UWW Tank 111

Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9889
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	33.1516
Working Losses (lb):	13.1518
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	1,734,088.1174
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	4,750.9263
Maximum Liquid Height (ft):	12.6350
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	23.2389

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 111 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	13.15	10.09	23.24

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 112	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Horizontal Tank	
Description:	United Waste Water Tank #112 at the Middletown Facility. Used for storing incoming oil.	
Tank Dimensions		
Shell Length (ft):		24.50
Diameter (ft):		9.50
Volume (gallons):		10,000.00
Turnovers:		365.00
Net Throughput(gal/yr):		3,650,000.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 112 - Horizontal Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oily Water	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

UWW Tank 112

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 112 - Horizontal Tank
Middletown, Ohio

Annual Emission Calcaulations

Standing Losses (lb):	6.3698
Vapor Space Volume (cu ft):	1,106.1233
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0689
Vented Vapor Saturation Factor:	0.9984
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,106.1233
Tank Diameter (ft):	9.5000
Effective Diameter (ft):	17.2191
Vapor Space Outage (ft):	4.7500
Tank Shell Length (ft):	24.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0689
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9984
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	4.7500

UWW Tank 112

Working Losses (lb):	27.6825
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	3,650,000.0000
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Tank Diameter (ft):	9.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	34.0523

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 112 - Horizontal Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oily Water	27.68	6.37	34.05

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	UWW Tank 113-119	
City:	Middletown	
State:	Ohio	
Company:	United Waste Water	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	United Waste Water Tanks 113-119 at the Middletown Facility. Used for Storing High Halogen Oil.	
Tank Dimensions		
Shell Height (ft):		16.00
Diameter (ft):		8.00
Liquid Height (ft) :		15.20
Avg. Liquid Height (ft):		13.60
Volume (gallons):		5,715.40
Turnovers:		365.00
Net Throughput(gal/yr):		2,086,121.04
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		16.00
Radius (ft) (Dome Roof)		4.00
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UWW Tank 113-119 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
High Halogen Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UWW Tank 113-119 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	16.0396
Vapor Space Volume (cu ft):	2,667.4216
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9823
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,667.4216
Tank Diameter (ft):	8.0000
Vapor Space Outage (ft):	53.0667
Tank Shell Height (ft):	16.0000
Average Liquid Height (ft):	13.6000
Roof Outage (ft):	50.6667
Roof Outage (Dome Roof)	
Roof Outage (ft):	50.6667
Dome Radius (ft):	4.0000
Shell Radius (ft):	4.0000
Vapor Density	

UWW Tanks 113-119

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9823
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	53.0667
Working Losses (lb):	15.8217
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	2,086,121.0438
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	5,715.4001
Maximum Liquid Height (ft):	15.2000
Tank Diameter (ft):	8.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	31.8613

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UWW Tank 113-119 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
High Halogen Oil	15.82	16.04	31.86

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	Tank 201-204	
City:	Middletown	
State:	Ohio	
Company:	United Wastewater	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	Tanks 201-204 at Middletown facility used for treating incoming oil/water	
Tank Dimensions		
Shell Height (ft):		13.00
Diameter (ft):		11.50
Liquid Height (ft) :		11.70
Avg. Liquid Height (ft):		10.40
Volume (gallons):		9,597.15
Turnovers:		365.00
Net Throughput(gal/yr):		3,502,959.22
Is Tank Heated (y/n):	Y	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		13.00
Radius (ft) (Dome Roof)		5.75
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank 201-204 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oily Water	All	160.00	160.00	160.00	160.00	0.2556	0.1810	0.3559	18.0068			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Tank 201-204 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	5.2057
Vapor Space Volume (cu ft):	2,095.5536
Vapor Density (lb/cu ft):	0.0007
Vapor Space Expansion Factor:	0.0125
Vented Vapor Saturation Factor:	0.7854
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,095.5536
Tank Diameter (ft):	11.5000
Vapor Space Outage (ft):	20.1750
Tank Shell Height (ft):	13.0000
Average Liquid Height (ft):	10.4000
Roof Outage (ft):	17.5750
Roof Outage (Dome Roof)	
Roof Outage (ft):	17.5750
Dome Radius (ft):	5.7500
Shell Radius (ft):	5.7500
Vapor Density	

