CHATTANOOGA-HAMILTON COUNTY AIR POLLUTION CONTROL BUREAU

Statement of Basis
Part 70 Permit No. 47-065-1170

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Emission Unit No.	Previous Certificate of Operation No.	Description
014	1170-30188801-14C*	Plant Fugitive Emissions
017	1170-30102611-17C* 1170-30102611-38C*	Ten Flash Tanks, Latex Stripping Column, and Surge Tank
030	1170-40704003-30C	Acrylic Acid and Methacrylic Acid Storage Tanks
032	1170-30182001-32C*	Wastewater Treatment Process
033	1170-40703613-33C	Styrene Storage Tank
037	1170-40723298-37C	Two tert-Dodecyl Mercaptan Storage Tanks
039	1170-30102614-39C	Additives Makeup System
040	1170-10200602-40C	Hurst Boilers #1 and #2
041	1170-40704403-41C	Butyl Acrylate Storage Tank
042	n/a	Cummins Emergency Generator Engine

*Federally Enforceable Certificate

Purpose

BASF Corporation has applied for Part 70 (Title V) Permit No. 47-065-1170 for Plant #2. This company name is registered as an active entity with the Tennessee Secretary of State. This statement of basis includes discussions of the operation of the permitted equipment, the air pollutant emissions, and the applicable regulations. It has been adapted from the Bureau annual inspection report for BASF Plant #2 dated March 6, 2025.

Sources of 1,3-butadiene and styrene emissions at Plant #2 are subject to “National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources” [40 CFR Part 63, Subpart VVVVVV (§63.11494–63.11503)], as adopted at Rule 16.5(c). Although the plant does not have the potential to emit any air pollutant at or above applicable major source thresholds, a Part 70 permit is required in accordance with §63.11494(e) of this subpart because a control device (a thermal oxidizer) is necessary to maintain emissions of hazardous air pollutants (1,3-butadiene and styrene) below their major source thresholds of 10 tons/yr each and 25 tons/yr combined.

Process Description

BASF manufactures styrene-butadiene copolymer latex at Plant #2 by the batch polymerization of styrene (vinylbenzene, $C_6H_5CH=CH_2$) and 1,3-butadiene ($H_2C=CHHC=CH_2$) monomers. This copolymer is composed of approximately 60% styrene and 40% 1,3-butadiene, and it is primarily used to make carpet backing. Another use for it is as a specialty paper coating. Because of its high styrene content, this product is not considered to be styrene-butadiene rubber (SBR), as is the copolymer that is produced by a continuous process at BASF Plant #1 on Lost Mound Drive. In addition, a styrene-butyl acrylate copolymer is made at Plant #2 by the batch polymerization of styrene and butyl acrylate [n-butyl acrylate, $H_2C=CHCOO(CH_2)_3CH_3$] monomers.

Styrene is received at the plant by tank truck. It is stored in a tank **(Emission Unit 033)** that has a capacity of 118,000 gallons. Volatile organic compound (VOC) emissions of styrene in the form of working losses from this tank are controlled by a shell-and-tube condenser that has an exit temperature of approximately 47 °F. The condensed styrene drains back into the tank. Emissions in the form of standing storage losses from this insulated tank are negligible because the styrene in the tank is cooled to a temperature of no more than 68 °F. This is done by continuously circulating a styrene stream from the tank through a shell-and-tube cooler and then back to the tank. The condenser and cooler are served by a single refrigeration unit.

1,3-Butadiene is received at the plant by railcar. It is a gas at ambient conditions, but it is stored as a liquid under pressure in two 18,000-gallon capacity tanks. During the filling of either of the 1,3-butadiene storage tanks, the tank that is being filled is connected to the railcar by a vapor balance system in order to eliminate emissions in the form of working losses. In addition, no emissions due to standing storage losses result from these two tanks because they are pressurized and are not vented to the atmosphere. Therefore, these tanks are not required to be permitted.

Butyl acrylate is also received at the plant by railcar. It is stored in a tank **(Emission Unit 041)** that has a capacity of 96,433 gallons. VOC emissions of butyl acrylate from this insulated tank occur as both working losses and standing storage losses. The working losses are minimized by the use of a vapor balance system during loading. The standing storage losses are minimized because this insulated tank is equipped with both a chilled-water cooling system and a conservation vent. The butyl acrylate contains an inhibitor to suppress polymerization while in storage. The cooling system is used to promote the effectiveness of the inhibitor by assuring that the temperature of the stored butyl acrylate does not exceed 70 °F. This system functions by circulating a stream of butyl acrylate from the tank through a shell-and-tube cooler and then back to the tank, as needed, with the cooling water being chilled automatically at times of warmer ambient temperatures.

The polymerizations of either styrene-butadiene latex or styrene-butyl acrylate copolymer can begin in any of twelve batch reactors, which are designated as Reactors #1-12. These reactions occur in an aqueous emulsion. Reactor #1 is also used on occasion to make polystyrene. Each of the reactors is equipped with a rupture disk that is designed to break in the event of an unsafe pressure buildup. In such a case, the rupture disk would discharge to a containment tank that is vented to the atmosphere. Reactors #2, #3, and #4 are currently out of service, but any of them could be reactivated in the future.

Additives to the aqueous emulsion in any of the reactors include catalysts for initiating the reaction, various supplemental monomers, tert-dodecyl mercaptan [tert-dodecanethiol, 4-P mercaptan, $(CH_3)_2CSH(CH_2)_8CH_3$] for restricting the chain length of the copolymer and for preventing chain cross-linking, soaps for use as emulsifying agents, stripping agents, and an aqueous solution of ammonium hydroxide (NH_4OH). The supplemental monomers that may be used include acrylic acid ($H_2C{=}CHCOOH$), methacrylic acid [$H_2C{=}C(CH_3)COOH$], itaconic acid [methylene succinic acid, $H_2C{=}C(COOH)CH_2COOH$], and N-methylolacrylamide [NMA, $H_2C{=}CH(C{=}O)NHCH_2OH$].

Fugitive VOC emissions of 1,3-butadiene and styrene occur from the flanges, valves, pumps, etc. of the various process vessels and tanks **(Emission Unit 014)** at the plant. All of these components in 1,3-butadiene, styrene, or acrylic acid service are monitored periodically to detect leaks and are repaired, if necessary, in accordance with a leak detection and repair (LDAR) program.

Acrylic acid is stored in a tank **(Emission Unit 030)** that has a capacity of 12,000 gallons. Uncontrolled VOC emissions of acrylic acid occur from this insulated tank as standing storage losses and are minimized because the tank is equipped with a conservation vent. A vapor balance system that is used during the loading of this tank from tank trucks prevents any emissions due to working losses from occurring from it.

