

Lane Regional Air Protection Agency
Standard Air Contaminant Discharge Permit

REVIEW REPORT

Eugene/Springfield Water Pollution Control Facility
410 River Avenue
Eugene, Oregon

Permit No. 202537

1. **General Background Information**

The Eugene/Springfield Water Pollution Control Facility, located at 410 River Avenue in Eugene, operates a wastewater treatment plant that serves the Eugene and Springfield municipal area. The facility uses one (1) Jenbacher digester gas-fired internal combustion engine generator to provide electrical power for the facility. One (1) Kewanee natural gas and digester gas-fired boiler is used for supplemental and backup power generation. The facility also uses one (1) Varec burner for ignition of excess digester gas. The digester gas is derived from two (2) sludge holding tanks and three (3) primary digesters. One (1) bio-filter and four (4) activated carbon vessels are also used to control odorous gas and other regulated pollutant emissions from portions of the wastewater treatment process. The facility operates continuously (8,760 hrs/yr).

2. **Reasons for Permit Action**

The facility operates a process listed in Title 37, Table 1, Part B and C and is therefore required to obtain a Standard air contaminant discharge permit (ACDP). The facility's ACDP expired on November 29, 2010. The objective of this permit action is to renew the expired permit and establish the most recent applicable regulations including Generic and source-specific PSELs in the permit according to Section 42-0040 and Section 42-0041.

3. **Compliance Summary**

The most recent site inspection and full compliance evaluation (FCE, concluded 9/28/06), which is documented in LRAPA files, shows the permittee to be in compliance with its permit and applicable regulations. The most recent required report also indicates compliance.

During the previous two permit terms (since December 2000), the permittee has been named in a total of twelve (12) odor complaints (none since January 30, 2007). Several of these were referred directly to plant personnel depending on the circumstance. The bulk of the on-file complaint reports that were fully investigated by LRAPA show no definitive root cause at the plant site. In other words, nothing was found amiss in plant operations, and there was no basis found for a regulatory violation. LRAPA file documentation shows the plant response to these complaints to be reasonable and prompt. No enforcement action was initiated in any of these complaints. Moreover, there is no indication in LRAPA files of any enforcement action against the permittee.

4. **Performance Test Results and Emission Factor Development**

No performance testing has been conducted at this facility. As part of the renewal, the facility provided a conservative estimation of VOC emitted from the wastewater treatment operations. The VOC emission factor was developed based upon plant influent and effluent 24-hr grab composite samples and tested using EPA analytical test methods (Methods 624, 625, 8260 and 8270) for a period of 14 years (1997-2010). The permit uses the 3.2 lb per million gallons "historic

annual maximum" VOC and semi-VOC factor as a conservative estimate for overall wastewater operation emissions to ensure compliance with the VOC PSEL. The new factor replaces the 1.41 lb VOC per million gallons formerly established in the permit derived from the facility's 1996 "Master Plan". The current emission factor is reasonable and conservative in that it likely overestimates the VOC emitted into the air; many of the compounds detected/measured in the influent/effluent water samples are thought to either interact with the waste or ultimately digested or volatilized to be combusted by the combustion generator (EU-1), boiler (EU-2), or flare (EU-3). The April 7, 2011 memo from the facility describing the wastewater VOC emission estimation is on file at LRAPA.

5. Plant Site Emission Limits

Background

The permittee completed its installation of an engine-generator (Waukesha Genset #1), a boiler, and a waste gas flare in 1983. Because operation of this equipment resulted in emissions of nitrogen oxides (NO_x) above the Significant Emission Rate (SER), a historical PSD review was performed at that time and the netting basis for NO_x and CO were reset to 1983 emission levels. Based on LRAPA files, the facility was first permitted in 1990, and the year 2000 review report contains the earliest mention of PSD.

At the last renewal, the permittee has retired the largest source of NO_x and CO emissions (Waukesha Genset), and emissions of all pollutants are well below both the Significant Emission Rate (SER) as well as Title V Major Source thresholds. Facility personnel have stated their interest in retaining the facility baseline/netting basis due to the possibility of future modifications that would result in appreciable emissions potential. Additionally, plant personnel have stated that an engine-generator unit was considered but the decision was made not to purchase a new generator to replace the Waukesha unit.