UWW Tanks 201-204

Vapor Density (lb/cu ft):	0.0007
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Daily Avg. Liquid Surface Temp. (deg. R):	619.6700
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	619.6700
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0125
Daily Vapor Temperature Range (deg. R):	0.0000
Daily Vapor Pressure Range (psia):	0.1749
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1810
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3559
Daily Avg. Liquid Surface Temp. (deg R):	619.6700
Daily Min. Liquid Surface Temp. (deg R):	619.6700
Daily Max. Liquid Surface Temp. (deg R):	619.6700
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.7854
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2556
Vapor Space Outage (ft):	20.1750
Working Losses (lb):	95.5291
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Annual Net Throughput (gal/yr.):	3,502,959.2156
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	9,597.1485
Maximum Liquid Height (ft):	11.7000
Tank Diameter (ft):	11.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	100.7348

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank 201-204 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oily Water	95.53	5.21	100.73

UWW Tanks 205-208

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	Tank 205-208	
City:	Middletown	
State:	Ohio	
Company:	United Wastewater	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	Tanks 205-208 at Middletown facility used for storing water	
Tank Dimensions		
Shell Height (ft):		15.00
Diameter (ft):		11.00
Liquid Height (ft) :		14.25
Avg. Liquid Height (ft):		12.75
Volume (gallons):		9,597.15
Turnovers:		365.00
Net Throughput(gal/yr):		3,502,959.22
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		15.00
Radius (ft) (Dome Roof)		5.50
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

UWW Tanks 205-208

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank 205-208 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oily Water	All	60.09	50.61	69.56	54.73	0.2556	0.1810	0.3559	18.0068			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Tank 205-208 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	50.0862
Vapor Space Volume (cu ft):	2,693.7193
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0854
Vented Vapor Saturation Factor:	0.7226
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,693.7193
Tank Diameter (ft):	11.0000
Vapor Space Outage (ft):	28.3450
Tank Shell Height (ft):	15.0000
Average Liquid Height (ft):	12.7500
Roof Outage (ft):	26.0950
Roof Outage (Dome Roof)	
Roof Outage (ft):	26.0950
Dome Radius (ft):	5.5000
Shell Radius (ft):	5.5000
Vapor Density	

UWW Tanks 205-208

Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0854
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.1749
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1810
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3559
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.7226
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2556
Vapor Space Outage (ft):	28.3450
Working Losses (lb):	95.5291
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Annual Net Throughput (gal/yr.):	3,502,959.2156
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	9,597.1485
Maximum Liquid Height (ft):	14.2500
Tank Diameter (ft):	11.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	145.6153

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank 205-208 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oily Water	95.53	50.09	145.62

UWW Tank 210

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	Tank 210	
City:	Middletown	
State:	Ohio	
Company:	United Wastewater	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	New Tank at Middletown facility used for storing water	
Tank Dimensions		
Shell Height (ft):		13.00
Diameter (ft):		8.80
Liquid Height (ft) :		12.35
Avg. Liquid Height (ft):		11.05
Volume (gallons):		5,618.95
Turnovers:		365.00
Net Throughput(gal/yr):		2,050,917.75
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		13.00
Radius (ft) (Dome Roof)		4.40
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank 210 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oily Water	All	60.09	50.61	69.56	54.73	0.2556	0.1810	0.3559	18.0068			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Tank 210 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	31.2454
Vapor Space Volume (cu ft):	1,664.2859
Vapor Density (lb/cu ft):	0.0008
Vapor Space Expansion Factor:	0.0854
Vented Vapor Saturation Factor:	0.7296
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,664.2859
Tank Diameter (ft):	8.8000
Vapor Space Outage (ft):	27.3636
Tank Shell Height (ft):	13.0000
Average Liquid Height (ft):	11.0500
Roof Outage (ft):	25.4136
Roof Outage (Dome Roof)	
Roof Outage (ft):	25.4136
Dome Radius (ft):	4.4000
Shell Radius (ft):	4.4000
Vapor Density	