Methacrylic acid is stored in drums, and the amount that is needed for each day's production is transferred to a small tank that has a capacity of 270 gallons. VOC emissions of methacrylic acid result from this day tank in the form of working losses and are controlled by a carbon adsorption drum. Because this tank is located indoors, it is not subject to daily temperature changes that would result in standing storage loss emissions.

An aqueous solution of NMA is stored in a portable tank that is known as a "tote," and the amount needed for daily production is transferred to a 750-gallon capacity tank. Uncontrolled VOC emissions of NMA, acrylamide [$H_2C{=}CH(C{=}O)NH_2$], and formaldehyde (methanal, H_2CO) result from this day tank in the form of working losses. There are considered to be no emissions due to standing storage losses from this tank because it is located indoors. The actual VOC emissions from this tank are estimated to be less than 5 lb/yr. Because these VOC emissions are minimal, the day tank is not required to be permitted.

tert-Dodecyl mercaptan is received at the plant by tank truck, and it is initially stored in a tank **(Emission Unit 037)** that has a capacity of 10,000 gallons. VOC emissions of tert-dodecyl mercaptan occur from this tank as both working losses and standing storage losses and are currently controlled by three carbon adsorption drums in series. The emissions due to standing storage losses are minimized because the tank is equipped with a conservation vent. Another carbon adsorption drum is used to control trace VOC emissions of tert-dodecyl mercaptan that result from relieving pressure from the tank truck after it has been unloaded.

The amount of tert-dodecyl mercaptan that is required for each day’s production is transferred from the initial storage tank to a small tank that has a capacity of 270 gallons. VOC emissions of tert-dodecyl mercaptan occur from this day tank as working losses and are controlled by a carbon adsorption drum. This tank is located indoors and is therefore not subject to daily temperature changes that would result in standing storage loss emissions.

Five indoor open-top tanks and a weigh scale of the additives makeup system **(Emission Unit 039)** are primarily used for making up aqueous solutions of acrylic acid, itaconic acid, catalysts, stripping agents, and soaps. After a solution has been made, it is pumped to any of nine indoor storage tanks that supply the reactors. In addition, an aqueous solution of a separate stripping agent is made up in a loading hopper, and this solution is pumped from the hopper to a separate indoor storage tank. Uncontrolled particulate matter (PM) emissions occur from the loading of the five makeup tanks, weigh scale, and loading hopper with powdered or granulated ingredients from bags. Uncontrolled VOC emissions of acrylic acid due to working losses result from the appropriate makeup tank and storage tanks when solutions containing acrylic acid are made. These tanks are not subject to daily temperature changes that would result in emissions due to standing storage losses because they are all located indoors. Two makeup tanks for solutions of itaconic acid and a catalyst are vented to a single exhaust stack. The remaining three makeup tanks, weigh scale, nine solution storage tanks, loading hopper, and stripping agent storage tank are all vented to a second exhaust stack. Emissions of VOC other than acrylic acid from any of the makeup tanks or storage tanks are uncontrolled and negligible.

From the twelve reactors, the resulting aqueous emulsion of either styrene-butadiene latex or styrene-butyl acrylate copolymer is placed into any of ten flash tanks **(Emission Unit 017)**, which are designated as Flash Tanks #31-40. VOC emissions of 1,3-butadiene, styrene, ethylbenzene ($C_6H_5CH_2CH_3$), and 4-vinylcyclohexene ($H_2CHC{=}CHCH_2CH_2CHCH{=}CH_2$) result from these indoor flash tanks. Ethylbenzene and 4-vinylcyclohexene are impurities in the styrene and 1,3-butadiene monomers, respectively. Essentially all of the unreacted 1,3-butadiene monomer is emitted from the flash tanks.

The VOC emissions from the flash tanks are vented to two non-contact condensers in parallel followed by a third non-contact condenser that all utilize cold water to partially condense styrene, ethylbenzene, and 4-vinylcyclohexene. These compounds have boiling points of 145 °C, 136 °C, and 128 °C, respectively. 1,3-Butadiene is not condensed as it has a much lower boiling point of -4 °C. The VOC emissions that are not condensed are then controlled by a thermal oxidizer that is fueled exclusively by natural gas. Emissions that result from the combustion of natural gas and VOC vapor in the thermal oxidizer are uncontrolled.

The aqueous latex emulsion is sent to a surge tank (Tank 2405) followed by a latex stripping column **(Emission Unit 017)**. Uncontrolled VOC emissions of styrene, ethylbenzene, 4-vinylcyclohexene, and 4-phenylcyclohexene ($H_2CHC{=}CHCH_2CH_2CHC_6H_5$) result from the surge tank in the form of working losses. 4-Phenylcyclohexene is a byproduct of the polymerization of styrene and 1,3-butadiene. No emissions due to standing storage losses are considered to occur from this insulated tank because it is located indoors.

VOC emissions of styrene, ethylbenzene, 4-vinylcyclohexene, and 4-phenylcyclohexene from the stripping column are initially controlled by the three condensers that are also used to control emissions from the flash tanks. The majority of each of the four compounds that are emitted from the stripping column is condensed by the condensers. 4-Phenylcyclohexene has a boiling temperature of about 250 °C. The remaining uncondensed vapors are then controlled by the thermal oxidizer. The latex product from the stripping column is stored in tanks that have no quantifiable emissions.

Water is removed from the condensed organics that result from the condensers in an initial decanter. The resulting aqueous layer from this decanter is normally purified further, although it is sometimes sent to a second decanter. If the purification process is used, an organic phase that results from it is sent to the second decanter, and the resulting water from this decanter is returned to the purification process. The organic layers that result from both decanters are currently shipped out as a waste in tank trucks, but they may be transferred off-site for recycling in the future. Negligible emissions result from the two decanters in the form of working losses because the liquid in each of them is maintained at a constant level, with the exception of a small run-off section, and no emissions are considered to result from them as standing storage losses because they are each equipped with a conservation vent. In addition, minimal uncontrolled VOC emissions of styrene due to loading losses occur from filling tank trucks with styrene from the decanters.

Wastewater that is generated by the plant is sent to a batch wastewater treatment process **(Emission Unit 032)**. This wastewater includes water that is further purified or that results from the second decanter if the purification process is not used. The wastewater is initially collected in a covered sump. It is then sent to either of two open-top “white water” tanks, followed by three chemical-treatment tanks in series and a dissolved air flotation (DAF) unit. Liquid from the open-top DAF unit is sent to either of two open-top “clear water” tanks, and sludge from this unit is sent to a sludge holding tank followed by a “plate-and-frame” filter press. Liquid from the filter press is returned to either of the two white water tanks. In addition, rainwater runoff and non-contact wastewater are sent directly to either of the two clear water tanks. An air-stripping column is used to remove VOC from the wastewater contained in the clear water tanks. This wastewater is then discharged to the local municipal sewage treatment plant. Uncontrolled VOC emissions of styrene result from the collection sump, eight tanks, DAF unit, and filter press. The three chemical-treatment tanks, sludge holding tank, and DAF unit are located indoors and are vented to a single exhaust stack. VOC emissions from the air-stripping column consist mostly of styrene and are uncontrolled.

