Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

BUREAU OF AIR MANAGEMENT
NEW SOURCE REVIEW PERMIT
TO CONSTRUCT AND OPERATE A STATIONARY SOURCE

Issued pursuant to Title 22a of the Connecticut General Statutes (CGS) and Section 22a-174-3a of the Regulations of Connecticut State Agencies (RCSA).

Owner/Operator	Hampford Research, Incorporated
Address	54 Veterans Boulevard, Stratford, CT 06615
Equipment Location	54 Veterans Boulevard, Stratford, CT 06615
Equipment Description	Organic Synthesis Facility
Town-Permit Numbers	178-0120
Premises Number	223
Stack Number	1, 3 and 4
Modification Issue Date	October 10, 2018
Prior Permit Issue Date(s)	February 1, 2001 (Original) September 11, 2007 (Minor Modification) May 4, 2016 (Minor Modification)
Expiration Date	None

/s/Robert Kaliszewski for
Robert J. Klee
Commissioner

10/10/2018
Date

This permit specifies necessary terms and conditions for the operation of this equipment to comply with state and federal air quality standards. The Permittee shall at all times comply with the terms and conditions stated herein.

PART I. DESIGN SPECIFICATIONS

A. General Description

Hampford Research, Incorporated is a custom manufacturer of electronic and dental chemical additives, specialty monomers, photoinitiators, and other specialty organic chemicals. The production plant consists of reactors, condensers, pilot units, filtration units, dryers, and ancillary equipment, such as vacuum pumps, receiving tanks, chillers and centrifuges. Many of Hampford Research, Incorporated's batch processes are interrelated; products are often made in one reactor and then transferred to another reactor for further processing.

This permit applies to the aggregate equipment listed in Part I.B of this permit.

B. Equipment Design Specifications

All process manufacturing equipment is located in two interconnected buildings (54 Veterans Boulevard and 301 Barnum Avenue Cut Off).

Table No. 1: Equipment List

Emissions Unit	Emissions Unit Description	Control Unit Description
EU-1	**Pilot line No. 1** 50 gallon pilot reactor (P-1) P-1 Receiver A (TP-1a) P-1 Receiver B (TP-1b)	Chiller/Condenser System[1] 27.5 ft² P-1 condenser (HX-P1)[2] 24 ft² P-1 secondary condenser (HXA-P1) Scrubber (acid gas and local ventilation)
EU-2	**Pilot line No. 2** 30 gallon pilot reactor No.2 (P-2) 5 gallon P-2 receiver tank (TP-2)	Chiller/Condenser System[1] 27.5 ft² P-1 condenser (HX-P1)[2] Scrubber (acid gas and local ventilation)
EU-3	**Pilot line No. 3** 50 gallon pilot reactor No. 3 (P-3) 35 ft² P-3 condenser (HX-P3) 25 gallon P-3 receiver tank (TP-3)	Chiller/Condenser System[1] 35 ft² P-3 condenser (HX-P3)[2] Scrubber (acid gas and local ventilation)
EU-4	**Pilot line No. 4** 100 gallon pilot reactor No. 4 (P-4) 45 ft² P-4 condenser (HX-P4) 50 gallon P-4 receiver tank (TP-4)	Chiller/Condenser System[1] 45 ft² P-4 condenser (HX-P4)[2] Scrubber (acid gas and local ventilation)
EU-5	**Pilot line No. 5** 100 gallon pilot reactor No. 5 (P-5) 50 gallon P-5 storage tank (TP-5)	Chiller/Condenser System[1] 55 ft² P-5 condenser (HX-P5)[2] Scrubber (acid gas and local ventilation)

1 The Chiller/Condenser System consists of Chiller 1 (EU-79), Chiller 2 (EU-80), Demister Pre-condenser (EU-83) and Demister Column (EU-82).

