STATEMENT OF BASIS

For the issuance of Draft Air Permit # 1085-AOP-R9. AFIN: 32-00036

1. PERMITTING AUTHORITY
   Arkansas Department of Environmental Quality
   5301 Northshore Drive
   North Little Rock, Arkansas 72118-5317

2. APPLICANT:

   FutureFuel Chemical Company
   2800 Gap Road
   Batesville, Arkansas 72501

3. PERMIT WRITER:

   Paula Parker

4. PROCESS DESCRIPTION AND NAICS CODE:

   NAICS Description: Petrochemical Manufacturing
   NAICS Code: 325199

5. SUBMITTALS:

   7/21/2008

6. REVIEWER'S NOTES:

- Renew the Title V Air Permit

As part of the renewal permit, the Wood Pellet process has been removed from the facility. In addition, rubber is no longer used at the Coal Boilers and the relevant specific conditions have been removed.

Emergency engines and NESHAP ZZZZ - *National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines*- conditions have also been added to the permit. These five engines are existing sources. The natural gas fired boilers, 6M06-01 and 6M07-01 emissions were recalculated using current AP-42 factors for natural gas combustion. Emissions for the coal boilers, 6M01-01, were re-evaluated based upon the maximum coal firing rate on an hourly basis, and an average rate for the annual emissions. Inorganics from this source were revised in accordance with the most recent test event for EEE. The facility is increasing production in the Aldehyde processing section from 45 million to 58.5 million pounds per year of vinyl compound products.

- Add tanks T-271 (30,000 gallons), T-272 (30,000 gallons), and T-273 (40,000 gallons)

These tanks will be operated at a pressure below 29.7 psia, thus triggering NSPS Kb applicability. Each tank is vapor balanced with incoming railcars and tank trucks at the Aldehyde Processing Section.

- Produce a multi-use anode material within the Organic Sulfonation section

Emissions from this process are 2.3 tpy PM/PM_{10}, 1.4 tpy VOC, and 1.4 tpy Organic HAP. A dormant part of the Organic Sulfonation plant will be retrofitted to process anode material. Existing and new process equipment both will be used in the process. The Anode Material Process (CP2), which will be permitted as a separate section, CP-2, consists of solids handling equipment, continuous stirred tank reactors, and dryers. Pelletized and granular material will be fed through a metering system into vessels where the material is heated and mixed. The formulated material is then dried and repackaged. All of this equipment is located inside the 5M11 building. Dust from all of the solids handling equipment is vented to a continuous dust control system (CDCS), 5M11-08. The CDCS will consist of a baghouse for solid particle separation, a collection hopper, and an induced draft fan. A central vacuum cleaning system (CVC), 5M11-09 will be used to clean spills. All VOC vents will be routed to the RTOs, 5N09-01. A 17,500 gallon solvent tank (CP2-T-004) and a 36,000 gallon residue tank (CP2-T-003) will be added. Emissions from tanks and equipment containing VOC's will vent to existing thermal oxidizers SN-5N09-01. Currently, SN-5M11-08 and SN-5M11-09 are permitted as a scrubbers (SRE-VE-501 and SER-VE-502) in the OSP section. As a result of this change, the source will be permitted as a baghouse (CP2-C-501 and SER-C-503).

Neither CP2-T-003 or CP2-T-004 will be regulated by 40 CFR Subpart Kb (Standards of Performance for Volatile Organic Liquid Storage Vessels) per 40 CFR 60.11b(b). Both tanks contain liquids with vapor pressures less than 15.0 kPa. Both tanks will be vented to the RTOs, 5N09-01. As a miscellaneous organic chemical manufacturing process unit (MCPU), this section is subject to 40 CFR Part 63 Subpart FFFF, and will be required to comply with these provisions upon startup.

- Install a 2.5 MMBTU thermal oxidizer and caustic scrubber, SN-5N09-2, in the OCI section.

Thermal oxidizer exhaust gases will vent to a caustic scrubber suitable for halogen halide and chlorinated hydrocarbon control. The source is subject to 40 CFR 63, Subpart FFFF. Permitted emissions are increasing by 0.1 tpy particulates, 13.1 tpy SO_2, 12.7 tpy VOC, 2.2 tpy CO, 13.1 tpy NO_x, 4.4 tpy Inorganic HAP, and 12.7 tpy Organic HAP. A small increase of 0.3 tpy of fugitive VOC and Organic HAP emissions from the OCI section will also be added from the installation of the source.

- To change the scrubbing fluid on SPS-VE-02 (SN-5M04-01 of the Organic Sulfonation Section) from 2,2,4-trimethyl-1-3-pentanediol diisobutyrate (TXIB) to water.

There are no changes to emissions as a result of the scrubber liquid change.

- Add a new storage tank, PSA-TF-01 to the Organic Sulfonation Section

The new tank will be added to the 5MNOBS-TNK tank bubble. Emissions are estimated to be less than 40 lb/yr of VOC from this source. Neither tank is subject to NSPS Kb.

Total emission changes as a result of these changes to the permit are reductions in particulate by 165.0 tpy, sulfur dioxide by 191.2 tpy, VOC and Organic HAP by 192.9, CO by 738.6 tpy. NO_x is increasing by 26.1 tpy. Inorganics are increasing by 147.2 tpy.

7. COMPLIANCE STATUS:

The following summarizes the current compliance of the facility including active/pending enforcement actions and recent compliance activities and issues.

The facility is currently under no enforcement actions.

8. PSD APPLICABILITY:

a. Did the facility undergo PSD review in this permit (i.e., BACT, Modeling, etc.)? N

b. Is the facility categorized as a major source for PSD? Y
Single pollutant ≥ 100 tpy and on the list of 28 or single pollutant ≥ 250 tpy and not on list?

If yes, explain why this permit modification is not PSD? Renewal and all modifications minor. Any increases are below significance.

9. GHG MAJOR SOURCE (TITLE V):

Indicate one:
☒ Facility is classified as a major source for GHG and the permit includes this designation
☐ Facility does not have the physical potential to be a major GHG source
☐ Facility has restrictions on GHG or throughput rates that limit facility to a minor GHG source. Describe these restrictions: ______________________________

10. SOURCE AND POLLUTANT SPECIFIC REGULATORY APPLICABILITY:

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
5N09-01, OCI-FUG	VHAP	40 CFR Part 63 Subpart GGG - National Emission Standards Pharmaceuticals Production
5N09-01, OCI-FUG	VHAP	40 CFR Part 63 Subpart MMM - National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production
TF-13 (SN-5N03-43) WB-06 (SN-6M-03-08) WB-07 (SN-6M-03-09) WB-08 (SN-6M-03-10) WB-09 (SN-6M-03-11) Tanks under SN-5M04-01 Tanks under SN-5M04-02	VOC	40 CFR Part 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
Tanks under SN-5M04-06 Tanks under SN-5M04-08 Tanks under SN-5M14-06 TFS-60 PT-60 PT-68 PT69A PT69B PB-51 PB-52 PM-50A PM-50B TBA-100 4P94-11 SN-5N03-51 SN-5N03-53 T-280 T-265 T-251 T-220 T-211A T-211B T-241 TF-13 PA-50 T-242 T-243 VC-PT-03 VC-PT-01 VC-PT-02		
Utilities Section (coal processing activities)	PM	40 CFR Part 60 Subpart Y- Standards of Performance for Coal Preparation Plants
Organic Sulfonation DIPB Production (Equipment Leaks)	VOC	40 CFR Part 60 Subpart VV - Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry
5M01-02	VOC	40 CFR Part 60 Subpart NNN - Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
DIPB Production (equipment Leaks, benzene)	Benzene	40 CFR Part 61 Subpart J - National Emission Standards for Equipment Leaks (Fugitive Emission Sources) of Benzene
DIPB Production (equipment leaks, VHAP)	VHAP	40 CFR Part 61 Subpart V - National Emission Standards for Equipment Leaks (Fugitive Emission Sources)
Tank T-210 (benzene vessel)	Benzene	40 CFR Part 61 Subpart Y - National Emission Standards for Benzene Emissions from Benzene Storage Vessels
DIPB Production T9, D9 (benzene waste streams).	Benzene	40 CFR Part 61 Subpart FF - National Emission Standard for Benzene Waste Operations
Facility (waste management/recovery operations).	VHAP	40 CFR Part 63 Subpart DD - National Emission Standards for Hazardous Air Pollutants from Off-Site Waste and Recovery Operations
6M03-05 6M01-01	Dioxins Furans Mercury Lead Cadmium Arsenic Beryllium Chromium CO Hydrocarbons HCl Cl_2 PM	40 CFR Part 63 Subpart EEE (Phase I and II) - National Emission Standard for Hazardous Air Pollutants from Hazardous Waste Combustors
Organic Chemical Intermediates Organic Sulfonation Process Solvent Recovery Isopropyl Benzene Production 5N07 Production Facility Aldehyde Processing Facility Storage Tanks and Misc. Sources Anode Production Section	VHAP	40 CFR Part 63 Subpart FFFF - National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing
6M07-01	NOx	40 CFR Part 60 Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

Source	Pollutant	Regulation (NSPS, NESHAP or PSD)
5N01-WA 7M04-HT-G01 7M04-HT-G04 6N02 8M01	VHAP	40 CFR Part 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

11. EMISSION CHANGES AND FEE CALCULATION:

See emission change and fee calculation spreadsheet in Appendix A.

12. NAAQS EVALUATIONS AND NON-CRITERIA POLLUTANTS:

a) NAAQS:

(i) Renewal with permitted changes to criteria pollutant emissions

Pollutant	Emission Rate (lb/hr)	NAAQS Standard (μg/m^3)	Averaging Time	Highest Concentration (μg/m^3)	% of NAAQS
PM_{10}	54.1	150	24-Hour	9.35	6
SO_2	1423.1	80	Annual	11.75	14.7
		1300	3-Hour	265.43	20.4
		365	24-Hour	71.43	19.6
CO	268.8	10,000	8-Hour	41.04	<1
		40,000	1-Hour	128.71	<1
NO_x	189.0	100	Annual	8.09	8
Pb	0.9	0.15	Rolling 3-Month	0.02**	13.3

*Emergency generators were not modeled
**H1H Monthly, 5 years of data

b) Non-Criteria Pollutants:

The facility has historically used a site-specific PAER option developed by a modeling comparison of the offsite concentration from the wastewater treatment basin and the emission rate from that source. This option was developed in place of specific HAP limits due to the permit appeal resolution. Batesville met data, 2005-2010, high second high concentrations were used for this exercise.