Process steam for the plant is provided by Hurst Boilers #1 and #2 **(Emission Unit 040)**. These two identical boilers are fueled exclusively by natural gas, and emissions that result from fuel combustion in them are uncontrolled. Both of these boilers are equipped with "low-NO_X" burners.

An emergency generator is available to provide electric power in the event of a loss of power to the plant. This generator is powered by a Cummins internal-combustion engine **(Emission Unit 042)** that is fueled exclusively by ultra-low sulfur diesel fuel (No. 2 fuel oil). It is operated periodically for test purposes, and uncontrolled emissions result from fuel combustion in it.

Evaluation

BASF Plant #2 is located about 3.0 miles from the closest point that is in the former PM non-attainment area, and PM emissions from this plant do not result in a significant impact on the air quality in this former non-attainment area. SCREEN modeling (assuming flat terrain and no building downwash) of previous Rule 8.1 (Schedule 1) allowable PM emissions of 25.04 lb/hr from two former Continental boilers combined at BASF Plant #2 resulted in a maximum ambient concentration of 176.3 $\mu g/m^3$ (24 hr avg.), including a background PM concentration of 41 $\mu g/m^3$ (24 hr avg.). According to Rule 21, Table 1, of the Ordinance, PM emissions from a plant result in the creation of a secondary PM non-attainment area if an ambient concentration that results from these emissions exceeds 150 $\mu g/m^3$ (24 hr avg.). Therefore, PM emission sources at this plant that were constructed or modified between September 16, 1980, and August 28, 1995, are subject to best available control technology [BACT, §4-8(e)(2)]. PM emission sources at this plant that were constructed after August 29, 1995, are subject to Rule 27. VOC emission sources and process gaseous emission sources at this plant that were constructed or modified after December 26, 1979, are subject to BACT (Rule 25.3) and Rule 23, respectively.

Emission Unit 014 Plant Fugitive Emissions

Plant-wide fugitive VOC emissions of 1,3-butadiene are estimated to be 0.0915 ton/yr for actual emissions and 0.320 ton/yr for potential emissions. Plant-wide fugitive VOC emissions of styrene are estimated to be 0.0095 ton/yr for actual emissions and 0.550 ton/yr for potential emissions. All of these fugitive emissions occur continuously (8,760 hr/yr). They were calculated by BASF for the Toxics Release Inventory (TRI) for calendar year 2023 for the actual emissions and calendar year 2006 for the potential emissions. All of the fugitive 1,3-butadiene emissions and approximately 1/6 of the fugitive styrene emissions (0.0016 ton/yr for actual emissions and 0.092 ton/yr for potential emissions) are considered to result from various flanges, valves, pumps, etc. at the plant. The remainder of the fugitive styrene emissions occur from the wastewater treatment process (Emission Unit 032).

1,3-Butadiene and styrene are hazardous air pollutants (HAP). Sources of fugitive VOC emissions of 1,3-butadiene and styrene at the plant are subject to "National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources" [40 CFR Part 63, Subpart VVVVVV (§63.11494–63.11503)], as adopted at Rule 16.5(c). LDAR requirements for these emission sources are given in §63.11495(a)(3), (4), and (5) of this subpart. No quantitative limitations are applicable for the fugitive VOC emissions of 1,3-butadiene and styrene from the plant.

Emission Unit 017 Ten Flash Tanks, Latex Stripping Column, and Surge Tank

The ten flash tanks, latex stripping column, and surge tank are operated for approximately 24 hr/day, 7 days/wk, and 50 wk/yr. However, emissions only result from the surge tank for about 12 hr/day. The stripping column operates continuously. According to an emissions test that was conducted on December 8, 1992, the thermal oxidizer has VOC control efficiencies of 99.9597% for 1,3-butadiene, 99.9973% for styrene, 98.0024% for ethylbenzene, 99.6661% for 4-vinylcyclohexene, and 99.9543% for total VOC at its operating temperature of 800 °F. The VOC control efficiency for 4-phenylcyclohexene was not determined by this test, and it is assumed to be equivalent to that for ethylbenzene. The efficiencies of the three condensers in controlling VOC emissions of styrene, ethylbenzene, 4-vinylcyclohexene, and 4-phenylcyclohexene have not been estimated.

The estimated VOC emissions from the flash tanks, latex stripping column, and surge tank are given in Table I, which follows. The emissions from the flash tanks were determined by the emissions test of December 8, 1992. The emissions from the stripping column are based on all of the VOC in the latex being emitted and on control only by the thermal oxidizer, with no additional control being provided by the condensers. The emissions from the surge tank were calculated by using experimentally determined vapor-liquid equilibrium constants. The concentrations of styrene, ethylbenzene, 4-vinylcyclohexene, and 4-phenylcyclohexene in the latex that enters the surge tank are estimated to be 100 ppm, 30 ppm, 5 ppm, and 5 ppm, respectively. The maximum emissions of 1,3-butadiene were found to occur whenever the contents of one of the batch reactors are dumped into one of the flash tanks. By contrast, no significant variations were found in the magnitude of the emissions of styrene, ethylbenzene, and 4-vinylcyclohexene at different times during the operation of the flash tanks. The potential emissions of the various pollutants are based on continuous operation, and the potential emissions of 1,3-butadiene are based on continuous operation at the maximum hourly emission rate.

Table I. VOC Emissions from the Ten Flash Tanks, Latex Stripping Column, and Surge Tank

Pollutant and Source	Actual Emissions	Potential Emissions		Allowable Emissions
	tons/yr	*lb/hr*	*tons/yr*	*lb/hr*
1,3-Butadiene from Ten Flash Tanks				
Total 1,3-Butadiene	***0.040***	***0.020***	***0.087***	***0.50***
Styrene				
Ten Flash Tanks	0.00035	0.000083	0.00036	0.10
Stripping Column	0.00013	0.000030	0.00013	
Surge Tank	0.023	0.011	0.024	n/a
Total Styrene	***0.023***	***0.011***	***0.024***	***n/a***
Ethylbenzene				
Ten Flash Tanks	0.0031	0.00074	0.0032	n/a
Stripping Column	0.028	0.0067	0.029	n/a
Surge Tank	0.0094	0.0045	0.0098	n/a
Total Ethylbenzene	***0.041***	***0.012***	***0.042***	***n/a***
4-Vinylcyclohexene				
Ten Flash Tanks	0.028	0.0067	0.029	n/a
Stripping Column	0.00078	0.00019	0.00081	n/a
Surge Tank	0.0022	0.0011	0.0023	n/a
Total 4-Vinylcyclohexene	***0.031***	***0.0079***	***0.032***	***n/a***
4-Phenylcyclohexene				
Stripping Column	0.0047	0.0011	0.0049	n/a
Surge Tank	0.000055	0.000026	0.000057	n/a
Total 4-Phenylcyclohexene	***0.0048***	***0.0011***	***0.0050***	***n/a***
Total VOC	**0.139**	**0.052**	**0.191**	**0.83**