2 Condensers operating under reflux conditions, which are required for processing, are not considered control devices.

Emissions Unit	Emissions Unit Description	Control Unit Description
EU-6	**Pilot line No. 6** 200 gallon pilot reactor No. 6 (P-6) 30 gallon P-6 charge vessel (P6-WT1) 50 gallon P-6 charge vessel (P6-WT2) 125 gallon P-6 receiver tank (TP-6)	Chiller/Condenser System[1] 47 ft^2 P-6 condenser (HX-P6)[2] Scrubber (acid gas and local ventilation)
EU-8	**Pilot line No. 7 (Old P-9)** 50 gallon pilot reactor (P-7)	Chiller/Condenser System[1] 30 ft^2 P-7 condenser (HX-P7)[2] Scrubber (acid gas and local ventilation)
EU-7	**Pilot line No. 8** 50 gallon pilot reactor (P-8)	Chiller/Condenser System[1] 30 ft^2 P-8 condenser (HX-P8)[2] Scrubber (acid gas and local ventilation)
EU-9	**Reactor line No. 1** 500 gallon reactor No. 1 (R-1) 200 gallon R-1 receiving tank (TR-1)	Chiller/Condenser System[1] 47 ft^2 R-1 secondary condenser (HXA-R1)[1] 100 ft^2 R-1 condenser (HX-R1)[2] Scrubber (acid gas and local ventilation)
EU-10	**Reactor line No. 2** 750 gallon reactor No. 2 (R-2) 500 gallon R-2 weight tank (R2-WT) 125 gallon R-2 receiver tank (TR-2)	Chiller/Condenser System[1] 47 ft^2 R-2 secondary condenser (HXA-R2)[2] 150 ft^2 R-2 condenser (HX-R2) Scrubber (acid gas and local ventilation)
EU-11	**Reactor line No. 3** 750 gallon reactor No. 3 (R-3) 200 gallon R-3 receiver tank (TR-3)	Chiller/Condenser System[1] 125 ft^2 R3 condenser (HX-R3)[2] Scrubber (acid gas and local ventilation)
EU-12	**Reactor line No. 4** 2,000 gallon reactor No. 4 (R-4)	Chiller/Condenser System[1] 333 ft^2 R-4 condenser (HX-R4)[2] 47 ft^2 R-4 secondary condenser (HXA-R4) Scrubber (acid gas and local ventilation)
EU-13	**Reactor line No. 5** 1,000 gallon reactor No. 5 (R-5)	Chiller/Condenser System[1] 200 ft^2 R-5 condenser (HX-R5)[2] 20 ft^2 R-6 wt tank condenser (HX-TR6) Scrubber (aid gas and local ventilation)
EU-14	**Reactor line No. 6** 1,000 gallon reactor No. 6 (R-6) 500 gallon R-6 weight tank (TR-6)	Chiller/Condenser System[1] 200 ft^2 R-6 condenser (HX-R6)[2] Scrubber (acid gas and local ventilation)
EU-15	**Reactor line No. 7** 500 gallon reactor No. 7 (R-7) 350 gallon R-7 receiver tank (TR-7) 150 gallon R-7 receiver tank (TR-7A)	Chiller/Condenser System[1] 120 ft^2 R-7 condenser (HX-R7)[2] 50 ft^2 TR-7 condenser (HX-TR7) Scrubber (acid gas and local ventilation)
EU-16	**Reactor line No. 8** 2,000 gallon reactor No. 8 (R-8)	Chiller/Condenser System[1] 333 ft^2 R-8 condenser (HX-R8)[2] Scrubber (acid gas and local ventilation)
EU-17	**Reactor line No. 9** 1,000 gallon reactor No. 9 (R-9) 750 gallon R-9 receiver tank (TR-9) 250 gallon TR-weight tank (TR-9A)	Chiller/Condenser System[1] 240 ft^2 R-9 condenser (HX-R-9) 50 ft^2 TR-9 condenser (HX-TR-9) Scrubber (acid gas and local ventilation)

1 The Chiller/Condenser System consists of Chiller 1 (EU-79), Chiller 2 (EU-80), Demister Pre-condenser (EU-83) and Demister Column (EU-82).