The wastewater treatment facility has an emission rate of 28.6 lb/hr and an offsite impact of 133.3 ug/m^3. Therefore, the site specific PAER would be = 28.6 lb/hr /13.3 mg/m^3 = 2.14

13. CALCULATIONS:

SN	Emission Factor Source (AP-42, testing, etc.)	Emission Factor (lb/ton, lb/hr, etc.)	Control Equipment and Efficiency	Comments
Particulate Emissions				
5N09-01	Table 13.5-1& Testing	274 micrograms per liter per million Btu. $Particulate\ Emissions: \quad \frac{274 \mu g}{L\ mmBtu} \times 20 mmBtu = \frac{5480\ \mu g}{L}$ $\frac{5480\ \mu g}{L} \times \frac{0.0353\ L}{ft^3} \times \frac{2.2 \times 10^{-9}\ lb}{\mu g} \times \frac{5.4\ million\ ft^3}{hr} = 2.2 \frac{lb}{hr}$ 20 occurrences over 35 hours per @6.4 lb/hr	N/A	The maximum flow rate through the RTO units is 5.4 million scfh and the highest anticipated average Btu content of the vent stream is 20 million Btu/hr. The Aldehyde Processing unit also generates particulate when reactors are being cleaned. These emissions are calculated to be 6.4 lb/hr and 2.2 ton/yr; therefore the peak pound per hour PM from the RTO is expected to be: 2.2 lb/hr + 6.4 lb/hr = 8.6 lb/hr x 1.2 = 10.3 tpy
5N09-02	AP-42 1.4 NG combustion	7.6 lb/10^6 lb/scf @ 45 scfm	N/A	8760 hrs
6M01-01A	TED vent emissions handbook	$\frac{0.02\ grains}{scf} \times \frac{800\ scf}{\min} \times \frac{1\ lb}{7000\ grains} \times \frac{60\ \min}{hy} = \frac{0.1371\ lb}{hr}$ $\frac{0.1371\ lb}{hr} \times \frac{24\ hr}{day} \times \frac{365\ day}{year} \times \frac{ton}{2000\ lb} = \frac{0.6\ ton}{year}$	Baghouse 0.02gr/scfm	8760 hrs
6M01-01	Table 1.1-9, Cumulative Particle Size and Size Specific Factors for Spreader Stokers Burning Bituminous Coal.	$PM_{10}\ per\ coal\ boiler = \left(6{,}422 \frac{lb\ coal}{hr} + 1{,}500 \frac{lb\ sludge}{hr}\right) \times 0.44 \frac{lb\ PM_{10}}{ton\ coal} \times \frac{ton\ coal}{2{,}000\ lb}$ $PM_{10}\ per\ coal\ boiler = 1.74 \frac{lb\ PM_{10}}{hr}$ $PM_{10}\ per\ coal\ boiler = \left(6{,}306.3 \frac{lb\ coal}{hr} + 1{,}500 \frac{lb\ sludge}{hr}\right) \times 0.44 \frac{lb\ PM_{10}}{ton\ coal} \times \frac{ton\ coal}{2{,}000\ lb}$ $\times \frac{8760\ hr}{yr} \times \frac{ton\ coal}{2000\ lb} = 7.52 \frac{ton\ PM_{10}}{year}$ Pound per hour particulate emission rates are derived using the coal feed rate associated with		Although coal, liquid fuel, and sludge are burned in the coal boilers, the highest rate of particulate generation per Btu occurs when only coal is burned. Sludge is assumed to have the same particulate generation rate as coal. Particulate from liquid fuel is assumed to be negligible. The following equation is used to

		the lowest Btu value received in the past 3 years. The lowest Btu value was used to ensure the calculated emission rate is conservative. Ton per year particulate emission rates are derived using the coal feed rate associated with the average Btu value of coal received in the past 3 years. Peak loading is estimated to be 5 times the annual average, or 26.1 lb/hr (112.8 ton/year) for the three coal boilers combined.		calculate particulate generation in the coal fired boilers: Typical coal and sludge feed rates were plugged into the above equation to generate typical PM10 emissions.
6M06-01	AP-42	7.6 lb/10^6ft^3	N/A	78 MMBTU/hr and 8760 hrs
6M07-01	AP-42	7.6 lb/10^6ft^3	N/A	221 MMBTU/hr and 8760 hrs
6M01	AP-42, Table 13.2.4-1 Coal received, Coal fired PP	$E = k \times 0.0032 \times \frac{\left[\frac{U}{5}\right]^{1.3}}{\left[\frac{M}{2}\right]^{1.4}} \quad (pound[lb]/ton)$ k = Aerodynamic particle size multiplier = 0.74 (dimensionless) U = Mean wind speed = 4.7 miles per hour M = Material moisture content = 4.5%		200 ton/day annual limt 100 ton/hr, short term limit
5M05-02	Manf. Specs.	Blower Rate: 502 dscfm Dust Collector Emission Rate (Vendor Supplied): 0.02 grains per ft^3.		
5M11-08	Manf. Specs	0.016 gr/scf and 11,585 scf/min		8760 hrs
5M11-09	Manf. Specs	0.016 gr/scf and 1307 scf/min		8760 hrs
5M11-15	Manf. Specs	$\frac{1600 acfm \times 2 gr/ft^3 \times 60 \min}{7000 gr/lb} = 27.4 Lb/hr$ $27.4 lb/hr \times .002 = .055 lb/hr$	Filter 99.8% control	8760 hrs
5M16-01	Manf. Specs	$\frac{1000 acfm \times 1 gr/ft^3 \times 60 \min}{7000 gr/lb} = 8.57 lb/hr$ $8.57 lb/hr \times .002 = .017 lb/hr$	Filter 99.8% control	8760 hrs
5M18-01	Manf. Specs		water venturi	maxmimum peak inlet rate of 291 lb/hr

		Avg. Estimated lbs/hr inlet = 145.5 = $\frac{16{,}980 acfm \times 1 gr/ft^3 \times 60 \min}{7000 gr/lb}$ Peak lbs/hr Inlet[1] = 291 = $\frac{16{,}980 \times 2 gr/ft^3 \times 60}{7000 gr/lb}$ **0.306 Lbs. Vented /100 Lb Inlet**	scrubber 97%	average estimated lbs/hr of 145.5
5M18-02	Manf. Specs	Estimated lbs/hr inlet = 1171.29 (Assumes 50 gr. loading x 2733 ft^3) **0.290 Lbs. Vented /100 Lb Inlet**		6 hours per day of operation
5M18-03	Manf. Specs	$\frac{600 acfm \times 10 gr/ft^3 \times 60 \min}{7000 gr/lb} = 51.43 Lb/hr$ $51.43 Lb/hr \times .004 = 0.2057 lb/hr$ $\frac{0.2057 lb/hr \times 24 hrs \times 365 days/yr}{2000 lb/ton} = 0.901 Tons/yr$	Filter 99.6% control	8760 hrs
5M01-TSP	Mass Balance	Filter Area: 792 Ft^3 90 bags, 6.2" x 6.0' $\frac{6.2}{12} \pi \times 6 \times 9 = 876 ft^3$ Volume: $876 \times \frac{1/32}{12} = 2.28 ft^3$ Weight: 2.28 Ft^3 x 40 lb/ Ft^3 = 91.3 lb Rate: $\frac{91.3}{6} \times 20\% = 3.04\ lb/hr$		1/32" of particulate material on filter bags Wt. = 40 Lb/ Open time = 6 hours per event Frequency = 6 times per year 20% of particulate is loose and carried out.

		Annual Total: $\frac{3.04 \times 120hr \times 1ton}{2000lb} = 0.18tons / yr$		
6M03-05	Testing	A compliance performance test on the Destructor was conducted January 12, 2011. The particulate samples collected during that test ran 0.6 lb/hr. FutureFuel is requesting a limit of 1.5 lb/hr due to feed stream variability, sample variability, and to allow for growth. The ton per year rate is a direct scale-up.		
4P05-01	AP-42	$\frac{1.3lb}{1000\ gal} \times \frac{368\ lb\ B100}{hr} \times \frac{gal}{7.51lb} \times 2 = \frac{0.127\ lb}{hr}$		
		SO_2 Emissions		
5N09-01	Table 1.4-2 & Material Balance	Sulfur dioxide is generated in the RTOs as sulfur containing molecules are combusted. SO_2 is also generated with natural gas combustion. The natural gas contribution is calculated using emission factors from AP-42 Table 1.4-2, *Emission Factors for Criteria Pollutants and Greenhouse Gasses from Natural Gas Combustion.* $N.Gas: 450scfm \times \frac{0.6lb}{1,000,000scf} \times \frac{60min}{hr} = 0.02\frac{lb}{hr}$ $0.02\frac{lb}{hr} \times 1.4 = 0.03\frac{lb}{hr}$ $Chemical Combustion\quad 3.35\frac{lb}{hr} \times 2 = 6.7\frac{lb}{hr}(from balance)$ Production of sulfur containing chemicals at FutureFuel Chemical Company is expected to increase, and all production may occur within a few months. The SO_2 contribution from combustion of organic chemicals is multiplied by a 2x factor over projected 2013 production. This factor is inserted into the equation as a contingency for high volume production of sulfur containing compounds over a short window of time.	N/A	
5N09-02	AP-42, 1.4	0.6 lb/10^6 scf @ 45 scfm	N/A	8760