Baseline Emissions / Netting Basis

NO_x and CO netting basis emissions remain for this renewal from prior to the retirement of the Waukesha Genset. Retirement of this equipment occurred in early 2006. The netting basis emissions for NO_x and CO were established from calculations of actual emissions in 1983. These emissions include the Waukesha engine-generator, the Kewanee Boiler and the waste gas flare burner. VOC netting basis emissions were calculated for the year 1978 and include the emissions from water treatment operations. Below is a tabular summary of the emissions netting basis, proposed PSEL's, the PSEL increase from baseline, and comparison to the significant emission rate (SER).

Pollutant	Netting Basis (tons/yr)	Proposed PSEL	Increase from Netting Basis	SER
PM/PM ₁₀ /PM _{2.5}	0	NA	0	25/15/10
SO ₂	0	NA	0	40
NO _x	59	98	39	40
CO	79	99	20	100
VOC	7.2	46	39	40

PM_{2.5} Baseline: Temporary rules adopted August 23, 2010 specify that a PM_{2.5} PSEL and Baseline Emission Rate be established for each permitting action involving public notice after September 1, 2010. For the purposes of this renewal, the PM_{2.5} Baseline emission rate is set at zero tons/year. Current potential emissions for PM and PM₁₀ are less than 0.5 tons/year. If one assumes all (100%) of the PM₁₀ emissions are emitted as PM_{2.5}, then the PM_{2.5} baseline emission rate and/or netting basis would also be less than 0.5 ton/year. In accordance with LRAPA Section 42-0020-3.A., PSELs are not required for any pollutant emitted at less than the de minimis level (1 ton/year) and hence the PSEL for SO₂, PM, PM₁₀, and PM_{2.5} is either removed or not established, respectively.

Unassigned Emissions

Unassigned emissions for all pollutants at this facility are set to zero (0) tons/year. As specified in LRAPA Section 42-0045, "unassigned emissions equal the netting basis minus the source's current potential to emit (PTE)" and are required to be reduced to no more than an a Significant Emission Rate (SER) after July 1, 2010. Because the PTE (or in this case the PSEL) for all pollutants is greater than the netting basis at this facility, unassigned emissions are set at zero (0) tons/year.

Plant Site Emission Limits (PSELs)

The PSELs are set in accordance with Section 42-0040, 42-0041 and 42-0043. The facility has a "capacity" (as defined in LRAPA Title 12) of greater than the Significant Emission Rate for VOC and, hence, the PSEL for VOC is set at the source-specific level accounting for an approximate 7 ton/year VOC baseline emission rate. The facility has the capacity to emit less than the Significant Emission Rate for NO_x but because the facility has a netting basis for NO_x, the NO_x PSEL is set at the netting basis plus 39 tons/year (1 ton less than the 40 ton/year NO_x SER). The facility no longer has the potential to emit above the 100 ton/year major source threshold for the pollutant CO since the Waukesha Genset was retired and hence, the synthetic minor limits for CO were removed. As noted above, and in accordance with LRAPA Section 42-0020-3.A., PSELs are not required for any pollutant emitted at less than the de minimis level (1 ton/year) and hence the PSEL for SO₂, PM, PM₁₀, and PM_{2.5} is either removed or not established, respectively.

The following summarizes the PSELs as they appear in the draft permit. The attachment to this review report contains calculations that provide the quantitative bases for the PSELs. The following annual PSELs are included in the permit (all values are in tons per year).

Annual (12-month rolling) PSEL (tons/year)

Source	NO _x	CO	VOC
Plant Site Total	98	99	46

6. Federally Enforceable Limits

The permit formerly limited total fuel combusted in Genset #1 (Genset #1 was the Wakesha Genset, now retired) to 33,200 MM BTU per rolling 12-month period. The limit was required to ensure that emissions of CO did not reach the Title V Major source threshold of 100 tons per year. The facility no longer has the potential to emit above the 100 ton/year major source threshold for the pollutant CO since the Waukesha Genset was retired and hence, the synthetic minor limits for CO were removed with this permit issuance.