1,3-Butadiene, styrene, and ethylbenzene are HAP. The ten flash tanks and latex stripping column are subject to “National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources” [40 CFR Part 63, Subpart VVVVVV (§63.11494–63.11503)], as adopted at Rule 16.5(c). Although §63.11496(a) of this subpart requires that VOC emissions of 1,3-butadiene, styrene, and ethylbenzene from the flash tanks be controlled to at least 85%, §63.11496(b) of this subpart requires that VOC emissions of 1,3-butadiene, styrene, and ethylbenzene from the stripping column be controlled to at least 95%.

The ten flash tanks were installed in 1964, and the latex stripping column and surge tank were installed in 1994. Control of the VOC emissions from the stripping column by three condensers (two of which are used in parallel) followed by a thermal oxidizer has been determined to be BACT (Rule 25.3). An appropriate BACT limitation for the total VOC emissions from the surge tank has been previously determined to be 0.03 lb/hr, and no controls are necessary in order to achieve this limitation. No quantitative limitation is applicable for the VOC emissions from the ten flash tanks. Appropriate VOC emission limitations for the ten flash tanks and latex stripping column combined, as requested by BASF, have been previously determined to be 0.50 lb/hr for 1,3-butadiene, 0.10 lb/hr for styrene, and 0.80 lb/hr for total VOC. BASF requested these limitations in order to maintain plant-wide potential emissions of 1,3-butadiene and styrene below their major source thresholds of 10 tons/yr each and 25 tons/yr combined. These are appropriate BACT limitations for the VOC emissions from the stripping column.

Approximately 5,200 ft^3/hr of natural gas were previously burned in thermal oxidizer, while natural gas is now burned in it at a much lower rate of about 100 ft^3/hr, beginning in December 2024. This is because most of the natural gas that was burned had been used to enrich the inlet VOC vapor stream in order for it to remain above the upper explosive limit. Steam is now added to the inlet VOC vapor stream, instead of natural gas, to achieve this purpose. Natural gas has average and maximum sulfur contents of 0.002 gr/ft^3 and 0.005 gr/ft^3, respectively. In addition, the emissions test of December 8, 1992, showed that VOC vapor is combusted in the thermal oxidizer at an average rate of 205.6 ft^3/hr and at a maximum rate of 393.5 ft^3/hr.

The estimated emissions of PM, nitrogen oxides (NO_X), and carbon monoxide (CO) that result from burning both natural gas and VOC vapor in the thermal oxidizer and the estimated emissions of sulfur dioxide (SO_2) and greenhouse gases [GHG, actual and carbon dioxide equivalents (CO_2e)] that result from the combustion of natural gas in the thermal oxidizer are given in Table VIII at the end of this section. The anticipated actual emissions are based on operation for 24 hr/day, 7 days/wk, and 50 wk/yr. Emissions from natural gas combustion, with the exception of emissions of GHG, were calculated by using AP-42 (1998) emission factors. The GHG emissions were calculated by using the Tier 1 calculation methodology that is found in §98.33 of 40 CFR Part 98, Subpart C. Emissions of PM and CO that result from the combustion of VOC vapor are assumed to be the same as what would result from burning an equal volume of natural gas. NO_X emissions that result from VOC vapor combustion are assumed to be 1.5 times what would result from the combustion of an equal volume of natural gas. This assumption is made because AP-42 (1998) NO_X emission factors for the combustion of propane and butane, on a heat input basis, are equivalent to 1.5 times the NO_X emission factor for natural gas combustion. The potential emissions are based on continuous operation of the thermal oxidizer at the maximum combustion rate for VOC vapor. All of the PM emissions that result from burning natural gas and VOC vapor are both $PM_{2.5}$ and PM_{10}. GHG emissions that result from natural gas combustion consist mostly of carbon dioxide (CO_2) and include lesser amounts of methane (CH_4) and nitrous oxide (N_2O).

The thermal oxidizer was installed in 1990. It is used to control process emissions and is therefore not classified as fuel-burning equipment. An appropriate BACT [§4-8(e)(2)] limitation for the PM emissions from the thermal oxidizer has been previously determined to be 0.20 lb/hr, and no controls are necessary in order to achieve this limitation. This limitation is more stringent than both the Rule 10.3 (Schedule 2) PM emission limit of 22.3 lb/hr for the thermal oxidizer, based on the process weight for the flash tanks of 38,000 lb/hr, and the Rule 10.7 PM emission limit of 0.25 gr/scf (32.71 lb/hr).

Combustion of natural gas and VOC vapor at the maximum rate in the thermal oxidizer results in potential NO_X emissions of 0.072 lb/hr. This NO_X emission rate is the effective NO_X emission limitation for the thermal oxidizer. This limitation is more stringent than the Rule 2.4 NO_X emission limit of 300 ppm (32.70 lb/hr).

Combustion of natural gas with the maximum sulfur content in the thermal oxidizer results in potential SO_2 emissions of 0.00014 lb/hr. This SO_2 emission rate is the effective SO_2 emission limitation for the thermal oxidizer. This limitation is more stringent than the Rule 13.1 SO_2 emission limit of 500 ppm (75.88 lb/hr).

It has been determined that no controls are necessary in order to satisfy reasonable and proper control technology, in accordance with Rule 23, for the emissions of CO and GHG from the thermal oxidizer, and no quantitative reasonable and proper limitations are necessary for these emissions.

Emission Unit 030 Acrylic Acid and Methacrylic Acid Storage Tanks

VOC emissions due to standing storage losses from the acrylic acid storage tank occur continuously (8,760 hr/yr). VOC emissions from the methacrylic acid day tank due to working losses occur whenever this tank is loaded. It is loaded at a rate of one 55-gallon drum per 5 minutes. No more than 270 gallons (the tank capacity) can be loaded into this tank in one hour. 1,104 drums of methacrylic acid were used during calendar year 1992. The carbon adsorption drum for the methacrylic acid tank is estimated to be 90% efficient in controlling VOC emissions.