6M01-01	AP-42 Table 1.1-3, Emission Factors for SOx, NOx, and CO from Bituminous and Subituminous Coal Combustion	Each coal boiler is designed to produce 70 million Btu/hr. The heating value of bituminous coal is generally between 10,500 and 14,000 Btu/lb (AP-42, 1.1 Bituminous and Subbituminous Coal Combustion). Coal energy content is variable; therefore the lb/hr calculation uses FFCC's lowest Btu shipment from the last 3 years, 10,900 Btu/lb. The ton/yr calculation uses FFCC's average coal Btu value from the last 3 years, 11,100 Btu/lb. The following calculation is used to determine the approximate quantity of coal required to operate the coal fired boilers at design capacity: $Coal\ Feed\ Rate = \frac{70{,}000{,}000\,Btu}{hr} \times \frac{lb\ coal}{Btu} \times 3\,Coal\ Fired\ Boilers = \frac{lb\ coal}{hr}$ Emission factors for SOx are found in AP-42 Table 1.1-3, *Emission Factors for SOx, NOx, and CO from Bituminous and Subituminous Coal Combustion*. Emissions are calculated by multiplying the weight percent sulfur in the coal by the Table value for spreader stoker boilers (38 lb/ton). The current permit limit for SO2 from the coal fired boilers is 1,418.7 lb/hr. $\frac{lb\ SOx}{hr} = 19{,}266\,\frac{lb\ coal}{hr} \times \frac{38\,lb\ SOx}{ton\ coal} \times 3.8\ percent\ S \times \frac{ton\ coal}{2000\,lb} = 1{,}391.1\,\frac{lb\ SOx}{hr}$ $\frac{lb\ SOx}{hr} = 18{,}918.9\,\frac{lb\ coal}{hr} \times \frac{38\,lb\ SOx}{ton\ coal} \times 3.8\ percent\ S \times \frac{ton\ coal}{2000\,lb} = 1{,}365.94\,\frac{lb\ SOx}{hr}$ $1{,}365.94\,\frac{lb\ SOx}{hr} \times \frac{8{,}760\,hr}{yr} \times \frac{ton}{2{,}000\,lb} = 5982.9\ tpy\ SOx$	N/A	It is assumed that all Sulfur entering the boilers, either through waste chemicals, sludge or coal, will be emitted as SO_2. The sulfur content in coal is greater than the sulfur content in sludge and liquid fuel, therefore burning coal is considered "worst case."
6M06-01	AP-42	0.6 $lb/10^6 ft^3$	N/A	78 MMBTU/hr and 8760 hrs
6M07-01	AP-42	0.6 $lb/10^6 ft^3$	N/A	221 MMBTU/hr and 8760 hrs
5N03-54	AP-42 Chapter 13.5	0.0680 lb/mmBtu		Vent Stream Heating value of 6.15 lb/mmBtu SO_2 value set equal to NO_x value The worst case vent rate to the flare is 305 lb/hr.
5M04-10	ASPEN	Minute traces from sulfuric acid		
6M03-05	Testing and mass balance	The System Removal Efficiency (SRE) of the chemical waste destructor was demonstrated to be 98.3% in acid gas tests conducted in April and in August of 2004. Every tank of waste chemicals that is burned in the destructor is sampled. The hourly rolling average of sulfur in the waste stream is calculated per the following equation: $Sulfur\ in\ feed \times (1 - SRE) \times \frac{Molec\ wt\ SO_2}{Molec\ wt.\ Sulfur}$		

<table>
<tr><td></td><td></td><td>The sulfur content in the Destructor feed stream from the current production processes can run up to 300 lb/hr, yielding an SO_2 emission of:
$$\frac{300\,lb\,S}{hr}\times(1-98.3\%)\times\frac{64.06}{32.06}=\frac{10.19\,lb\,SO_2}{hr}=\frac{44.6\,ton\,SO_2}{yr}$$
Worst case emissions are calculated assuming the sulfur content in the waste stream can double: 20.4 lb SO_2/hr and 89 ton SO_2 annually.</td><td></td><td></td></tr>
<tr><td>5N03-54</td><td>AP-42</td><td>0.068 lb SO2/MMBTU and 6.15 MMBTU</td><td></td><td>SO_2 was assumed to be equal to NOx</td></tr>
<tr><td>4P05-01</td><td>AP-42</td><td>SO2 and SO3 generation factors, 150 lb/1000 gal fuel oil and 2 lb/1000 gal fuel oil respectively, were obtained from AP-42 Table 1.3-1, Criteria Pollutant Emission Factors for Fuel Oil Combustion. Although SO2 is dominant, the combined sulfur emissions in the forms of SO2 and SO3 are reported as SOx.
$$0.05S\,in\,fuel\,oil\times\frac{150\,lb\,SO2}{1000\,gal\,fuel}\times\frac{367.6\,lb\,fuel}{hr}\times\frac{gal\,fuel}{7.51\,lb\,fuel}\times 2=0.734\frac{lb\,SO}{hr}$$
$$0.05S\times\frac{2\,lb\,SO3}{1000\,gal\,fuel}\times\frac{367.6\,lb\,fuel}{hr}\times\frac{gal\,fuel}{7.51\,lb\,fuel}\times 2=0.010\frac{lb\,SO3}{hr}$$</td><td></td><td>Sulfur dioxide and sulfur trioxide are generated when sulfur containing fuels are burned in the process heater. Fuel oil contains more sulfur than natural gas, therefore fuel oil factors were used to estimate emissions. The estimated emissions were then doubled to allow for elevated sulfur content in the fuel and to ensure that emissions will be within specifications. The normal sulfur content of the fuel oil is less than 0.05 percent.

50% growth factor</td></tr>
<tr><td colspan="5">VOC Emissions</td></tr>
<tr><td>5N09-01</td><td></td><td><table><tr><th>Area</th><th>Growth Factor (%)</th><th>Projected Emission Rate (lb/hr)</th><th>Projected Emission Rate (tpy)</th></tr><tr><td>OCI Batch Production Buildings</td><td>25</td><td>15.71</td><td>68.8</td></tr><tr><td>OCI Tank Farm Area</td><td>25</td><td>6.0</td><td>26.3</td></tr><tr><td>Batch Still Area (5P05) and Misc. Equip</td><td>25</td><td>0.14</td><td>0.6</td></tr><tr><td>OSR Equipment (5P02)</td><td>25</td><td>2.64</td><td>11.6</td></tr></table></td><td>RTOs VOC removal efficiency 98%</td><td>Calculations were completed using the chemical properties of acetone when actual data was not available.</td></tr>
</table>

Biodiesel Production	0	3.3	14.5
Aldehyde Processing	100	1.28	5.6
4P Solvent Recovery	10	13.9	60.9
Total:		43.0	188

5N09-02	Engr estimates	2.7 MMBTU/hr from n-hexane with a heating value of 19391 BTU/lb emitted as VOC	98% control	8760
OCI-FUG		(see below)	N/A	It is assumed that all equipment is in light liquid service and VOC's are travelling through the components 1752 hours per year (~20% of the time) The leak factors were derived in 1991 and are considered conservative due to improved construction techniques, superior materials, and better emission monitoring practices.

Number of Valves = Number of Pumps x 25
Number of Flanges = Number of Valves x 1.6

Fugitive Emission Factors for Components in *Light Liquid* Service

Component	Average Emission Factor (lb/hr/component)
Pumps	0.00417
Valves	0.000154
Flanges	0.000057
Relief Devices	0.000168
Capped Lines or Sample Points	0.0086

Fugitive Emission Calculations for Components in *Light Liquid* Service, Organic Chemical Intermediates

Component	Number	VOC Emissions (lb/hr)	(tpy)
Pumps	164	0.67	2.9
Valves	3922	0.60	2.6
Flanges	7743	0.44	1.9
Relief Devices	125	0.02	0.09
Sample Ports	44	0.38	1.6
2.12	9.09		

–Fugitive Emission Calculations for Components in *Light Liquid* Service, Organic ChemicalIntermediates Tank Farm Area

Component	Number	VOC Emissions (lb/hr)	(tpy)
Pumps	50	0.20850	0.91
Valves	1,200	0.18480	0.81
Flanges	2,700	0.15390	0.67
Relief Devices	50	0.00840	0.03
Sample Ports	75	0.64500	2.82
1.20060	5.24		

Fugitive Emission Calculations for Components in Light Liquid Service, Organic Chemical Intermediates Batch Still Area & Miscellaneous Equipment

Component	Number	VOC Emissions

		(lb/hr)	(tpy)
Pumps	9	0.03753	0.16
Valves	125	0.01925	0.08
Flanges	210	0.01197	0.05
Relief Devices	10	0.00168	0.007
Sample Ports	14	0.12040	0.53

0.19083	0.827

Component	Number	Lb/hr VOC	Tpy VOC
Pumps	**3**	**0.0125**	**0.05**
Valves	**15**	**0.0023**	**0.01**
Flanges	**30**	**0.0017**	**0.007**
Relief Devices	**1**	**0.000168**	**0.0007**
Sample Ports	**5**	**0.043**	**0.1883**
		0.0597	**0.2613**

Fugitive Emission Summary for Components in Organic Chemical Intermediates Facilities.

Organic Chemical Intermediate	VOC Emissions (lb/hr)	(tpy)
OCI Batch Production Buildings	2.1	9.2
OCI Tank Farm Area	1.2	5.2
Batch Still Area and Miscellaneous Equipment	0.2	0.9
Addition of New RTO	**0.0597**	**0.2613**
Total Fugitive Emissions, OCI	3.6	15.6

<table>
<tr>
<td>6M01-01</td>
<td>AP-42, Section 1.1, Table 1.1-19; Total Non-Methane Organic Carbon for Spreader Stoker Boilers.</td>
<td>

$$VOC\ per\ boiler = \left[6{,}422\frac{lb\ coal}{hr} \times 0.05\frac{lb\ VOC}{ton\ coal}\times\frac{ton}{2{,}000\ lb}\right] +$$

$$\left[\left\{1-\left(\frac{20\%\ water\ in\ liq.\ fuel}{100\%}\right)\right\}+\left\{1-\left(\frac{85\%\ water\ in\ sludge}{100\%}\right)\right\}\right]\times$$

$$\left[\left(\frac{2{,}000\ lb\ liquid\ fuel\ feed}{hr}+\frac{1{,}500\ lb\ sludge}{hr}\right)\times(1-0.999985\ SRE)\right]$$

$$VOC\ per\ boiler = 0.21\frac{lb}{hr}\left(based\ on\ 10{,}900\frac{Btu}{lb}coal\right)\ \ or\ \ 0.91\frac{ton}{year}\left(based\ on\ 11{,}100\frac{Btu}{lb}coal\right)$$

$$VOC\ for\ 3\ coal\ boilers = 0.63\frac{lb}{hr}\ \ or\ \ 2.73\frac{ton}{year}$$

</td>
<td></td>
<td>VOC is produced from the burning of coal, liquid fuel and biological waste (sludge) from the on-site wastewater treatment facility.