2 Condensers operating under reflux conditions, which are required for processing, are not considered control devices.

Emissions Unit	Emissions Unit Description	Control Unit Description
EU-18	**Reactor line No. 10** 200 gallon reactor No. 10 (R-10) 200 gallon R-10 receiver tank (TR-10)	Chiller/Condenser System[1] 100 ft^2 R-10 condenser (HX-R10)[2] 47 ft^2 R-10 secondary condenser (HXA-R10) Scrubber (acid gas and local ventilation)
EU-19	**Reactor line No. 11** 500 gallon reactor No. 11 (R-11)	Chiller/Condenser System[1] 150 ft^2 R-11 condenser (HX-R11)[2] 47 ft^2 R-11 secondary condenser (HXA-R11) Scrubber (acid gas and local ventilation)
EU-20	**Reactor line No. 12** 500 gallon reactor No. 12 (R-12)	Chiller/Condenser System[1] 150 ft^2 R-12 condenser (HX-R12)[2] 47 ft^2 R-12 secondary condenser (HXA-R12) Scrubber (acid gas and local ventilation)
EU-21	**Reactor line No. 13** 200 gallon reactor No. 13 (R-13)	Chiller/Condenser System[1] 102 ft^2 R-13 condenser (HX-R13)[2] 47 ft^2 R-13 secondary condenser (HXA-R13) Scrubber (acid gas and local ventilation)
EU-22	**Reactor line No. 16** 500 gallon reactor No. 16 (R-16) 200 gallon R-16 receiver (TR-16)	Chiller/Condenser System[1] 141 ft^2 R-16 condenser (HX-R16)[2] 47 ft^2 R-16 secondary condenser (HXA-R16) Scrubber (acid gas and local ventilation)
EU-23	**Plant vacuum pumps** 125 cfm vacuum pump No. 1 (VP-1)	Chiller/Condenser System[1] 30 ft^2 VP-1 condenser (HX-VP1)
EU-24	**Plant vacuum pumps** 125 cfm vacuum pump No. 2 (VP-2)	Chiller/Condenser System[1] 70 ft^2 VP-2 condenser (HX-VP2)
EU-25	**Plant vacuum pumps** 75 cfm vacuum pump No. 4 (VP-4)	Chiller/Condenser System[1] 30 ft^2 VP-4 condenser (HX-VP4)
EU-26	**Plant vacuum pumps** 75 cfm vacuum pump No. 7 (VP-7)	Chiller/Condenser System[1] 25 ft^2 VP-7 condenser (HX-VP7)
EU-86	**Plant vacuum pumps** 200 cfm vacuum pump No. 13 (VP-13)	Chiller/Condenser System[1] 25 ft^2 VP-7 condenser (HX-VP13)
EU-27	**Filter** 42 inch filter No. 1 (F-1)	N/A
EU-28	**Filter** 32 inch filter No. 2 (F-2)	N/A
EU-29	**Filter** 18 inch filter No. 3 (F-3)	N/A
EU-30	**Filter** 32 inch filter No. 4 (F-4)	N/A
EU-31	**Filter** 23 inch filter No. 5 (F-5)	N/A

1 The Chiller/Condenser System consists of Chiller 1 (EU-79), Chiller 2 (EU-80), Demister Pre-condenser (EU-83) and Demister Column (EU-82)

2 Condensers operating under reflux conditions, which are required for processing, are not considered control devices.

Emissions Unit	Emissions Unit Description	Control Unit Description
EU-32	**Filter** 42 inch filter No. 6 (F-6)	N/A
EU-33	**Pressure filter** 24 inch pressure filter No. 1 (PF-1)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-34	**Pressure filter** 36 inch pressure filter No. 2 (PF-2)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-35	**Pressure filter** 28 inch pressure filter No. 3 (PF-3)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-36	**Pressure filter** 24 inch pressure filter No. 4 (PF-4)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-37	**Centrifuge No. 1** 48 inch x 30 inch centrifuge No. 1 (C-1) 300 gallon centrifuge No. 1 receiver tank (C1-LT)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-38	**Centrifuge No. 2** 48 inch x 30 inch centrifuge No. 2 (C-2) 650 gallon centrifuge No. 2 liquor tank (C2-LT) 75 gallon centrifuge No. 2 receiver tank (C2-RT)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-39	**Centrifuge No. 3** 32 inch x 20 inch centrifuge No. 3 (C-3) 260 gallon centrifuge No. 3 receiver (C3-LT)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-40	**Centrifuge No. 4** 24 inch x 12 inch centrifuge No. 4 (C-4)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-41	**Centrifuge No. 5** 24 inch x 14 inch centrifuge No. 5 (C-5)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-42	**Centrifuge No. 6** 30 inch x15 inch centrifuge No. 6 (C-6)	Chiller/Condenser System[1] Scrubber (acid gas and local ventilation)
EU-43	**Vacuum tray dryer No. 1 and 2** 234 ft^2 vacuum tray dryer No. 1 & No. 2 (VTD-1/2) 75 cfm VTD-1 vacuum pump (VP-3)	Chiller/Condenser System 300 ft^2 VP-3 pre-condenser (HXP-VP3) 25 ft^2 VP-3 condenser (HX-VP3) 25 ft^2 VP-3 condenser (HX-VP3a) Scrubber (acid gas and local ventilation)
EU-44	**Laboratory tray dryer No. 1** 9 ft^2 laboratory tray dryer (LTD-1)	N/A
EU-45	**Laboratory tray dryer No. 2** 18 ft^2 laboratory tray dryer (LTD-2)	N/A
EU-46	**Air tray dryer** 158 ft^2 air tray dryer (ATD-1)	N/A
EU-47	**Vacuum tray dryer No. 3** 100 ft^2 vacuum tray dryer No. 3 (VTD-3) 75 cfm VTD-3 vacuum pump (VP-6)	Chiller/Condenser System[1] 25 ft^2 VP-6 pre-condenser (HX-VTD3) 25 ft^2 VP-6 condenser (HX-VP6) Scrubber (acid gas and local ventilation)
EU-48	**Vacuum tray dryer No. 4** 100 ft^2 vacuum tray dryer No. 4 (VTD-4) 75 cfm VTD-4 vacuum pump (VP-11)	Chiller/Condenser System[1] 25 ft^2 VP-11 condenser (HX-VP11) Scrubber (acid gas and local ventilation)