The estimated VOC emissions of acrylic acid and methacrylic acid from these two tanks are given in Table II, which follows. The emissions from the acrylic acid tank were calculated by using an AP-42 (1985) equation for breathing losses, and an AP-42 (1997) working-loss equation was used to calculate the controlled emissions from the methacrylic acid tank. The potential emissions from the acrylic acid tank are based on continuous operation and are equivalent to the actual emissions. The potential emissions from the methacrylic acid tank are based on filling the tank to capacity once every day.

Table II. VOC Emissions from the Acrylic Acid and Methacrylic Acid Storage Tanks

Pollutant	Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	*tons/yr*	Allowable Emissions *lb/hr*
Acrylic Acid	0.0078	0.0018	0.0078	0.005
Methacrylic Acid	0.000023	0.00069	0.000031	0.005
Total VOC	**0.0079**	**0.0025**	**0.0079**	**0.010**

The acrylic acid storage tank was replaced with a larger one in December 2012, and methacrylic acid day tank was modified in 1993. Acrylic acid is a HAP. Reduction of the VOC emissions of acrylic acid from the acrylic acid storage tank by using a vapor balance system has been determined to be BACT (Rule 25.3). Appropriate BACT (Rule 25.3) limitations have been previously determined to be 0.005 lb/hr for the VOC emissions of acrylic acid from the acrylic acid storage tank and 0.005 lb/hr for the VOC emissions of methacrylic acid from the methacrylic acid day tank. No controls are necessary in order to achieve the methacrylic acid limitation.

Emission Unit 032 Wastewater Treatment Process

Wastewater is treated in the air-stripping column of the wastewater treatment process at a maximum rate of 90 gal/min (5,400 gal/hr). According to analyses of wastewater samples that were collected from November 1990 through June 1991, the column has an estimated VOC removal efficiency of 85.65%. Wastewater entering the column has concentrations of VOC, which consist mostly of styrene, of approximately 0.45 mg/l for wastewater that has been further purified and 14.67 mg/l for wastewater that has not gone through the purification process. The purification process is operated for about 95% of the time. 19,449,361 gallons of water were treated in the air-stripping column during calendar year 2023.

The estimated VOC emissions from the air-stripping column are given below in Table III. The potential emissions are based on operation of the column at rates of 5,400 gal/hr and 32,000,000 gal/yr while treating wastewater that has not gone through the purification process.

Table III. VOC Emissions from the Wastewater Air-Stripping Column

Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	*tons/yr*	Allowable Emissions *lb/hr*	*tons/yr*
0.081	0.566	1.678	1.35	4.0

Plant-wide fugitive VOC emissions of styrene are estimated to be 0.0095 ton/yr for actual emissions and 0.550 ton/yr for potential emissions. These emissions occur continuously (8,760 hr/yr) and were calculated by BASF for the TRI for calendar years 2023 and 2006, respectively. Approximately 5/6 of the fugitive styrene emissions (0.0079 ton/yr for actual emissions and 0.458 ton/yr for potential emissions) are considered to result from the wastewater treatment process, and the remainder occur from various flanges, valves, pumps, etc. at the plant (Emission Unit 014).

Styrene is a HAP. The wastewater treatment process is subject to "National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources" [40 CFR Part 63, Subpart VVVVVV (§63.11494–63.11503)], as adopted at Rule 16.5(c). Specific requirements for wastewater streams are given in §63.11498 of this subpart.

The air-stripping column was installed in 1991. An appropriate BACT (Rule 25.3) limitation for the VOC emissions from this column has been previously determined to be 1.35 pounds per 5,400 gallons of water throughput for the column, and no controls are necessary in order to achieve this limitation. In addition, appropriate BACT water throughput limitations for this column have been previously determined to be 5,400 gal/hr and 32,000,000 gal/yr. The potential emissions that are given in Table III are based upon these throughput limitations. Compliance with the BACT emission and throughput limitations results in VOC emission limits of 1.35 lb/hr and 4.0 tons/yr. No quantitative limitations are applicable for the fugitive VOC emissions of styrene that occur from the collection sump, eight tanks, DAF unit, and filter press of the wastewater treatment process.

Emission Unit 033   Styrene Storage Tank

Styrene is stored in the storage tank continuously (8,760 hr/yr), and it is loaded from tank trucks at a maximum rate of 300 gal/min. 70,030,406 pounds (9,275,550 gallons) of styrene were received into the tank during calendar year 2023. Operation of the plant at its annual production capacity is projected to require no more than 19,550,000 gallons of styrene.

The estimated VOC emissions of styrene from the storage tank are given in Table IV, which follows. These emissions were calculated by using an AP-42 (1997) equation for working losses. The potential emissions are based on loading at the maximum rate and on operation of the plant at its production capacity. The hourly potential emissions are based on setting the turnover factor in the working loss equation equal to 1 (representing saturation) and using the styrene vapor pressure for 47 °F. The actual and annual potential emissions are based on using the appropriate turnover factor and the styrene vapor pressure for 68 °F, which results in lower emissions than using a turnover factor of 1 with the vapor pressure for 47 °F. The emission reduction that is provided by the condenser is greater than the effective reduction due to being below saturation that is accounted for by the turnover factor for annual styrene throughputs of less than 10,570,000 gallons.

Table IV. VOC Emissions of Styrene from the Styrene Storage Tank

Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	Potential Emissions *tons/yr*	Allowable Emissions *lb/hr*	Allowable Emissions *tons/yr*
0.616	2.392	0.900	2.50	0.90

The styrene storage tank was installed in 2003. Styrene is a HAP. Control of the VOC emissions of styrene from the tank by a condenser and reduction of them by a styrene cooling system have been determined to be BACT (Rule 25.3). Appropriate BACT limitations for the VOC emissions of styrene from this tank have been previously determined to be 2.50 lb/hr and 0.90 ton/yr.

Emission Unit 037 Two tert-Dodecyl Mercaptan Storage Tanks

VOC emissions due to working losses occur from the tert-dodecyl mercaptan initial storage tank and tert-dodecyl mercaptan day tank whenever they are loaded. The initial storage tank is loaded at a rate of 6,000 gal/hr. No more than 10,000 gallons (the tank capacity) can be loaded into this tank in one day. No more than 270 gallons (the tank capacity) can be loaded into the day tank in one hour. 63,000 gallons of tert-dodecyl mercaptan are typically used in a year. Each of the three required carbon adsorption drums is estimated to be 90% efficient in controlling VOC emissions of tert-dodecyl mercaptan.

The estimated VOC emissions of tert-dodecyl mercaptan from these two tanks are given below in Table V. These emissions were calculated by using an AP-42 (1997) equation for working losses and are based on an estimated vapor pressure for tert-dodecyl mercaptan of 0.1 psia. The potential emissions are based on filling the day tank to capacity once every day. The trace emissions from tank truck pressure-relief venting after unloading are accounted for with the emissions that result from loading the initial storage tank.