The percent water in the boiler feed stream is obtained by sampling the boiler feed tank. A System Removal Efficiency (SRE) of 0.999985 is used for VOC's. This value was established in the 1999 Trial Burn.</td>
</tr>
<tr>
<td>6M06-01</td>
<td>AP-42</td>
<td>5.5 $lb/10^6 ft^3$</td>
<td>N/A</td>
<td>78 MMBTU/hr and 8760 hrs</td>
</tr>
<tr>
<td>6M07-01</td>
<td>AP-42</td>
<td>5.5 $lb/10^6 ft^3$</td>
<td>N/A</td>
<td>221 MMBTU/hr and 8760 hrs</td>
</tr>
<tr>
<td>BLR-FUG</td>
<td></td>
<td>

Table 10.12.2 – Fugitive Emission Factors for Components in *Light Liquid* Service

<table>
<tr><th>Component</th><th>Average Emission Factor (lb/hr/component)</th></tr>
<tr><td>Pumps</td><td>0.00417</td></tr>
<tr><td>Valves</td><td>0.000154</td></tr>
<tr><td>Flanges</td><td>0.000057</td></tr>
<tr><td>Relief Devices</td><td>0.000168</td></tr>
<tr><td>Capped Lines or Sample Points</td><td>0.0086</td></tr>
</table>

Table 10.12.3 – Fugitive Emission Calculations for Components in *Light Liquid* Service, Coal Boilers

<table>
<tr><th rowspan="2">Component</th><th rowspan="2">Number</th><th rowspan="2">Emission Factors (lb/hr/component)</th><th colspan="2">VOC Emissions</th></tr>
<tr><th>(lb/hr)</th><th>(tpy)</th></tr>
<tr><td>Pumps</td><td>11</td><td>0.00417</td><td>0.05</td><td>0.20</td></tr>
<tr><td>Valves</td><td>320</td><td>0.000154</td><td>0.05</td><td>0.22</td></tr>
<tr><td>Flanges</td><td>1,555</td><td>0.000057</td><td>0.09</td><td>0.39</td></tr>
<tr><td>Relief Devices</td><td>19</td><td>0.000168</td><td>0.003</td><td>0.014</td></tr>
<tr><td>Sample Ports</td><td>14</td><td>0.0086</td><td>0.12</td><td>0.53</td></tr>
</table>

</td>
<td></td>
<td>The following is a summary of the fugitive VOC emissions based on information derived in a bagging study. Leak rates were derived for components and multiplied by the facility component count. If detailed information was not available the following formulas were used to estimate the number of components:

Number of Valves = Number of Pumps x 25
Number of Flanges = Number of Valves x 1.6

Assuming the equipment, construction, maintenance, and operations are equivalent, the factors developed during the bagging study are applied to the entire facility. The leak factors were derived in 1991 and are considered</td>
</tr>
</table>

		(see Subtotals table below)		conservative due to improved construction techniques, superior materials, and better emission monitoring practices

Subtotals	0.313	1.35
Anticipated Increase (30%)	0.094	0.41
Total Fugitive Emissions, Boiler Area	0.41	1.76

5M01-01 5M01-02 5M01-05 5M01-06 5M01-07 5M01-08 5M01-09 5M03-01 5M03-02 5M04-01 5M04-02 5M05-01 5M11-01 5M11-04 5M11-05 5M11-06 5M11-07 5M13-01	ASPEN	(see PES table below)		NOBS I scrubbers were simulated using ASPEN at actual operating conditions. An additional 50% was added to the VOC output from each model to ensure emissions are not underestimated at normal operating conditions.
5MNOBS-TNK	TANKS	EX-TF-01 EX-TF-02 EX-TF-03		

PES #	Calculated Emissions lb/hr	Calculated Emissions ton/yr
5M01-01	0.007	0.0323
5M01-02	0.018	0.0789
5M01-05	Trace	Trace
5M01-06	0.006	0.0254
5M01-07	Trace	Trace
5M01-08	Trace	Trace
5M01-09	<0.001	0.0012
5M03-01	0.0012	0.0051
5M03-02	Trace	Trace
5M04-01	Trace	Trace
5M04-02	0.018	0.0808
5M04-10	Trace	Trace
5M05-01	0.001	0.0051
5M11-01	0.007	0.0323
5M11-04	Trace	Trace
5M11-05	0.006	0.0254
5M11-06	Trace	Trace
5M11-07	Trace	Trace
5M13-01	0.0012	0.0051

<table>
<tr>
<td></td>
<td></td>
<td>MLG-TF-01
PSA-TF-01
=112 lb/yr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOBS-FUG</td>
<td></td>
<td>
<table>
<tr><th>Component</th><th>Average Emission Factor

(lb/hr/component)</th><th>Number</th></tr>
<tr><td>Pumps</td><td>0.00417</td><td>100</td></tr>
<tr><td>Valves</td><td>0.000154</td><td>800</td></tr>
<tr><td>Flanges</td><td>0.000057</td><td>1200</td></tr>
<tr><td>Relief Devices</td><td>0.000168</td><td>40</td></tr>
<tr><td>Capped Lines
or Sample Points</td><td>0.0086</td><td>40</td></tr>
</table>
<table>
<tr><th rowspan="2">Component</th><th colspan="2">VOC Emissions</th></tr>
<tr><th>(lb/hr)</th><th>(tpy)</th></tr>
<tr><td>Pumps</td><td>0.42</td><td>1.83</td></tr>
<tr><td>Valves</td><td>0.12</td><td>0.54</td></tr>
<tr><td>Flanges</td><td>0.07</td><td>0.30</td></tr>
<tr><td>Relief Devices</td><td>0.01</td><td>0.03</td></tr>
<tr><td>Sample Ports</td><td>0.34</td><td>1.51</td></tr>
</table>
<table>
<tr><td>Subtotals</td><td>0.96</td><td>4.21</td></tr>
<tr><td>Anticipated Increase (25%)</td><td>0.24</td><td>1.05</td></tr>
<tr><td></td><td>1.20</td><td>5.26</td></tr>
</table>
</td>
<td></td>
<td>Leak rates were derived for components and multiplied by the facility component count. If detailed information was not available the following formulas were used to estimate the number of components:

Number of Valves = Number of Pumps x 25
Number of Flanges = Number of Valves x 1.6

Assuming the equipment, construction, maintenance, and operations are equivalent, the factors developed during the bagging study are applied to the entire facility. The leak factors were derived in 1991 and are considered conservative due to improved construction techniques, superior materials, and better emission monitoring practices.</td>
</tr>
<tr>
<td>6M03-05</td>
<td>AP-42 and Testing</td>
<td>
$$VOC = \left[\mathit{fuel\ oil\ feed} \times 0.00004 \frac{lb\ VOC}{lb\ fuel\ oil}\right] + \left[\mathit{natural\ gas\ feed} \times 0.0055 \frac{lb\ VOC}{kscf\ natural\ gas}\right]$$
=4.0 tpy
$$VOC = \left\{\begin{array}{l} \left[(1 - \%water \times waste\ feed) \times process\ waste \frac{lb}{yr}\right] \\ + \left[fuel\ oil\ feed \times 0.00004 \frac{lb\ VOC}{lb\ fuel\ oil}\right] \\ + \left[kscf\ natural\ gas\ feed \times 0.0055 \frac{lb\ VOC}{kscf\ natural\ gas}\right] \end{array}\right\} \times (1 - 99.9997\%)$$
=0.31 tpy
</td>
<td></td>
<td>Natural gas, fuel oil, and process waste are burned in the Chemical Waste Destructor at FutureFuel Chemical Company. Natural gas keeps the pilot light lit and fuel oil is used as an auxiliary fuel to maintain a minimum temperature in the combustion chamber. Process waste streams can come from different sources and can have varying water compositions and Btu content. The process waste is segregated and sampled before it is burned. The destruction removal efficiency (DRE) for VOC is 99.9997% per NOC 12-7-04.

A fuel oil factor of 0.00004 lb VOC per lb. fuel oil was</td>
</tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>derived from AP-42 Section 1.3 Fuel Oil Combustion table 1.3-3 (Emission factors for TOC, Methane and Non-Methane TOC from uncontrolled fuel oil combustion), NMTOC emission factor for No.6 Fuel Oil fired industrial boilers. This value was chosen instead of NO.2 fuel oil to be conservative and to cover other potential auxiliary fuels.

A natural gas factor of 0.0055 lb VOC per kscf natural gas was derived from AP-42 Section 1.4 Natural Gas Combustion table 1.4-2 (Emission factors for Criteria pollutants and Greenhouse Gases).