7. Additional Emission Limitations

Process weight rule: LRAPA's process weight rule specifies limits on the emissions of particulate matter for specific processes as a function of the amount of material processed. [LRAPA 32-045(A)] Because PM emissions are minimal, the source is expected to be in compliance with the process weight rule.

Visible emissions and particulate concentration: The permit includes general limitations for visible emissions as well as particulate matter concentration (grain-loading).

Operation and Maintenance: The permit requires the facility to prepare and follow an LRAPA-approved Operation and Maintenance (O&M) Plan to formalize procedures related to pollution control devices to maintain odors at the lowest possible levels.

Flare (EU-3): To ensure highest and best operation of the waste gas flare (EU-3), the permit establishes requirements for similar units subject to requirements under 40 CFR 60.18b pertaining to general control device requirements under Subpart A of the NSPS. The flare is not subject to any NSPS but the NSPS requirements provide an achievable set of operation requirements to ensure maximum efficiency under LRAPA 32-007.

Biofilter and Activated Carbon Vessels (EU-4): Additionally, the permit requires the biofilter and activated carbon filters to be operated continuously unless an intermittent operation schedule is established by way of an LRAPA-approved Operation and Maintenance (O&M) plan. The currently-approved O&M plan establishes a continuous operation schedule for the biofilter except for periods of maintenance or malfunction. Because one or more of the carbon filters control odorous processes that have only intermittent potential to create odor (not a constant source of odor), the O&M establishes the need and intended design for intermittent operation of the activated carbon filters.

8. Hazardous Air Pollutants (HAP)

The projected HAP emissions from the source are expected to be minimal (About 6 tpy according to the 1996 master plan/report.) This facility is therefore an area source of HAPs (and not a major source of HAPs).

Spark Ignition Reciprocating Internal Combustion Engines (SI RICE NESHAP): The Jenbacher genset (EU-1) is subject to the National Emission Standards for HAPs (NESHAPs) for Spark Ignition Reciprocating Internal Combustion Engines (SI RICE NESHAP) as specified in 40 CFR Subpart ZZZZ. As defined in 40 CFR 63.6590(1)(iii), the Jenbacher is considered an *existing stationary RICE*. The Jenbacher is a RICE located at an area source of HAP emissions because the unit was constructed before June 12, 2006. The permit contains the emission limits and testing requirements as specified in Subpart ZZZZ. The sole requirements are to perform periodic maintenance on the four stroke lean burn (4SLB) engine according to a schedule

specified in the rule (as well as recordkeeping requirements). There are no emission limitations and therefore no performance testing is required.

Additionally, the 40 CFR part 63 subpart VVV NESHAP (Publicly Owned Treatment Works) is not applicable because the facility is not a major source of HAPs.

9. Typically Achievable Control Technology (TACT)

LRAPA Title 32-008 requires an existing emission unit at a facility to meet TACT if the emissions unit has emissions of criteria pollutants greater than ten (10) tons per year of any gaseous pollutant or five (5) tons per year of particulate, the emissions unit is not subject to the emissions standards under LRAPA Title 32, Title 33, Title 44, or Title 46 for the pollutants emitted, and the facility is required to have a permit. The engine-generator emits more than 10 tons/year of CO but is subject to the RICE NESHAP for CO and is therefore not required to meet TACT. The other emission units emit less than the TACT emission thresholds specified above and are therefore not required to be evaluated for TACT.

10. New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

Because the proposed PSEs for all regulated pollutants are below the Significant Emission Rates (SERs) in LRAPA Title 38, the facility is neither subject to NSR requirements for PM10 nor the PSD requirements for PM_{2.5}, SO_x, NO_x, CO, and VOC.

11. New Source Performance Standards (NSPS)

The facility is not subject to any NSPS. The permittee is not subject to NSPS-Subpart O, Standards of Performance for Sewage Treatment Plants because the facility combusts biogas in generators and does not combust sludge in incinerators.