1 The Chiller/Condenser System consists of Chiller 1 (EU-79), Chiller 2 (EU-80), Demister Pre-condenser (EU-83) and Demister Column (EU-82)

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Emissions Unit	Emissions Unit Description	Control Unit Description
EU-49	**Vacuum tray dryer No. 5** 60 ft² vacuum tray dryer No. 5 (VTD-5) 75 cfm VTD-5/6 vacuum pump (VP-12)	Chiller/Condenser System[1] 25 ft² VP-12 condenser (HX-VP12) Scrubber (acid gas and local ventilation)
EU-50	**Vacuum tray dryer No. 6** 20 ft² vacuum tray dryer No. 6 (VTD-6)	N/A
EU-51	**Vacuum tray dryer No. 7** 148 ft² vacuum tray dryer No. 7 (VTD-7) 125 cfm VTD-7 vacuum pump (VP-10)	Chiller/Condenser System[1] 25 ft² VP-10 condenser (HX-VP10) Scrubber (acid gas and local ventilation)
EU-53	**Still No. 2** 15 gallon still No. 2 (S-2)	Chiller/Condenser System[1] 10 ft² S-2 condenser (HX-S2) Scrubber (acid gas and local ventilation)
EU-54	**Still No. 3** 60 gallon still No. 3 (S-3) 325 gallon S-3 weight tank (S3-WT1) 325 gallon S-3 weight tank (S3-WT2) 80 gallon S-3 receiver tank (TS-3)	Chiller/Condenser System[1] 47 ft² S-3 condenser (HX-S3) Scrubber (acid gas and local ventilation)
EU-55	**Still No. 4** 100 gallon still No. 4 (S-4) 300 gallon S-4 weight tank (S4-WT) 80 gallon S-4 receiver tank (TS-4)	Chiller/Condenser System[1] 62 ft² S-4 Condenser (HX-S4) Scrubber (acid gas and local ventilation)
EU-56	**Still No. 5** 100 gallon still No. 5 (S-5) 25 gallon S-5 receiver (TS-5)	Chiller/Condenser System[1] 47 ft² S-5 condenser (HX-S5) Scrubber (acid gas and local ventilation)
EU-57	**Process tank No. 2** 750 gallon process tank (T-2)	N/A
EU-58	**Process tank No. 3** 500 gallon process tank (T-3)	Chiller/Condenser System[1] 25 ft² T-3 condenser (HX-T3) Scrubber (acid gas and local ventilation)
EU-59	**Process Tank No. 4** 200 gallon process tank (T-4)	Chiller/Condenser System[1] 25 ft² T-4 condenser (HX-T4) Scrubber (acid gas and local ventilation)
EU-60	**Process Tank No. 5** 200 gallon process tank (T-5)	Chiller/Condenser System[1] 47 ft² T-5 condenser (HX-T5) Scrubber (acid gas and local ventilation)
EU-61	**Process Tank Line No. 6** 3,000 gallon process tank (T-6)	N/A