The average annual waste feed to the destructor is 520 million lb/yr. The feed composition is approximately 60% water. The fuel oil usage is 8.5 million pounds per year and the natural gas usage is 1.4 million kscf per year.</td></tr>
<tr><td>DEST-FUG</td><td></td><td>
<table>
<tr><th>Component</th><th>Average Emission Factor (lb/hr/component)</th></tr>
<tr><td>All – Pumps, Valves, Flanges, RD, Sample Ports</td><td>0.00051</td></tr>
</table>
<table>
<tr><th rowspan="2">Component</th><th rowspan="2">Number</th><th colspan="2">VOC Emissions</th></tr>
<tr><th>(lb/hr)</th><th>(tpy)</th></tr>
<tr><td>All</td><td>1951</td><td></td><td></td></tr>
<tr><td colspan="2">Total Fugitive Emissions, Destructor</td><td>1.0</td><td>3.00</td></tr>
</table>
</td><td></td><td>It is assumed that all equipment is in light liquid service and VOC's are travelling through the components 6000 hours per year</td></tr>
<tr><td>4PSR-00</td><td>ASPEN</td><td>40million lbs/yr feed rate and 192 lb/hr uncontrolled emissions</td><td>RTO</td><td>Solvent recovery equipment was modeled with ASPEN™. Typical solvents (acetone, methanol, heptane, toluene, xylene, isopropanol, and</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>hexane) were used in the models. Process emissions are controlled with Regenerative Thermal Oxidizers (RTOs), 5N09-01.</td></tr>
<tr><td>SR-FUG</td><td></td><td>
<table>
<tr><th>Component</th><th>Average Emission Factor (lb/hr/component)</th></tr>
<tr><td>All – Pumps, Valves, Flanges, RD, Sample Ports</td><td>0.0015</td></tr>
</table>
<table>
<tr><th>Component</th><th>Number</th><th>VOC Emissions (lb/hr)</th><th>(tpy)</th></tr>
<tr><td>All</td><td>3321</td><td></td><td></td></tr>
<tr><td colspan="2">Total Fugitive Emissions</td><td>5.0</td><td>21.9</td></tr>
</table>
</td><td></td><td>It is assumed that all equipment is in light liquid service and VOC's are travelling through the components 8760 hours per year</td></tr>
<tr><td>7K01-01</td><td>Toxchem model</td><td>
<table>
<tr><th>Component</th><th>Lb/day</th></tr>
<tr><td>Acetic Acid</td><td>119.38</td></tr>
<tr><td>Benzene</td><td>0.25</td></tr>
<tr><td>Hexane</td><td>267.66</td></tr>
<tr><td>Methanol</td><td>74.68</td></tr>
<tr><td>Phenol</td><td>13.34</td></tr>
<tr><td>Toluene</td><td>158.57</td></tr>
<tr><td>Triethylamine</td><td>7.11</td></tr>
<tr><td>Pelargonic Acid</td><td>42.58</td></tr>
<tr><td>Glycerin</td><td>0.005497</td></tr>
<tr><td>Sodium Propionate</td><td>3.85</td></tr>
<tr><td>Total</td><td>687.42</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>7M01-02</td><td>tanks 4.0</td><td>175 lb/yr</td><td></td><td></td></tr>
<tr><td>5NDIPB-TNK</td><td></td><td colspan="3">
<table>
<tr><td>5N03-15</td><td>T-240A</td><td>VOC</td><td>0.0033</td><td></td><td>0.015</td><td></td></tr>
<tr><td>5N03-16</td><td>T-240B</td><td>VOC</td><td>0.0033</td><td></td><td>0.015</td><td></td></tr>
<tr><td>5N03-41</td><td>T-250A</td><td>VOC</td><td>0.0025</td><td></td><td>0.011</td><td></td></tr>
<tr><td>5N03-42</td><td>T-250B</td><td>VOC</td><td>0.0025</td><td></td><td>0.011</td><td></td></tr>
<tr><td>5N03-49</td><td>T-62</td><td>VOC</td><td>0.0003</td><td></td><td>0.0012</td><td></td></tr>
<tr><td>5N03-51</td><td>T-280</td><td>VOC</td><td>0.007</td><td></td><td>0.03</td><td></td></tr>
<tr><td>5Q94-01</td><td>T-241</td><td>VOC</td><td>0.017</td><td></td><td>0.073</td><td></td></tr>
<tr><td>5N03-52</td><td>T-251</td><td>VOC</td><td>0.016</td><td></td><td>0.07</td><td></td></tr>
<tr><td>5N03-57</td><td>T-260</td><td>VOC</td><td>0.00012</td><td></td><td>0.0005</td><td></td></tr>
<tr><td>5N03-53</td><td>T-265</td><td>Inorganics</td><td>0.009</td><td></td><td>0.04</td><td></td></tr>
</table>
</td></tr>
<tr><td>5N03-54</td><td>AP-42</td><td>0.0518 lb VOC/MMBTU
6.15 MMBTU</td><td></td><td></td></tr>
</table>

DIPB-FUG

Component	Average Emission Factor (lb/hr/component)
All – Pumps, Valves, Flanges, RD, Sample Ports	0.00032

Component	Number	VOC Emissions (lb/hr)	(tpy)
All	932		
Total Fugitive Emissions		0.3	1.3

Leak rates were derived for components and multiplied by the facility component count. It is assumed that all equipment is in light liquid service and VOC's are travelling through the components 8760 hours per year (100% of the time).

5N07

Biodiesel Area	VOC Emissions (lb/hr)	VOC Emission Rate (tpy)
Biodiesel Refining and Methanol Recovery	0.53	2.32
Material Storage	0.22	0.96
Glycerol Refining	0.29	1.26
Fugitive Emissions	1.78	7.82
Total:	2.82	12.36

Biodiesel Refining and Methanol Recovery

Equipment	Control Device	Controlled VOC Emissions (lb/hr)
SX-01	RTO	2.48E-02
SM-01	RTO	2.48E-02
SX-02	RTO	2.60E-03
SX-52	RTO	2.00E-05
TFS-59	RTO	5.72E-03
TFS-61	RTO	1.60E-03
TFS-62	RTO	5.90E-04
TFS-63	RTO	1.29E-03
TFS-64	RTO	7.05E-02
TFS-65	RTO	1.25E-03
TFS-66	RTO	1.33E-03

PM-50A	RTO	1.12E-06
TFS-53	RTO	2.28E-08
TFS-54	RTO	1.22E-02
TFS-55	RTO	0.00E+00
TFS-60	RTO	1.76E-02
TFS-71	RTO	6.81E-02
TFS-73	RTO	6.81E-02
TFS-74	RTO	1.75E-03
TFS-75	RTO	1.14E-06
TFS-76	RTO	1.75E-03
PE-01	RTO	7.64E-02
PR-56A	ATM	9.25E-05
PR-56B	ATM	9.25E-05
TFS-69	ATM	0.00E+00
SM-02	RTO	1.86E-02
SI-01	RTO	1.86E-02
SB-02	RTO	1.86E-02
SX-03	RTO	3.40E-03
SX-04	RTO	3.46E-03
SB-01	RTO	0.00E+00
SM-51	RTO	0.00E+00
SB-03	RTO	7.64E-02
SB-26	RTO	0.00E+00
SA-21	RTO	0.00E+00
PT-50	RTO	8.60E-03
TFS-52	RTO	0.00E+00
TFS-77	RTO	1.75E-03
	VOC (lb/hr):	**5.30E-01**
	VOC (ton/year):	**2.32E+00**

Storage

Equipment	**VOC Emissions lb/year**	**VOC Emissions lb/hr**

TFB-01	0.02	0.000002
TFB-02	0.02	0.000002
TFB-10	24.4	0.003
TFB-11	24.4	0.003
TFB-12	24.4	0.003
TFB-20	41.8	0.005
TFB-21	41.8	0.005
TFB-30	222.2	0.03
TFB-31	5.1	0.0006
TFB-40	339.7	0.03
TFB-41	339.7	0.03
T-242	770.6	0.08
T-243	67.1	0.008
BD-01	8.24	.00094
	Total lb/year 1,909.5	**Total lb/hr** 0.22
	Total ton/yr 0.96	

Glycol Refining

	VOC Emissions lb/hr	VOC Emissions tpy
PROD-DC-301	0.09	0.39
PE-51	2.38	10.45
PE-53	2.38	10.45
GT-1	3.84	16.82
GT-2	2.38	10.45
DE-50	1.22	5.35
PM-50B	1.03	4.53
GT-3	1.03	4.53
TL-51	0.03	0.12
Pre-RTO	**Total lb/hr** 14.38	**Total ton/yr** 62.98
Post RTO	**Total lb/hr** 0.29	**Total ton/yr** 1.26

Fugitives

Component	Number	VOC Emissions (lb/hr)	(tpy)
Pumps	168	0.7006	3.07
Valves	3650	0.5621	2.46
Flanges	5900	0.3363	1.47
Relief Devices	81	0.0136	0.06
Sample Ports	20	0.1720	0.75
1.78	7.82		

4P05-01		The Hot Oil System for the Aldehyde Processing plant is rated to deliver 5 MMBtu/hr to the		

<table>
<tr><td></td><td></td><td>process. It can combust natural gas or fuel oil. It also recovers energy from process vent streams which are also combusted in the unit. FFCC would like to increase the Aldehyde Processing rate by 30%, from 45 mppy to 58.5 mppy (Condition AP 3). FFCC can increase throughput and remain below current emission limits.