The NSPS for Stationary Gas Turbines (Subpart GG) is not applicable to the Jenbacher genset (EU-1) since the maximum heat input for the unit is 8.1 gigajoules per hour (see LRAPA construction approval letter dated August 6, 1997) as compared with the NSPS GG threshold of 10.7 gigajoules/hr.

The NSPS for Stationary Spark Ignition (SI) Landfill/Digester Gas Engines (RICE NSPS – Subpart JJJJ) are not applicable to the Jenbacher genset (EU-1) since it was constructed before the NSPS trigger date of 2007 (for non-lean burn) or 2008 (for lean burn engines).

12. Continuous Compliance

To ensure compliance with the annual PSEs, the permittee is required to keep a 12-month rolling record of the following information for a period of two (2) years from date of entry.

Emission Unit (EU)	Monitoring Parameter (units)	Minimum Recording Frequency
EU-1	Gas burned in the genset (cubic feet)	Monthly
	Hours of operation of the genset (hrs)	Monthly

EU-1		
EU-1	Maintenance performed in accordance with the Subpart ZZZ NESHAP.	Upon occurrence
EU-2	Gas burned in the boiler (cubic feet)	Monthly
EU-3	Gas burned in the waste gas flare (cubic feet)	Monthly
EU-4	Wastewater effluent volume (million gallons)	Monthly

13. Reporting Requirements

The facility is required to annually report 12-month rolling emissions including greenhouse gases (GHG, if required by OAR 340 Division 215) and any entries in the upset log as required by Condition G15.

14. Public Notice

The draft permit was on public notice from June 27, 2011 to August 1, 2010. No written comments were submitted during the 35-day comment period.

Max/cmw
08/11/11

1983* Baseline Emissions

Two Waukesha Engines
 Design Capacity (bhp): 675 8,589,375 (Efficiency = 20% for conversions, ergo input = 3,375 hp or 8,589,375 Btu/hr)

Pollutant	Hours of Operation (hrs/yr)	Emission Factor (lb/hr-hr)	Units Conversion factor (qt/lb)	Annual Emissions (tons)
PM/PM10	8,760	7.71E-05	—	3.3112E-07 (Emission factor is in units of lb/MMBtu)
SO2	8,760	5.88E-04	—	2.53E-06 (Emission factor is in units of lb/MMBtu)
NOx	8,760	9	453.6	58.7
CO	8,760	12	453.6	78.2
VOC	8,760	1	453.6	6.5

Total digester gas produced limited operation to one Waukesha engine at any time, at capacity.
 Emission Factors for PM & SO2 from AP-42; EF's for NOx, CO & VOC from manufacturer for the engine fired on digester gas.
 Annual Emissions (tons) = Max Capacity x Hours of Operation x Emission Factor x Conversion Factors.
 One Waukesha genset was replaced in 1997 by the Jenbacher.

* The facility began construction of the Waukesha engines in August of 1981. Baseline emissions were therefore effectively reset based on PSD rules, which went into effect in September of 1981. The operation of the engines in 1983 resulted in a >40 ton per year (SER) increase in NOx.

Boilers

Pollutant	Digester Gas Produced (MMscf/hr)	Emission Factor (lbs/MM scf)	Emissions (tons/yr)
PM/PM10	1.88	7.6	0.01
SO2	1.88	0.6	0.00
NOx	1.88	100	0.09
CO	1.88	84	0.08
VOC	1.88	5.5	0.01

Total digester gas produced at the facility during 1983 was:
 103,100 (1983 population of Eugene) x 1 cf/day/person x 365 days/yr = 37,631,500 cu. ft.
 The boiler burned an estimated 5% of the total digester gas in 1983.
 The quantity of digester gas burned in the boilers in million cubic feet during 1983 was:
 37,631,500 cf/1,000,000 x 5% = 1.88 million cf.
 Emission Factors are from AP-42, Table 1.4-1, *Emission Factors for Natural Gas Combustion*, July 1998.
 Annual Emissions = Digester gas produced in 1983 (million scf/hr) x Emission Factor x 1 ton/2000 lbs.