UWW Tank 210

Vapor Density (lb/cu ft):	0.0008
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0854
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.1749
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1810
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3559
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.7296
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2556
Vapor Space Outage (ft):	27.3636
Working Losses (lb):	55.9305
Vapor Molecular Weight (lb/lb-mole):	18.0068
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2556
Annual Net Throughput (gal/yr.):	2,050,917.7512
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	5,618.9527
Maximum Liquid Height (ft):	12.3500
Tank Diameter (ft):	8.8000
Working Loss Product Factor:	1.0000
Total Losses (lb):	87.1759

UWW Tank 210

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank 210 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oily Water	55.93	31.25	87.18

UWW Tank 211

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification		
User Identification:	Tank 211	
City:	Middletown	
State:	Ohio	
Company:	United Wastewater	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	Tank 211 at Middletown facility used for storing oil	
Tank Dimensions		
Shell Height (ft):		15.20
Diameter (ft):		8.60
Liquid Height (ft) :		14.44
Avg. Liquid Height (ft):		12.92
Volume (gallons):		6,274.62
Turnovers:		365.00
Net Throughput(gal/yr):		2,290,234.95
Is Tank Heated (y/n):	N	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Dome	
Height (ft)		15.20
Radius (ft) (Dome Roof)		4.30
Breather Vent Settings		
Vacuum Settings (psig):		0.00
Pressure Settings (psig)		0.00

Meterological Data used in Emissions Calculations: Dayton, Ohio (Avg Atmospheric Pressure = 14.22 psia)

UWW Tank 211

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Tank 211 - Vertical Fixed Roof Tank
Middletown, Ohio

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Oil	All	60.09	50.61	69.56	54.73	0.0064	0.0041	0.0064	200.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Tank 211 - Vertical Fixed Roof Tank
Middletown, Ohio

Annual Emission Calcaulations	
Standing Losses (lb):	14.5638
Vapor Space Volume (cu ft):	2,412.6883
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0731
Vented Vapor Saturation Factor:	0.9861
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	2,412.6883
Tank Diameter (ft):	8.6000
Vapor Space Outage (ft):	41.5350
Tank Shell Height (ft):	15.2000
Average Liquid Height (ft):	12.9200
Roof Outage (ft):	39.2550
Roof Outage (Dome Roof)	
Roof Outage (ft):	39.2550
Dome Radius (ft):	4.3000
Shell Radius (ft):	4.3000
Vapor Density	

UWW Tank 211

Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg. R):	519.7561
Daily Average Ambient Temp. (deg. F):	51.6500
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.4000
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,249.3035
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0731
Daily Vapor Temperature Range (deg. R):	37.8987
Daily Vapor Pressure Range (psia):	0.0023
Breather Vent Press. Setting Range(psia):	0.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0041
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0064
Daily Avg. Liquid Surface Temp. (deg R):	519.7561
Daily Min. Liquid Surface Temp. (deg R):	510.2814
Daily Max. Liquid Surface Temp. (deg R):	529.2307
Daily Ambient Temp. Range (deg. R):	19.6000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9861
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0064
Vapor Space Outage (ft):	41.5350
Working Losses (lb):	17.3697
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0064
Annual Net Throughput (gal/yr.):	2,290,234.9495
Annual Turnovers:	365.0000
Turnover Factor:	0.2489
Maximum Liquid Volume (gal):	6,274.6163
Maximum Liquid Height (ft):	14.4400
Tank Diameter (ft):	8.6000
Working Loss Product Factor:	1.0000
Total Losses (lb):	31.9336

UWW Tank 211

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Tank 211 - Vertical Fixed Roof Tank
Middletown, Ohio

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Oil	17.37	14.56	31.93