VOC emissions from material balance data and AP-42 Section 1.3 Fuel Oil Combustion, Table 1.3-3. EMISSION FACTORS FOR TOTAL ORGANIC COMPOUNDS result in a projected VOC emission of 1.55 lb/hr. Applying a 30% factor for peak loading and a 2X factor for start-up the resultant lb/hr emission rate is 4.0. The annual emission rate should not exceed the R8 limit of 6.8 tpy.</td><td></td><td></td></tr>
<tr><td>4PSR-FUG</td><td></td><td>
<table>
<tr><th></th><th></th><th>(lb/hr)</th><th>(tpy)</th></tr>
<tr><td>Pumps</td><td>42</td><td>0.18</td><td>0.77</td></tr>
<tr><td>Valves</td><td>894</td><td>0.14</td><td>0.60</td></tr>
<tr><td>Flanges</td><td>2181</td><td>0.12</td><td>0.54</td></tr>
<tr><td>Relief Devices</td><td>57</td><td>0.01</td><td>0.04</td></tr>
<tr><td>Sample Ports</td><td>147</td><td>1.26</td><td>5.54</td></tr>
<tr><td>Subtotal</td><td></td><td>1.71</td><td>7.49</td></tr>
<tr><td>With 25% increase</td><td></td><td>2.14</td><td>9.37</td></tr>
</table>
<table>
<tr><th>Component</th><th>Average Emission Factor (lb/hr/component)</th></tr>
<tr><td>Pumps</td><td>0.00417</td></tr>
<tr><td>Valves</td><td>0.000154</td></tr>
<tr><td>Flanges</td><td>0.000057</td></tr>
<tr><td>Relief Devices</td><td>0.000168</td></tr>
<tr><td>Capped Lines</td><td>0.0086</td></tr>
</table>
</td><td></td><td>Leak rates were derived for components and multiplied by the facility component count. If detailed information was not available the following formulas were used to estimate the number of components:

Number of Valves = Number of Pumps x 25
Number of Flanges = Number of Valves x 1.6

Assuming the equipment, construction, maintenance, and operations are equivalent, the factors developed during the bagging study are applied to the entire facility. The leak factors were derived in 1991 and are considered conservative due to improved construction techniques, superior materials, and better emission monitoring practices.</td></tr>
<tr><td>6N01-2</td><td>TANKS</td><td>Gasoline storage, 1,288.50 lb/yr</td><td></td><td></td></tr>
<tr><td>6N01-03</td><td>TANKS</td><td>Diesel Storage, 2.35 lb/yr</td><td></td><td></td></tr>
<tr><td>5N03TK-01</td><td>TANKS</td><td>26 Tanks
<table>
<tr><th></th><th></th><th>Lb/yr</th></tr>
<tr><td>5N01-44</td><td>TF-2</td><td>1,327.67</td></tr>
<tr><td>5N01-41</td><td>TF-7</td><td>0.6*</td></tr>
<tr><td>5N03-39</td><td>TF-10</td><td>0</td></tr>
<tr><td>5N03-45</td><td>TF-12</td><td>2289.75*</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

		5N01-27	TFV-4	785.26		
		5N01-23	TFV-5	422.94		
		5N01-26	TFV-6	19.14		
		5N01-34	TFS-5	15.22		
		5N01-37	TFS-10	45.29		
			TFS-79	2,454.08		
		5N01-48	WG-1	0.09		
		5N01-49	CG-1	0.07		
		4P94-12	PR-56A	0.24		
		4P94-13	PR-56B	0.24		
		5N01-22	TFV-1	175.61		
		5N01-36	TFS-7	101.33		
		5N01-38	TFS-9	82.05		
		5N03-18	PBV-50	107.26		
		5N01-42	TF-6	0.88		
		5N03-50	PA-50	0.52*		
		5N01-39	TF-3	97.26		
		5N03-40	TF-11	0		
		5N01-25	TFV-3	3,803.54		
		5N01-32	TFS-1	16.51		
		5N01-31	TFS-2	19.53		
			VOC/OHAP	11,765.08		
			Inorganic	2290.87		
4Q01-10	TANKS	524.07 lb/yr				
4Q01-11	TANKS	20.62 lb/yr				
4Q01-01	TANKS	0.02 lb/yr				
4Q01-02	TANKS	0.02 lb/yr				

4Q01-03	TANKS	0.45 lb/yr		
4Q01-04	TANKS	0.18 lb/yr		
4Q01-05	TANKS	0.57 lb/yr		
4Q01-06	TANKS	4.66 lb/yr		
4Q01-07	TANKS	4.66 lb/yr		
4Q01-08	TANKS	259.47 lb/yr		
4Q01-09	TANKS	444.22 lb/yr		
NOx Emissions				
5N09-01	Table 1.4-1 & Mass Balance	300 scfm (natural gas flowrate) 50% growth factor		The NOx contribution from combustion of organic chemicals is generally considered to be negligible as long as nitrated compounds are not being produced. A 2x factor over actual 2007 natural gas usage is inserted into the equation above as a contingency for the production of nitrogen containing compounds. Natural gas usage in the RTO has increased 40% from 2007 due to changes necessary to obtain destruction removal efficiency requirements imposed by 40 CFR 63 Subpart FFFF. The NOx pound per hour rate is inflated by 40% for the additional natural gas usage. A 50% growth factor was also added.
5N09-02	Table 1.4-1	100 lb per 10^6 scf @ 45 scfm		8760

6M01-01	AP-42, Section 1, Table 1.1-3 Spreader-Stoker boiler burning bituminous coal.	$NOx\ per\ coal\ boiler,\ coal\ only = \frac{6{,}422\ lb\ coal}{hr} \times \frac{11\ lb\ NOx}{ton\ coal} \times \frac{ton\ coal}{2{,}000\ lb}$ $NOx\ per\ boiler,\ coal\ only = \frac{35.3\ lb\ NOx}{hr} \quad \left(based\ on\ 10{,}900 \frac{Btu}{lb} coal\right)$ $Annual\ NOx\ per\ boiler = \frac{6{,}306.3\ lb\ coal}{hr} \times \frac{11\ lb\ NOx}{ton\ coal} \times \frac{ton\ coal}{2{,}000\ lb} \times \frac{8760 hr}{yr} \times \frac{ton}{2000\ lb}$ $NOx\ per\ boiler,\ coal\ only = \frac{151.9\ ton\ NOx}{yr} \quad \left(based\ on\ 11{,}100 \frac{Btu}{lb} coal\right)$ $NOx\ for\ 3\ boilers,\ coal\ only = \frac{106.0\ lb\ NOx}{hr} \quad or \quad \frac{455.8\ ton\ NOx}{yr}$		AP-42, Section 1, Table 1.1-3 lists a value of 11 lb of NOx for every ton of coal burned in a Spreader-Stoker boiler burning bituminous coal. This NOx factor is used when liquid fuel is not being burned in the coal fired boilers. When liquid fuel is burned in the boilers the Btu value of the waste stream is variable. Nitrogen may be present in our liquid fuel, therefore the NOx value can increase due to the combustion of "fuel NOx." It is assumed that any nitrogen in the fuel will exit the boiler stack as NOx.
6M06-01	BACT	13.3 lb/hr NOx as a PSD limit	N/A	78 MMBTU/hr and 8760 hrs
6M07-01	BACT	22 lb/hr NOx as a PSD limit (0.1 lb NOx/MMBTU)	N/A	221 MMBTU/hr and 8760 hrs
5N03-54	AP-42	0.068 lb SO2/MMBTU and 6.15 MMBTU		
6M03-05		19,800 lb/hr waste chemicals fed		The Fuel Oil NOx Emission Factor (0.002837 lb NOx/lb fuel oil) comes from AP-42 Section 1.3 fuel Oil Combustion, Table 1.3-1 *Values for Distillate Oil Fired Boilers Operating at Less Than 100 Million BTU per hour*. The Natural Gas NOx Emission Factor (0.1 lb NOx / kscfh natural gas) comes from AP-42 Section 1.4, Table 1.4-1 *Factors for Uncontrolled NOx from Small Boiler.*
4P05-01	Testing plus a safety factor	0.00568 lb NOx/lb fuel oil 368 lb fuel oil/hr $368 \frac{lb\ fuel\ oil}{hr} \times \frac{0.00284 lb\ NOx}{lb\ fuel\ oil} \times 2 = 2.1 \frac{lb\ NOx}{hr} = 9.15 tpy$		

CO Emissions

5N09-01	Table 1.4-1 & Mass Balance	Carbon monoxide is generated as natural gas is burned in the RTOs and as organic chemical combustion takes place. The natural gas contribution is calculated using emission factors from AP-42 Table 1.4-1, *Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion.* Natural gas usage in the RTO has increased 40% from 2007 due to changes necessary to obtain destruction removal efficiency requirements imposed by 40 CFR 63 Subpart FFFF. The CO pound per hour rate is inflated by 40% for the additional natural gas usage. Carbon Monoxide generated from incomplete chemical combustion comes from the material balance database. $Natural\ Gas:\ \ 300\ scfm \times \frac{84\ lb}{1{,}000{,}000\ scf} \times \frac{60\ \min}{hr} = 1.5\frac{lb}{hr}$ $1.5\frac{lb}{hr} \times 1.4 = 2.1\frac{lb}{hr}$ $Chemical\ Combustion:\ \ 1.0\frac{lb}{hr}\ \ (from\ material\ balance$ $Aldehyde\ Bakeout:\ \ 8.6\frac{lb}{hr}\ \ (peak\ emission\ sampling)$ The Aldehyde Processing unit generates CO when reactors are being cleaned (baked out). These emissions are calculated to be 8.6 lb/hr and 8.9 ton/yr; therefore the peak pound per hour CO from the RTO is expected to be: Total lb/hr CO Emissions: 2.1 lb/hr + 1.0 lb/hr +8.6 lb/hr = 11.7 lb/hr. The ton per year emission rate is calculated to be: $3.1\frac{lb}{hr} \times \frac{8760\ hr}{yr} \times \frac{ton}{2000\ lb} + \frac{8.9 ton}{yr} = 22.5\frac{ton}{yr}$		
5N09-02	Table 1.4-1	84 lb/10^6 scf @ 45 scfm		8760
6M01-01		dscfm = acfm x (Pstack/Pstd) x (Tstd/Tstack) x Md • Pstack is the maximum stack pressure (29.85 in. Hg) from 1999 trial burn. • Pstd is standard pressure (29.92 in. Hg). • Tstack is the stack temperature in deg. R.		An average stack gas flow rate of 20,000 dscfm and a CO concentration of 100