Waste Gas Flare (Varec)

Pollutant	Allowable Gas Throughput (MMBtu)	Emission Factor (lbs/MMBtu)	Emissions (tons/yr)
NOx	5644.7	0.068	0.2
CO	5644.7	0.37	1.0

The Waste Gas Burner (flare) burned an estimated 25% of the total digester gas in 1983.
 The average rating for digester gas = 600 BTU/cf of gas.
 Reference: Wastewater Engineering, Metcalf and Eddy, Third Edition, 1991.
 Total BTU burned by the waste gas burner in 1983 was:
 37,631,500 cf x 25% x 600 BTU/cf/1,000,000 = 5,644.73 MM BTU.
 Emission Factors are from AP-42, Table 13.5-1, *Emission Factors for Flare Operations*.
 Annual Emissions = Allowable gas throughput (MM BTU) x Emission Factor/2000 lbs/ton.

Wastewater Treatment Operations

Pollutant	Wastewater Treated (10 ⁶ gal/day)	Emissions (tons/yr)
VOC	28,500,000	7.20

Emissions are a ratio of the emissions estimated from the "Master Plan" Appendices on file at LRAPA.
 No flow data exists for the baseline year 1978. Flow data was estimated based upon population and rainfall.
 Per capita wastewater flow is fairly consistent, but rainfall-induced inflow and infiltration has a significant effect on flow.
 The rainfall in 1989 was similar to the rainfall in 1978 (about 40 in/yr).
 Per capita plant flow for 1989: 43,170,000 gals/151,245 people = 285.4 gal.
 For 1978: 285.4 gals/day/person x 99,750 people = 28.5 mgd (million gallons per day)
 Actual treatment process VOCs (Master Plan) with plant flow of 38.3 mgd were 9.67 tons.
 Proportionally, VOC emissions in 1978 were: 28.5 mgd / 38.3 mgd x 9.67 tons = 7.2 tons

Totals

Pollutant	Annual (tons/yr)
PM/PM10	0.0 (1983)
SO2	0.0 (1983)
NOx	58.9 (1983)
CO	79.3 (1983)
VOC	7.2 (1978)

Current vs. Baseline

Pollutant	Annual (tons/yr)
PM/PM10	0.4
SO2	0.0
NOx	-36.2
CO	-37.6
VOC	37.0

Current Emissions (PSEL Basis)

Digester Gas Btu Content: 600 Btu/ft³

Genset #1 -- Jenbacher (EU-1)

Design Capacity: 1,143 bhp at 1,500 rpm

Pollutant	Emission Factor (EF) (g/bhp-hr)	Emission Factor (EF) (lb/MMBtu)	Conversion Factor (g/lb)	Capacity Emissions (tons/yr)
PM/PM10	NA	NA	453.6	NA
SO ₂	NA	NA	453.6	NA
NO _x	1.5	0.5164	453.6	16.6
CO	2.8	0.964	453.6	30.9
VOC	0.6	0.2066	453.6	6.6

The Jenbacher engine replaced one of the original Waukesha engines in 1997.
 Estimates at capacity assume continuous operation (8,760 hrs/yr).
 Emission Factors are from a March 28, 2000, gas analysis taken by Jenbacher Energy Systems Ltd.

Boiler -- Kewanee (EU-2)

Design Capacity (input): 6.825 10⁶ Btu/hr input
 Fuel Capacity: 11375 scf/hr (digester gas)

Pollutant	EF (lb/10 ⁶ scf)	Capacity Emissions (tons/yr)
PM/PM10	7.6	0.4
SO ₂	0.6	0.030
NO _x	100	5.0
CO	84	4.2
VOC	5.5	0.3

The boiler is assumed to operate continuously (8760 hrs/yr).
 Fuel Capacity assumes boiler operates entirely on digester gas, which gives highest emissions.
 Boiler Emission Factors are from AP-42, Table 1.4-1, *Emission Factors for Natural Gas Combustion*, July 1998.