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Emissions Unit	Emissions Unit Description	Control Unit Description
EU-65	**Lab hood** 2,000 cfm lab hood No. 2 (LH-2)	N/A
EU-66	**Lab hood** 2,000 cfm lab hood No. 3 (LH-3)	N/A
EU-67	**Lab hood** 2,000 cfm lab hood No. 4 (LH-4)	N/A
EU-68	**Lab hood** 2,000 cfm lab hood No. 5 (LH-5)	N/A
EU-69	**Lab Hood** 2,000 cfm lab hood No.6 (LH-6) QA/QC lab	N/A
EU-70	**Lab Hood** 2,000 cfm lab hood No. 7 (LH-7) QA/QC lab	N/A
EU-71	**Lab Hood** 2,000 cfm lab hood No. 8 (LH-8)	N/A
EU-72	**Lab Hood** 2,000 cfm lab hood No. 9 (LH-9)	N/A
EU-85	**Rotary dryer No. 1** 20 ft^2 rotary vacuum dryer No. 3 (RVD-3) 75 cfm RVD-1 vacuum pump (VP-9)	Chiller/Condenser System[1] 25 ft^2 VP-9 pre condenser (HXP-VP9) 25 ft^2 VP-9 condenser (HX-VP9)
EU-84	**Rotary dryer No. 2** 28 ft^2 rotary vacuum dryer No. 2 (RVD-2) 75 cfm RVD-2 vacuum pump (VP-8)	Chiller/Condenser System[1] 25 ft^2 VP-8 pre condenser (HXP-VP8) 25 ft^2 VP-8 condenser (HX-VP8)
EU-73	**Rotary dryer No. 3** 25 ft^2 rotary vacuum dryer No. 3 (RVD-3) 75 cfm RVD-3 vacuum pump (VP-5)	Chiller/Condenser System[1] 25 ft^2 VP-5 condenser (HX-VP5)
EU-74	**Pressure Filter dryer No. 1** 0.4 m^2 pressure filter dryer No. 1 (PFD-1) 500 gallon PFD-1 receiving tank (TPFD-1)	Chiller/Condenser System[1] 25 ft^2 PFD-1 condenser (HX-PFD1)
EU-75	**Laboratory Reactor** 5 gallon autoclave	N/A
EU-76	**Process Tank** 30 gallons (T-30)	N/A
EU-77, EU-86	**Fuel Burning Equipment** Two - 100 horse power plant steam boiler. Primary burns natural gas and the secondary burns oil.	N/A
EU-78	Ethylene Glycol Convault Tank	6,000 gallons

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2 Condensers operating under reflux conditions, which are required for processing, are not considered control devices.

Table No. 2: Control Equipment List

Equip ID	Description	Size
EU-79	Glycol Chiller 1 (GC-2016A)	89 ton
EU-80	Glycol Chiller 2 (GC-2016B)	89 ton
EU-81	Packed Tower Caustic Scrubber (SC-2)	5,000 cfm
EU-82	Demister/Condenser Column (HX-Stk3)	10 ft x 16 in. Diameter
EU-83	Demister Pre-Condenser (HXP-Stk3)	256 ft^2

C. Control Equipment Design Specifications

1. Emissions from all of the equipment listed in Part I, Section B, shall be vented to the control systems described below:

   a. Condenser (EU 83; PHX-01)
   256 ft^2 shell-and-tube
   Type of coolant: ethylene glycol

   Pollutant(s) controlled: VOCs/HAPs/Acetone

   b. Demister Column (EU-82; PHX-01)
   Face velocity: vertical flow
   Pressure drop across mist eliminator (inches H_2O): 1.0

   c. Scrubber (EU-81; SC-2)
   Packing material: 1" polypropylene TriPac
   Packed height: 3' 6"
   Type of flow: countercurrent
   Gas flow rate: 5,000 scfm at 68 °F
   Pollutant control: acetic acid, hydrochloric acid

D. Stack Parameters

1. Stack 1: Catch Tank
   a. Maximum gas flowrate: 10 acfm
   b. Minimum distance to property line: 53.1 ft
   c. Minimum stack height: 32.5 ft

2. Stack 3: Demister Column
   a. Maximum gas flowrate: 10 acfm
   b. Minimum distance to property line: 50.0 ft
   c. Minimum stack height: 30.1 ft

3. Stack 4: Scrubber (SC-2)
   a. Maximum gas flow rate: 5,000 acfm
   b. Minimum distance to property line: 55.0 ft
   c. Minimum stack height: 32.8 ft

PART II. OPERATIONAL CONDITIONS

Notwithstanding the design specifications or description provided in Part I, above, the Permittee of the subject source shall comply with the following operating requirements.