		• Tstd is standard temperature (528 deg. R). • Md is the mole fraction of dry gas from the 1999 trial burn (0.8867). $CO\frac{lb}{hr} = \frac{CO\ ppmv}{1{,}000{,}000} \times dcfm \times \frac{28g}{g.mol} \times \frac{0.0415\ g.mol}{L} \times \frac{1{,}000L}{m^3}$ $\times \frac{m^3}{35.31 ft^3} \times \frac{lb}{456.3g} \times \frac{60 \min}{hr}$ 0.0415g-mol/L is the volume occupied by an ideal gas at 70 deg F at 1 atm of pressure. • 28 g/g-mol is the molecular weight of CO. $CO\frac{lb}{hr} = \frac{2000\ ppmv}{1{,}000{,}000} \times \frac{22000\ dscfm \times 28 \times 0.0415 \times 1000 \times 60}{35.31 \times 456.3} = 190.4\frac{lb}{hr}$ Total CO lb/hr = 25.95 lb/hr + 190.4 lb/hr = 216.4 lb/hr Total CO tpy = 216.4 x 8760 hr/yr ÷ 2000 lb/ton = 947.8 tpy		ppmv are typical when the boiler is operating at steady-state. Inserting these values into the equation above yields 8.65 lb CO per hour per boiler, 25.95 for 3 boilers. When coal boilers are ignited incomplete combustion generates high concentrations of CO until the boilers reach optimal operating temperature. The following equation is used to estimate the CO emission rate from startup and shutdown activity.
6M06-01		84 lb CO/10^5 scf		78 MMBTU/hr and 8760 hrs
6M07-01		84 lb CO/10^5 scf		221 MMBTU/hr and 8760 hrs
5N03-54	AP-42	0.37 lb CO/MMBTU and 6.15 MMBTU		
6M03-05		6.03 x 1.85= 11.16 lb/hr Annual limit calculated from 6.03 x 4.38 = 26.4 tpy		
4P05-01	ASPEN	Carbon monoxide is generated as natural gas is burned in the process heater. A CO generation factor of 84 lb CO per million scf of natural gas burned, AP-42 Table 1.4-1 was used to estimate CO generation in the process heater. $84\frac{lb\ CO}{1{,}000{,}000\ scf} \times \frac{5{,}750 scf}{hr} \times 2 = 0.97\frac{lb\ CO}{hr} = 4.23 tpy$		
Inorganic Emissions				
5N09-01	Table 1.4-1 & Mass Balance	$Non-VOC\ Hazardous\ Air\ Pollutants: \frac{18.05\ ton}{year} \times \frac{year}{8760\ hr} \times \frac{2{,}000\ lb}{ton} = \frac{4.12\ lb}{hr}$ $\frac{4.12\ lb}{hr} \times 2 = 8.2\frac{lb}{hr}$ *(from material balance with 2x capacity factor)*		FutureFuel Chemical Company makes several chlorinated chemicals. The pound per hour halogen atom emission rate is calculated as 2x the actual ton per year emission rate because

				FutureFuel has the capacity to produce many more halogenated products than were in actual production in 2007. The halogen atom emission rates are also based on anticipated production for the next 5 years. It is assumed that halogen atoms are not removed across the RTO. A 20% factor for growth has been added to the calculated rate for the permitted rate.
5N09-02	MON standard	No more than 1 lb/hr		
6M01-01	AP 42 Section 1, Table 1.1-18 Emission Factors for Trace Metals From Controlled Coal Combustion	Coal Combustion, Metals: $Arsenic\frac{lb}{hr} = \left(4.10\times10^{-4}\frac{lb\ Arsenic}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0039\frac{lb\ Arsenic}{hr}$ $Beryllium\frac{lb}{hr} = \left(2.10\times10^{-5}\frac{lb\ Beryllium}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0002\frac{lb\ Berylliu}{hr}$ $Chromium\frac{lb}{hr} = \left(2.60\times10^{-4}\frac{lb\ Chromium}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0025\frac{lb\ Chromium}{hr}$ $Cadmium\frac{lb}{hr} = \left(5.10\times10^{-5}\frac{lb\ Cadmium}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0005\frac{lb\ Cadmium}{hr}$ $Lead\frac{lb}{hr} = \left(4.20\times10^{-4}\frac{lb\ Lead}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0040\frac{lb\ Lead}{hr}$ $Mercury\frac{lb}{hr} = \left(5.10\times10^{-5}\frac{lb\ Mercury}{ton\ coal}\right)\times\left(19{,}266\frac{lb}{hr}\right)\times\left(\frac{ton}{2000\ lb}\right) = 0.0005\frac{lb\ Mercury}{hr}$ Total LVM, SVM, and HVM from coal combustion is 0.0117 lb/hr.		"Inorganics" are considered to be chlorine, low volatile metals, semi-volatile metals, and highly volatile metals.

		Substituting a coal feed rate of 18,918 lb/hr (82,860 tpy) and calculating tons per year yields a metals emission rate of 0.05 tpy. Liquid Combustion, Metals (Trial Burn Average Rates): Arsenic: 0.26 lb/hr, 1.15 tpy Beryllium: 0.02 lb/hr, 0.07 tpy Chromium: 0.92 lb/hr, 4.02 tpy Cadmium: 0.00 lb/hr, 0.01 tpy Lead: 0.75 lb/hr, 3.31 tpy Mercury: 0.00 lb/hr, 0.00 tpy Total Metals Emission Rate: 2 lb/hr, 8.6 tpy		
6M01-01	AP 42 Section 1, Table 1.1-18 Emission Factors for HCl and HF from Coal Combustion	Coal Combustion, Cl: $HCl\ Emission\ Rate\ from\ Coal = 9.633 \frac{ton\ Coal}{hr} \times 1.2 \frac{lb\ HCl}{ton\ Coal} = 11.56 \frac{lb\ HCl}{hr}$ $HCl\ Emission\ Rate\ from\ Coal = 11.56 \frac{lb\ HCl}{hr} \times \left(\frac{35.43\ lb-mol\ Cl}{36.461\ lb-mol\ HCl} \right) = 11.23 \frac{lb\ Cl}{hr}$ Substituting a coal feed rate of 18,918 lb/hr (82,860 tpy) and calculating tons per year yields an HCl emission rate of 49.7 tpy and a Cl emission rate of 48.3 tpy. Liquid Combustion, Cl: Liquid Cl feed rate (trial burn average) = 222.6 $\frac{lb\ Cl}{hr}$		"Inorganics" are considered to be chlorine, low volatile metals, semi-volatile metals, and highly volatile metals.

<table>
<tr><td></td><td></td><td>Total Cl Emission Rate:
$11.23 \frac{lb\ Cl}{hr} + 222.6 \frac{lb\ Cl}{hr} = 233.8 \frac{lb\ Cl}{hr} + 10\%\ \text{peak} = 257 \frac{lb\ Cl}{hr}$
$48.3 \frac{ton\ Cl}{yr} + 975.0 \frac{ton\ Cl}{yr} = 1023.3 \frac{ton\ Cl}{yr}$</td><td></td><td></td></tr>
<tr><td>6M01-01</td><td></td><td>Total Inorganic Rate:
Total Metals + Total Cl:
2 lb/hr Metals + 257 lb/hr Cl = 259 lb/hr Cl
8.6 tpy Metals + 1023 tpy Cl = 1031.6 tpy Cl</td><td></td><td>"Inorganics" are considered to be chlorine, low volatile metals, semi-volatile metals, and highly volatile metals.</td></tr>
<tr><td>6M03-05</td><td></td><td>CPT Test Results, Chemical Waste Destructor Inorganic Emissions
<table>
<tr><th>Inorganic</th><th>SRE %</th><th>Normal Feed Rate (lb/hr)</th><th>Emission (lb/hr)</th><th>Emission (tpy)</th></tr>
<tr><td>Chlorine</td><td>99.95</td><td>400</td><td>0.20</td><td>0.88</td></tr>
<tr><td>Low Volatile Metals
Arsenic
Beryllium
Chromium</td><td>99.82</td><td>0.03</td><td>$5.4e^{-5}$</td><td>0.0002</td></tr>
<tr><td>Semi Volatile Metals
Cadmium
Lead</td><td>99.81</td><td>1.1</td><td>0.01</td><td>0.057</td></tr>
<tr><td>Highly Volatile Metals
Mercury</td><td>0</td><td>0.001</td><td>0.001</td><td>0.0044</td></tr>
<tr><td colspan="3">Sub Total:</td><td>0.211</td><td>0.941</td></tr>
<tr><td colspan="3">Assume peak feed rates are 5x normal:</td><td>1.06</td><td>4.7</td></tr>
</table></td><td></td><td>For the purpose of the following calculations, "inorganics" are considered to be low volatile metals, semi-volatile metals, and highly volatile metals. The FFCC calculated rate based on the system removal efficiency (SRE) established during a compliance performance test conducted January 12, 2011 (Tables 8-15). FFCC expects to grow and to use more exotic materials; therefore an emission rate of 1.4 lb/hr and 6.1 tpy (direct scale-up) is requested.</td></tr>
</table>

		Anticipated 5yr Increase: 50% 50% Emission Total: 1.58 7.06 Current Permit Limit 6.04 17.5		
7M01-03	TANKS	0.1 tpy Methanol used as a surrogate		
7M01-03-B	TANKS	0.26 tpy Methanol used as a surrogate		
5N03-55	ASPEN	D-10, 5N03-48, is a water scrubber that is located on the vent discharge of an Aluminum Chloride baghouse. D-10 vents to the atmosphere. The emission rate from this scrubber is 0.09 lb/hr or 0.4 tons per year at maximum production rates.		
5N03-48	ASPEN	D-270, 5N03-55, is a water scrubber that receives vapor off of a tank containing an Aluminum Chloride solution. The emission rate from this scrubber is 0.009 lb/hr or 0.04 tons per year at maximum production rates.		

14. TESTING REQUIREMENTS:

The permit requires testing of the following sources.

SN(s)	Pollutant	Test Method	Test Interval	Justification For Test Requirement
5N09-01	SO2 VOC CO NOx	6C 25A 10 7E	Every five years.	To ensure compliance with the lb/hr emission limits.
5N09-01	VOC	25A	Every five years.	To ensure compliance with the lb/hr emission limits.
6M01-01	NOx	7E	Every five years.	To ensure compliance with the lb/hr emission limits.
6M03-05	VOC PM/PM_{10} NOx SO_2	25A 5 7E 6C	Every five years.	To ensure compliance with the lb/hr emission limits.
	For MACT: Dioxins Furans Mercury Lead Cadmium Arsenic Beryllium Chromium CO Hydrocarbons HCl Cl_2 PM		Comprehensive Testing- every 61 months. Confirmatory Testing (only dioxins and furans)-31 months after each Comprehensive Test.	To demonstrate compliance with the MACT standards.