Digester Gas Flare -- Whessoe Varec (EU-3)

Pollutant	Actual Gas Throughput (cf/yr)	Allowable Gas Throughput (cf/yr)	Allowable Gas Throughput (MMBtu/yr)	EF (lb/MMBtu)	Annual Emissions (tons/yr)
NO _x	17,414,216	60,000,000	36,000	0.068	1.2
CO	17,414,216	60,000,000	36,000	0.37	6.7
HC (VOC surrogate)	17,414,216	60,000,000	36,000	0.14	2.5

Actual Gas Throughput is the measured gas burned for the year 2000.
 Emission Factors are from AP-42, Table 13.5-1, *Emission Factors for Flare Operations*.
 Annual Emissions = Allowable Gas Throughput (MMBtu) x Emission Factor/2000 lbs/ton.

Water Treatment Operations (EU-5)

Pollutant	Wastewater Treated (10 ⁶ gal/day)	Emission Factor * (lb/10 ⁶ gal)	Annual Emissions (tons/yr)
VOC	59.5	3.2	34.7

* The emission factor was derived from plant influent flow and estimated emissions from historic (1997-2010) water grab sampling

Pollutant	Total Emissions (tons/yr)
PM/PM10	0.4
SO ₂	0.0
NO _x	22.8
CO	41.7
VOC	44.2

Current Emissions (2010 Actual)

Digester Gas Btu Cor 600 Btu/ft3

Genset #1 -- Jenbacher (EU-1)

Pollutant	Emission Factor (EF) (lb/MMBtu)	Emissions (tons/yr)	cubic feet of digester gas combusted Btu/cu ft
PM/PM10	NA	NA	
SO2	NA	NA	
NOx	0.5164	14.5	
CO	0.964	27.0	
VOC	0.2066	5.8	

The Jenbacher engine replaced one of the original Waukesha engines in 1997.
 Estimates at capacity assume continuous operation (8,760 hrs/yr).
 Emission Factors are from a March 28, 2000, gas analysis taken by Jenbacher Energy Systems Ltd.

Boiler -- Kewanee (EU-2)

Pollutant	EF (lb/10 ⁶ scf)	Emissions (tons/yr)	Capacity scf/yr(digester gas) scf/yr(natural gas)
PM/PM10	7.6	0.1	
SO2	0.6	0.0	
NOx	100	0.8	
CO	84	0.7	
VOC	5.5	0.0	

The boiler is assumed to operate continuously (8760 hrs/yr).
 Fuel Capacity assumes boiler operates entirely on digester gas, which gives highest emissions.
 Boiler Emission Factors are from AP-42, Table 1.4-1, *Emission Factors for Natural Gas Combustion*, July 1998.

Digester Gas Flare -- Whessoe/Varec (EU-3)

Pollutant	Actual Gas Throughput (cf/yr)	EF (lb/MMBtu)	Annual Emissions (tons/yr)
CO	43,636,770	0.37	4.8
HC (VOC surrogate)	43,636,770	0.14	1.8

Actual Gas Throughput is the measured gas burned for the year 2000.
 Emission Factors are from AP-42, Table 13.5-1, *Emission Factors for Flare Operations*.
 Annual Emissions = Allowable Gas Throughput (MMBtu) x Emission Factor/2000 lbs/ton.

Water Treatment Operations (EU-5)

Pollutant	Wastewater Treated (10 ⁶ gal/yr)	Emission Factor * (lb/10 ⁶ gal)	Annual Emissions (tons/yr)
VOC	14438	3.2	23.1

* The emission factor was derived from plant influent flow and estimated emissions from historic (1997-2010) water grab sampling

Pollutant	Total Emissions (tons/yr)
PM/PM10	0.1
SO2	0.0
NOx	16.2
CO	32.5
VOC	30.8

MG	
jan	1627
feb	1203
mar	1353
apr	1564
may	1229
jun	1255
jul	728
aug	643
sept	723
oct	857
nov	1246
dec	2010
TOTAL	14438 million gallons

VOC Calculations

Number of Influent Detections:

Number of Influent Measurements:

Row Labels	Count of RESULT	Row Labels	Count of RESULT
2-Butanone (MEK)	1	2-Butanone (MEK)	13
4-Chloro-3-methylphenol	1	4-Chloro-3-methylphenol	32
4-Methyl-2-pentanone (MIBK)	1	4-Methyl-2-pentanone (MIBK)	13
4-Methylphenol	1	4-Methylphenol	1
Acetone	24	Benzene	28
Benzene	1	Benzene	32
Bis(2-ethylhexyl)phthalate	11	Bis(2-ethylhexyl)phthalate	32
Chloroform	1	Chloroform	32
Diethyl phthalate	1	Diethyl phthalate	32
Ethylbenzene	1	Ethylbenzene	32
Methylene chloride	5	Methylene chloride	32
Phenol	20	Phenol	32
Tetrachloroethene	4	Tetrachloroethene	32
Toluene	14	Toluene	32
Xylene isomers (Total)	6	Xylene isomers (Total)	29
Grand Total	92	Grand Total	404

Influent VOC & Semi VOC

Row Labels	Detection Ratio Detected/Measured	Annual Detection Count	Historical Avg. Mass g/day*	Historical Avg. Mass g/year**	Historical Max. Mass g/day*	Historical Max. Mass g/year**	Projected at Buildout Avg. Mass g/day*	Projected at Buildout Avg. Mass g/year**	Projected at Buildout Max. Mass g/day*	Projected at Buildout Max. Mass g/year**
2-Butanone (MEK)	0.0769	28.10	3540	99460	3540	99460	4282	119758	4412	123952
4-Chloro-3-methylphenol	0.0313	11.41	4240	48396	4240	48396	5105	58272	5284	60313
4-Methyl-2-pentanone (MIBK)	0.0769	28.10	7010	198954	7010	198954	8441	237149	8736	245453
4-Methylphenol	1.0000	385.25	3000	1095750	3000	1095750	3612	1319372	3739	1365574
Acetone	0.8571	313.07	26400	8265086	53400	16718014	31788	9951838	68550	20834763
Benzene	0.0313	11.41	421	4805	421	4805	507	5786	525	5989
Bis(2-ethylhexyl)phthalate	0.3438	125.55	1340	168243	1940	243576	1613	202579	2418	303556
Chloroform	0.0313	11.41	360	4109	360	4109	433	4948	449	5121
Diethyl phthalate	0.0313	11.41	905	10330	905	10330	1090	12438	1128	12873
Ethylbenzene	0.0313	11.41	905	10330	905	10330	1349	15393	1396	15932
Methylene chloride	0.1563	57.07	1120	12784	1120	12784	1084	61846	1446	82503
Phenol	0.6250	228.28	2960	51363	1160	66202	3564	813613	7465	1704123
Tetrachloroethene	0.1250	45.86	1310	675713	5990	1367405	1577	72016	2667	121764
Toluene	0.4375	158.80	1516	59810	9610	97704	1825	291691	11976	1913796
Xylene isomers (Total)	0.2069	75.57	1500	242252	6910	1535648	1806	136487	8612	650767
Totals:										
		g / time unit	56522	11048407.88	107746	22023318	68057	13303185	126801	27446478
		pounds / time unit	125	24358	224	48553	150	29329	280	60509
		tons / time unit	0.0623	12.2	0.112	24.3	0.0750	14.7	0.140	30.3
		pounds / MG	3.74	2.00	5.41	3.20	4.51	2.41	6.74	3.99
		tons / MG	0.00187	0.00100	0.00270	0.00160	0.00225	0.00121	0.00337	0.00200

* Daily Average Mass values are based on those occasions when the compound was detected; values do not reflect the frequency of detection.
 ** Annual Average Mass values are based on those occasions when the compound was detected and normalized for the frequency of detection to estimate the annual headworks load.

Plant Flow
 ***Observed Average: 33.3 mgd
 ***Observed Maximum Average: 41.5 mgd
 ***Flow rates observed when compound was detected.
 Existing: 49 mgd
 Buildout: 59 mgd
 Flow Ratio: 1.2041
 Flow Ratio: 1.2462
 Observed Flow Average / Flow Max. for detects.