Table V. VOC Emissions from the Two tert-Dodecyl Mercaptan Storage Tanks

Source	Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	Potential Emissions *tons/yr*	Allowable Emissions *lb/day*	Allowable Emissions *tons/yr*
Initial Tank	0.0015	0.287	0.0024	0.50	0.003
Day Tank	0.00044	0.013	0.00059	0.50	0.003
Total VOC	**0.0019**	**0.300**	**0.0029**	**1.00**	**0.006**

The two tert-dodecyl mercaptan storage tanks were installed in 1993. Control of the VOC emissions from each of these tanks by a carbon adsorption drum has been determined to be BACT (Rule 25.3). Appropriate BACT limitations for the VOC emissions of tert-dodecyl mercaptan from each of the two tanks have been previously determined to be 0.50 lb/day and 6.0 lb/yr.

Emission Unit 039 Additives Makeup System

The estimated PM emissions and VOC emissions of acrylic acid from the additives makeup system are given below in Table VI. The VOC emissions of acrylic acid were calculated by using an AP-42 (1997) equation for working losses. The potential emissions are based on continuous operation at maximum production rates.

Table VI. Emissions from the Additives Makeup System

Pollutant	Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	Potential Emissions *tons/yr*	Allowable Emissions *lb/hr*
Particulate Matter (PM)	0.721	0.407	0.891	3.21*
Acrylic Acid (VOC)	0.011	0.0037	0.014	n/a

*0.25 gr/scf

The additives makeup system was installed in 1964. The PM emissions from the additives makeup system are limited by Rule 10.7 to 0.25 gr/scf (3.21 lb/hr). This limitation is more stringent than the Rule 10.3 (Schedule 2) PM emission limit of 14.0 lb/hr, based on a process weight of 18,000 lb/hr. Acrylic acid is a HAP. No limitations are applicable for the VOC emissions of acrylic acid from this system.

Emission Unit 040 Hurst Boilers #1 and #2

Each of Hurst Boilers #1 and #2 has a rated capacity of 25.2 MMBtu/hr. 193,978 MMBtu of natural gas were burned in the plant during calendar year 2024, of which 151,172 MMBtu are considered to have been burned in the two boilers. This is based on burning 41,932,800 cubic feet (42,771.5 MMBtu) of natural gas in the thermal oxidizer (Emission Unit 017) for 48 weeks in the first eleven months of 2024 and 33,600 cubic feet (34.3 MMBtu) of natural gas in it for two weeks during December 2024. Natural gas has average and maximum sulfur contents of 0.002 gr/ft^3 and 0.005 gr/ft^3, respectively.

The estimated emissions of PM, NO_X, CO, VOC, SO_2, and GHG (actual and CO_2e) that result from natural gas combustion in Boilers #1 and #2 combined are given in Table VIII. These emissions, with the exception of emissions of GHG, were calculated by using AP-42 (1998) emission factors for low-NO_X burners. The GHG emissions were calculated by using the Tier 1 calculation methodology that is found in §98.33 of 40 CFR Part 98, Subpart C. The potential emissions are based on continuous operation of both boilers at their rated capacities while burning natural gas that has the maximum sulfur content. All of the PM emissions that result from burning natural gas are both $PM_{2.5}$ and PM_{10}. According to AP-42 (1998) emission factors, VOC emissions that result from natural gas combustion consist of 32.7% hexane [$CH_3(CH_2)_4CH_3$] and 1.5% formaldehyde, which are both HAP. GHG emissions that result from natural gas combustion consist mostly of CO_2 and include lesser amounts of methane and nitrous oxide.

Hurst Boilers #1 and #2 were installed in 2004. Potential PM emissions from each of these boilers are estimated to be 0.188 lb/hr and 0.822 ton/yr, based on continuous operation of each boiler at its rated capacity. Therefore, the PM emissions from the two boilers are subject to Rule 27.3. An appropriate reasonable and proper limitation, in accordance with Rule 27.3, for these emissions from each boiler has been previously determined to be 0.25 lb/hr. No controls are necessary in order to achieve this limitation for either boiler. This limitation is more stringent than the Rule 8.2 (Schedule 2) PM emission limit of 9.03 lb/hr for each boiler. This limitation is also more stringent than the Rule 26.6 (RACT) PM emission limit of 0.2437 lb/MMBtu, which, although it is not applicable to the two boilers, is equivalent to 6.14 lb/hr for each boiler while it is operating at its rated capacity.

Combustion of natural gas with the maximum sulfur content in either boiler at its rated capacity results in potential SO_2 emissions of 0.0353 lb/hr. This SO_2 emission rate is the effective SO_2 emission limitation for each boiler. This limitation is more stringent than the Rule 13.2 SO_2 emission limit of 4 lb/MMBtu, which is equivalent to 100.8 lb/hr for either boiler while it is operating at its rated capacity.

It has been determined that no controls are necessary in order to satisfy BACT (Rule 25.3) for the VOC emissions from either Boiler #1 or #2, and no quantitative BACT limitations are necessary for these emissions. No limitations are applicable for the emissions of NO_X, CO, and GHG from either of the two boilers.

Hurst Boilers #1 and #2 are subject to a recordkeeping provision of “Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units” [40 CFR Part 60, Subpart Dc (§60.40c–60.48c)], as adopted at Rule 15.1. The applicable recordkeeping requirement is given in §60.48c(g) of Subpart Dc.

Emission Unit 041 Butyl Acrylate Storage Tank

VOC emissions due to working losses occur from the butyl acrylate storage tank whenever it is being loaded. Butyl acrylate is loaded into the tank from railcars at a maximum rate of 300 gal/min, and the capacity of a railcar is 20,000 gallons. 8,891,700 pounds (1,182,407 gallons) of butyl acrylate were received into the tank during calendar year 2023. Operation of the plant at the annual production capacity for the styrene-butyl acrylate copolymer requires no more than

10,600,000 gallons of butyl acrylate. The vapor balance system is estimated to be 98.7% efficient in reducing VOC emissions.

The estimated VOC emissions of butyl acrylate from the storage tank are given below in Table VII. These emissions were calculated by using the TANKS 4.09d computer program, which utilizes AP-42 (1997) equations. (Separate runs for each month using monthly meteorological data were used to correct a program error.) The effect of the butyl acrylate cooling system was approximated by setting ambient temperatures to no more than 70 °F. The effect of insulation was approximated by selecting white as the tank color. The hourly potential emissions are based on loading at the maximum rate (with the turnover factor equal to 1). The annual potential emissions are based on operation of the plant at its production capacity for styrene-butyl acrylate copolymer.