15. MONITORING OR CEMS

The permittee must monitor the following parameters with CEMS or other monitoring equipment (temperature, pressure differential, etc.)

SN	Parameter or Pollutant to be Monitored	Method of Monitoring (CEM, Pressure Gauge, etc)	Frequency*	Report (Y/N)**
5N09-01,02	temperature	not specified	continuous	no
	Numerous monitoring parameters specified by MACT.			
6M01-01	Steam production	Not specified	Continuously	no
	CO	CEMS	Continuously	no
	ESP power input	Gauge	daily	no
	Coal, wood, biosludge, and liquid feed rates	Not specified	daily	no
	Sulfur content of coal	4.2%	Each shipment	no
	MACT EEE requirements in addition to those specified above.			
6M06-01	Natural gas usage	Not specified		
6M06-01	Natural gas usage	Not specified	daily	
6M07-01	NO_2	PEMS	Continuous	y
6M01-01A 5M16-01 5M18-03 5M11-15 5M05-02 5M18-01 5M18-02	pressure drop	Pressure gauge	daily	no
Scrubbers and filters in the OSP, SR, 5N07,AP, and DIPB Sections	Maintain and monitor according to the FOP			
6M03-05	Maintain and monitor scrubber according to the FOP			
	OPLS from CWD 6			
	Numerous monitoring parameters specified by MACT. Please see Specific Conditions CWD 9 through 11			
7K01-01	VOC emissions from wastewater	Toxchem software	annual	No
5N03-54	Temp and flame presence	Not specified	Continuous	N

16. RECORDKEEPING REQUIREMENTS:

The following are items (such as throughput, fuel usage, VOC content, etc.) that must be tracked and recorded.

SN	Recorded Item	Limit (as established in permit)	Frequency*	Report (Y/N)**
5N09-01,02 5M11-08,09	opacity	20%	weekly	no
6M01-01	Power input to the ESP	FOP	Continuously	no
6M01-01	amount and type of coal, biosludge, liquids, and wood waste to boilers	FOP	daily	no
6M01-01A	pressure drop across fabric filter	FOP	daily	no
5M16-01 5M18-03 5M11-15 5M05-02	pressure drop	FOP	daily	no
5M18-01	pressure drop	FOP	daily	no
5M18-02	pressure drop	FOP	daily	no
6M03-05	OPLs	NOC	Continuously	no
	opacity	20%	weekly	no
4PSR-00	Biodiesel production	250 million gal/yr	Monthly	yes
	solvent throughput	40 million lbs/yr	daily	no
4P94-02 PM-50A TFS-53 TFS-54 TFS-55 TFS-56 TFS-60 TFS-71 TFS-73 TFS-74 TFS-75 TFS-76 TFS-78 TFS-80 PE-01 PR-56A	Biodiesel production	250,000,000 gal/yr	monthly	No

SN	Recorded Item	Limit (as established in permit)	Frequency*	Report (Y/N)**
PR-56B				
Aldehyde Section	vinyl compounds produced	58.5 million lbs/yr	Monthly	N
CP2 Section	Anode product	10.8 million pouds/yr	Monthly	N
5M11-08, 09	pressure drop	FOP	daily	No
5N01-WA 7M04-HT-G01 7M04-HT-G04 6N02 8M01	Hours of operation	100 hours non-emergency use	As needed	No
	Opacity	20%		

17. OPACITY:

SN	Opacity	Justification for limit	Compliance Mechanism
5N09-01,02	20%	Normal operation of the source	Method 9
6M01	5%	Normal operation of the source	Method 9
6M01-01	20%	Pre-1970s source	Method 9
6M01-01A	5%	Fabric filter, normal operation	Method 9
6M06-01	5%	Natural gas usage	Method 9
6M07-01	20%	NSPS limit	Method 9
5M05-02	5%	Normal operation	Method 22/Method 9
5M11-15	5%	Normal operation	Method 22/Method 9
5M16-01	5%	Normal operation	Method 22/Method 9
5M18-01	5%	Normal operation	Method 22/Method 9
5M18-02	5%	Normal operation	Method 22/Method 9
5M18-03	5%	Normal operation	Method 22/Method 9
5M11-08	5%	Normal operation	Method 22/Method 9

SN	Opacity	Justification for limit	Compliance Mechanism
5M11-09	5%	Normal operation	Method 22/Method 9
6M03-05	20%	Normal operation	Method 22/Method 9
5N03-54	0%	Normal operation	Method 22
4P05-01	5%	Normal operation	Method 22/Method 9
Emergency Generators	20%	Normal operation	Method 9

18. DELETED CONDITIONS:

Former SC	Justification for removal
All WP conditions and emissions have been removed. Source is no longer operating.	

19. GROUP A INSIGNIFICANT ACTIVITIES

Source Name		Group A Category	Emissions (tpy)						
			PM/PM_{10}	SO_2	VOC	CO	NO_x	HAPs	
								Single	Total
Storage Tank (Storage Tank Process)	TF-7	A-13			0			0	0
Storage Tank (Storage Tank Process)	WH-03	A-13			0.0005			0	0
Storage Tank (Storage Tank Process)	TF-6	A-13			0.0004			0.0004	0.0004
Storage Tank (Storage Tank Process)	WH-06	A-13			0.005			0	0
Quenching (Solvent Recovery Process)	4P02-02	A-13			0			0	0
Storage Tank (Solvent Recovery Process)	4P94-04	A-13			0			0	0
Extractor (Solvent Recovery Process)	5N01-58	A-13			0.073			0.073	0.073
Vacuum System (Organic Sulfonation Process)	5M01-03	A-13			0			0	0
Vacuum System (Organic Sulfonation Process)	5M03-06	A-13			0.0031			0	0
Storage Tank (Organic Sulfonation Process)	5M04-03	A-13			0.000075			0	0
Storage Tank (Organic Sulfonation Process)	5M04-09	A-13			0			0	0
Vacuum System (Organic Sulfonation Process)	5M11-03	A-13			0			0	0
Vents (Organic Sulfonation Process)	5M11-08	A-13			0			0	0

Source Name		Group A Category	Emissions (tpy)						
			PM/PM_{10}	SO_2	VOC	CO	NO_x	HAPs	
								Single	Total
Vents (Organic Sulfonation Process)	5M11-09	A-13			0			0	0
Unloading Station (Isopropyl Benzene Process)	5N03-46	A-13			0.23			0.23	0.23
Unloading Station (Isopropyl Benzene Process)	5N03-47	A-13			0			0	0
Railcar Loading and Unloading Racks	4Q01-12	A-13			0.0112			0	0
Sawdust pile and handling		A-13	2.0						
Biodiesel Tank	4Q01-10	A-13			0.005				
Biodiesel Tank	6Q01-02	A-13			0.003				
5P01-01	Storage Tank (Glycerin)	A-13			0.001				
5P01-02	Storage Tank (Glycerin)	A-13			0.001				
4Q01-12	Storage Tank (Glycerin)	A-13			0.001				
4Q01-13	Storage Tank (Glycerin)	A-13			0.001				
A-13 Totals			2.0		0.35			0.31	0.31
Storage Tank (Organic Sulfonation Process)	5M04-04	A-4							
Storage Tank (Organic Sulfonation Process)	5M04-07	A-4							
Storage Tank (Solvent Recovery Process)	4P94-03	A-4							
Storage Tank (Storage Tank Process)	5N03-39	A-4							
Storage Tank (Storage Tank Process)	5N03-40	A-4							
Storage Tank (Chemical Destruction Process)	6M03-15	A-4							
Caustic Tank (CL-01R)	-	A-4							
Storage Tank (Organic Chemical Intermediate Process)	5N01-63	A-3			0.001			0.001	0.001
Storage Tank (Organic Chemical Intermediate Process)	5N01-64	A-3			0.001			0.001	0.001
Storage Tank (Organic Chemical Intermediate Process)	5N03-63	A-3			0.001			0.001	0.001
Storage Tank (Storage Tank Process)	6N01-01	A-3			0.001				

Source Name		Group A Category	Emissions (tpy)						
			PM/PM_{10}	SO_2	VOC	CO	NO_x	HAPs	
								Single	Total
A-3 Totals					0.004			0.003	0.003

20. VOIDED, SUPERSEDED, OR SUBSUMED PERMITS:

List all active permits voided/superseded/subsumed by the issuance of this permit.

Permit #
1085-AOP-R8

21. CONCURRENCE BY:

The following supervisor concurs with the permitting decision.

Thomas Rheaume, P.E.

APPENDIX A – EMISSION CHANGES AND FEE CALCULATION

Fee Calculation for Major Source

FutureFuel Chemical Company
32-00036
1085-AOP-R9

$/ton factor	22.97		Annual Chargeable Emission (tpy)	6535.1
Permit Type	Modification		Permit Fee $	1000

Minor Modification Fee $	500
Minimum Modification Fee $	1000
Renewal with Minor Modification $	500
If Hold Active Permit, Amt of Last Annual Air Permit Invoice $	0
Total Permit Fee Chargeable Emissions (tpy)	-181.1

Pollutant (tpy)	Check if Chargeable Emission	Old Permit	New Permit	Change in Emissions	Permit Fee Chargeable Emissions	Annual Chargeable Emissions
PM	☑	342.1	177.1	-165	[illegible]	[illegible]
PM_{10}	☐	342.1	177.1	-165	[illegible]	[illegible]
SO_2	☑	6314.6	6,123.40	-191.2	0	[illegible]
VOC	☑	639.4	446.5	-192.9	-192.9	446.5
CO	☐	1864.6	1,126.00	-738.6	[illegible]	[illegible]
NO_X	☑	794.7	820.8	26.1	26.1	820.8
Inorganic HAP	☑	940	1087.2	147.2	147.2	1087.2
Organic HAP	☐	639.4	446.2	-193.2	[illegible]	[illegible]
Pb	☑	0	3.5	3.5	3.5	3.5