Table VII. VOC Emissions of Butyl Acrylate from the Butyl Acrylate Storage Tank

Actual Emissions	Potential Emissions		Allowable Emissions	
tons/yr	*lb/hr*	*tons/yr*	*lb/hr*	*tons/yr*
0.019	0.065	0.023	0.08	0.03

The butyl acrylate storage tank was installed in January 2014. Reduction of the VOC emissions of butyl acrylate from this tank by using both a vapor balance system and a butyl acrylate cooling system has been determined to be BACT (Rule 25.3). Appropriate BACT limitations for the VOC emissions of butyl acrylate from this tank have been previously determined to be 0.08 lb/hr and 0.03 ton/yr.

Emission Unit 042 Cummins Emergency Generator Engine

The Cummins emergency generator engine burns diesel fuel at an approximate maximum rate of 8.7 gal/hr (1.19 MMBtu/hr effective rated capacity) and has a maximum power output of 162 horsepower (120.8 kilowatts). It is operated for about 19 hr/yr (15 min/wk × 52 wk/yr + 30 min/mo × 12 mo/yr) for test purposes. The diesel fuel that is burned in the engine has a maximum allowable sulfur content of 15 ppm (0.0015%) by weight.

The estimated emissions of PM, NO_X, CO, VOC, SO_X, and GHG (actual and CO_2e) that result from diesel fuel combustion in the engine are given in Table VIII. These emissions are based on operation of the engine at its rated capacity and maximum power output while burning diesel fuel that has the maximum allowable sulfur content. Emissions of PM (considered to be $PM_{2.5}$, PM_{10}, and total) and CO were calculated by using manufacturer-supplied emissions test results of 0.10 g/(kW·hr) and 1.0 g/(kW·hr), respectively. Emissions of NO_X and VOC combined were calculated by using a manufacturer-supplied emission test result of 3.7 g/(kW·hr), which was multiplied by the appropriate ratio of NO_X and VOC emission factors found in AP-42 (1996) Table 3.3-1 (fuel input column) to arrive at the separate emissions of NO_X and VOC. For the NO_X

emissions, the appropriate ratio is 4.41/(4.41 + 0.36), and it is 0.36/(4.41 + 0.36) for the VOC emissions. SO_X emissions were calculated by using an emission factor from AP-42 (1998) Table 1.3-1. GHG emissions were calculated by using the Tier 1 calculation methodology that is found in §98.33 of 40 CFR Part 98, Subpart C. The potential emissions are based on operation of the engine for 100 hr/yr. GHG emissions that result from diesel fuel combustion consist mostly of CO_2 and include lesser amounts of methane and nitrous oxide.

The Cummins emergency generator engine was installed in 2013 and is subject to "National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines" [40 CFR Part 63, Subpart ZZZZ (§63.6580–63.6675)], as adopted at Rule 16.5(c). §63.6590(c)(1) of this subpart stipulates that the requirements of the subpart are met for the engine by meeting the requirements of "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" [40 CFR Part 60, Subpart IIII (§60.4201–60.4219)], as adopted at Rule 15.1. §60.4202(a)(2) and §60.4205(b) of Subpart IIII stipulate that the engine must meet Tier 3 standards for PM, CO, and combined NO_X and VOC emissions that are given in Appendix I and opacity standards that are given in §1039.105 of "Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines" [40 CFR Part 1039 (§1039.1–1039.825)]. Recordkeeping requirements are given in §60.4214(b) of Subpart IIII.

§60.4211(f) of 40 CFR Part 60, Subpart IIII, stipulates that the emergency generator engine may be operated without time constraints during emergency situations and for up to 100 hr/yr for testing and other specific purposes. The potential emissions from the engine that are given in Table VIII are based upon this operational limitation. This limitation is more stringent than the Rule 2.7 limit of 20 days/yr (480 hr/yr) on the operation of any emergency generator engine that emits more than 1,500 ppm of NO_X, although Rule 2.7 is not applicable to this engine because potential NO_X emissions from it are estimated to be only 276 ppm.

Potential PM emissions from the engine are estimated to be 0.12 ton/yr, based on continuous operation at its rated capacity. Therefore, the PM emissions from this engine are subject to Rule 27.3. An appropriate reasonable and proper limitation, in accordance with Rule 27.3, for these emissions is 0.05 lb/hr. No controls are necessary in order to achieve this limitation. This limitation is more stringent than the applicable Tier 3 PM emission standard ("weighted cycle average") of 0.30 g/(kW·hr) (0.080 lb/hr if not averaged) that is found in Appendix I of 40 CFR Part 1039 and stipulated by 40 CFR Part 60, Subpart IIII. This limitation is also more stringent than both the Rule 10.3 (Schedule 2) PM emission limit of 0.41 lb/hr, based on a process weight of 61 lb/hr (8.7 gal/hr × 7.05 lb/gal), and the Rule 10.7 PM emission limit of 0.25 gr/scf (0.99 lb/hr).

No controls are necessary in order to satisfy BACT (Rule 25.3) for the VOC emissions from the engine, and no quantitative BACT limitation is necessary for these emissions. However, the emissions of NO_X and VOC combined from the engine are limited by a Tier 3 emission standard (weighted cycle average) of 4.0 g/(kW·hr) (1.065 lb/hr if not averaged) that is found in Appendix I of 40 CFR Part 1039 and stipulated by 40 CFR Part 60, Subpart IIII. CO emissions from the engine are limited by a Tier 3 emission standard (weighted cycle average) of 5.0

g/(kW·hr) (1.332 lb/hr if not averaged) that is also found in Appendix I of 40 CFR Part 1039 and stipulated by 40 CFR Part 60, Subpart IIII.

§60.4207(b) of 40 CFR Part 60, Subpart IIII, stipulates that the diesel fuel that is burned in the engine must meet the requirements for nonroad diesel fuel that are given in §1090.305 of "Diesel Fuel and ECA Marine Fuel Standards" [40 CFR Part 1090, Subpart D (§1090.300–1090.325)]. §1090.305(b) of Subpart D limits the sulfur content of this diesel fuel to 15 ppm (0.0015%) by weight. Combustion of diesel fuel with this maximum allowable sulfur content in the engine at its rated capacity results in potential SO_X emissions of 0.0019 lb/hr. This SO_X emission rate is the effective SO_X emission limitation for the engine. This limitation is more stringent than the Rule 13.1 SO_2 emission limit of 500 ppm (2.30 lb/hr).

No controls are necessary in order to satisfy reasonable and proper control technology, in accordance with Rule 23, for the GHG emissions from the engine, and no quantitative reasonable and proper limitation is necessary for these emissions.

Table VIII. Plant-Wide Emissions Resulting from Combustion

Pollutant and Source	Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	*tons/yr*	Allowable Emissions *lb/hr*
Particulate Matter ($PM_{2.5}$, PM_{10}, and Total)				
Thermal Oxidizer (017)	0.010	0.0038	0.016	0.20
Boilers #1 and #2 (040)	0.563	0.376	1.645	0.50
Generator Engine (042)	0.00025	0.027	0.0013*	0.05
Total PM	**0.573**	**0.406**	**1.663**	**0.75**
Nitrogen Oxides (NO_X)				
Thermal Oxidizer (017)	0.178	0.072	0.314	0.072
Boilers #1 and #2 (040)	3.705	2.471	10.821	n/a
Generator Engine (042)	0.0087	0.911	0.046*	n/a
Total NO_X	**3.892**	**3.453**	**11.181**	**n/a**
Carbon Monoxide (CO)				
Thermal Oxidizer (017)	0.108	0.041	0.182	n/a
Boilers #1 and #2 (040)	6.225	4.151	18.180	n/a
Generator Engine (042)	0.0025	0.266	0.013*	n/a
Total CO	**6.335**	**4.458**	**18.374**	**n/a**

*Based on operation for 100 hr/yr

Table VIII. Plant-Wide Emissions Resulting from Combustion (continued)

Pollutant and Source	Actual Emissions *tons/yr*	Potential Emissions *lb/hr*	Potential Emissions *tons/yr*	Allowable Emissions *lb/hr*
Volatile Organic Compounds (VOC)				
Boilers #1 and #2 (040)	0.408	0.272	1.190	n/a
Generator Engine (042)	0.00071	0.074	0.0037*	n/a
Total VOC	**0.408**	**0.346**	**1.194**	**n/a**
Sulfur Oxides (SO_2)				
Thermal Oxidizer (017)	0.00024	0.00014	0.00063	0.00014
Boilers #1 and #2 (040)	0.042	0.071	0.309	0.071
Generator Engine (042)	0.000018	0.0019	0.000094*	0.0019
Total SO_2	**0.043**	**0.073**	**0.310**	**0.073**
Actual Greenhouse Gases (GHG)				
Thermal Oxidizer (017)	50.409	12.002	52.569	n/a
Boilers #1 and #2 (040)	8,894.1	5,895.8	25,823.5	n/a
Generator Engine (042)	1.860	195.772	9.789*	n/a
Total GHG	**8,946.3**	**6,103.6**	**25,885.9**	**n/a**
Greenhouse Gases (GHG) as Carbon Dioxide Equivalents (CO_2e)				
Thermal Oxidizer (017)	50.460	12.014	52.622	n/a
Boilers #1 and #2 (040)	8,903.1	5,901.7	25,849.6	n/a
Generator Engine (042)	1.866	196.434	9.822*	n/a
Total CO_2e	**8,955.4**	**6,110.2**	**25,912.1**	**n/a**

*Based on operation for 100 hr/yr

Summary

The plant-wide sources of fugitive emissions (Emission Unit 014) are subject to and in compliance with §4-41, Rule 12 (odor) and Rule 16.5(c) ("National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources," Title 40 *Code of Federal Regulations* Part 63, Subpart VVVVVV) of the Chattanooga Air Pollution Control Ordinance (the Ordinance).

The ten flash tanks (Emission Unit 017) are subject to and in compliance with §4-41, Rule 12 (odor) and Rule 16.5(c) ("National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process," Title 40 *Code of Federal Regulations* Part 63, Subpart SS, and "National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources," Title 40 *Code of Federal Regulations* Part 63, Subpart VVVVVV) of the Ordinance.

The latex stripping column (Emission Unit 017) is subject to and in compliance with §4-41, Rule 12 (odor), Rule 16.5(c) ("National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process," Title 40 *Code of Federal Regulations* Part 63, Subpart SS, and "National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources," Title 40 *Code of Federal Regulations* Part 63, Subpart VVVVVV), Rule 23 (reasonable and proper gaseous emissions), and Rule 25.3 (BACT VOC emissions) of the Ordinance.

The thermal oxidizer that is used as control equipment for the ten flash tanks and latex stripping column (Emission Unit 017) is subject to and in compliance with §4-8(e)(2) (BACT PM and visible emissions) and §4-41, Rule 2 (NO_X emissions), Rule 12 (odor), Rule 13 (SO_2 emissions), and Rule 23 (reasonable and proper gaseous emissions) of the Ordinance.

The surge tank (Emission Unit 017) is subject to and in compliance with §4-41, Rule 12 (odor), Rule 23 (reasonable and proper gaseous emissions), and Rule 25.3 (BACT VOC emissions) of the Ordinance.

The acrylic acid and methacrylic acid storage tanks (Emission Unit 030), styrene storage tank (Emission Unit 033), two tert-dodecyl mercaptan storage tanks (Emission Unit 037), and butyl acrylate storage tank (Emission Unit 041) are subject to and in compliance with §4-41, Rule 12 (odor) and Rule 25.3 (BACT VOC emissions) of the Ordinance.

The wastewater treatment process (Emission Unit 032) is subject to and in compliance with §4-41, Rule 12 (odor), Rule 16.5(c) ("National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources," Title 40 *Code of Federal Regulations* Part 63, Subpart VVVVVV), Rule 23 (reasonable and proper gaseous emissions), and Rule 25.3 (BACT VOC emissions) of the Ordinance.

The additives makeup system (Emission Unit 039) is subject to and in compliance with §4-41, Rule 3 (visible emissions), Rule 10 (PM emissions), and Rule 12 (odor) of the Ordinance.

Hurst Boilers #1 and #2 (Emission Unit 040) are subject to and in compliance with §4-41, Rule 12 (odor), Rule 13 (SO_2 emissions), Rule 15.1 ("Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units," Title 40 *Code of Federal Regulations* Part 60, Subpart Dc), Rule 25.3 (BACT VOC emissions), and Rule 27.3 (reasonable and proper PM and visible emissions) of the Ordinance.

The Cummins emergency generator engine (Emission Unit 042) is subject to and in compliance with §4-41, Rule 12 (odor), Rule 13 (SO_2 emissions), Rule 15.1 (“Standards of Performance for Stationary Compression Ignition Internal Combustion Engines” Title 40 *Code of Federal Regulations* Part 60, Subpart IIII), Rule 16.5(c) (“National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines” Title 40 *Code of Federal Regulations* Part 63, Subpart ZZZZ), Rule 23 (reasonable and proper gaseous emissions), Rule 25.3 (BACT VOC emissions), and Rule 27.3 (reasonable and proper PM and visible emissions) of the Ordinance.

None of the emission sources at this plant are subject to §4-68(e) (“Compliance Assurance Monitoring,” Title 40 *Code of Federal Regulations* Part 64) of the Ordinance because this plant is not classified as a “major source.”