A. Operating Parameter Limitations

Controls

1. Surface condenser

The control efficiency attained by the surface condenser is a function of the condenser inlet temperature. The maximum exit temperature of the ethylene glycol from the chillers shall be 40 °F.

2. Scrubber

The scrubber shall be operated during processes where an acid is used as a solvent or where acid gasses are generated by chemical process. Minimum flow rate of caustic solution through scrubber: 50 gallons/minute.

B. Emission Limits

The Permittee shall not exceed the emission limits stated herein at any time.

Note: The emissions from any new compounds, for production or trial runs, shall be counted toward any applicable emission limit in this permit.

1. VOC Emissions

a. All equipment listed in this permit shall not emit VOC (highly photochemically reactive solvents as defined in RCSA Section 22a-174-20(f), in excess of 8.0 pounds per hour or 40.0 pounds per day from each piece of equipment.

b. All equipment listed in this permit shall not emit VOC (non-highly photochemically reactive solvents as defined in RCSA Section 22a-174-20(f), in excess of 160.0 pounds per hour or 800.0 pounds per day from each piece of equipment.

c. The total VOC emissions for all equipment listed in this permit shall not exceed 24.9 TPY of VOC.

d. Hourly and daily equipment emissions are calculated using the following assumptions:

   i. The total process emissions for each compound from a process is assumed to be emitted by each piece of equipment.

ii. The emissions per piece of equipment are assumed to be emitted during a specific operating time. This period of time is shorter than the production time of the entire process line.

The conservative approach for calculating the hourly and daily emissions provides higher than actual emission to be compared to RCSA Section 22a-174-20(f) thresholds.

2. Hazardous Air Pollutants (HAP) Emissions

a. The Permittee shall not cause or allow emissions of Acetone for the premises to equal or exceed 25 tons in any consecutive 12 months.

b. The Permittee shall not cause or allow emissions of Methylene Chloride for the premises to equal or exceed 10 tons in any consecutive 12 months.

c. The Permittee shall not cause or allow emissions of HAPs for the premises, subject to Section 112(b) of the Clean Air Act, to equal or exceed 10 tons per year for any individual HAP and 25 tons per year for any combination of HAPs.

3. Demonstration of compliance with the above VOC, HAPs, and Acetone emission limits shall be met by calculating the emission rates using emission factors from the following source:

Emission factors shall be used to calculate VOC, HAPs and Acetone emissions from all HRI processes. Emission factors are based on the mass balance of material/solvents used and produced in each process.

4. The above statement shall not preclude the commissioner from requiring other means (e.g. stack testing) to demonstrate compliance with the above emission limits, as allowed by state or federal statute, law or regulation.

C. Hazardous Air Pollutants

This equipment shall not cause an exceedance of the Maximum Allowable Stack Concentration (MASC) for any hazardous air pollutant (HAP) emitted and listed in RCSA Section 22a-174-29. [STATE ONLY REQUIREMENT]

PART III. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

A. Monitoring Requirements

1. The Permittee shall monitor the temperature at the discharge of the chiller system on a continuous basis. The Permittee shall include an alarm set at 40 °F that will indicate a temperature exceedance.

2. The Permittee shall monitor the daily flow rate of caustic solution through the scrubber using a flow meter.

B. Record Keeping Requirements

1. The Permittee shall make and keep records of the temperature at the discharge of the chiller system on a continuous basis.

2. The Permittee shall record each chiller system alarm occurrence and document the duration, emissions, and resolution of each temperature exceedance.

3. The Permittee shall make and keep records of the daily flow rate of caustic solution through the scrubber. The scrubber operation shall be recorded in a scrubber log.

4. The Permittee shall make and keep records of the monthly and 12 consecutive months VOC and Acetone emissions for all equipment listed in this permit. The VOC and Acetone emissions shall be based on any consecutive 12 month time period and shall be determined by adding the current month's VOC and Acetone emissions to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

5. The Permittee shall make and keep records of the hourly and daily emissions of highly photochemically reactive VOC's and non-highly chemically reactive VOC's and State of Connecticut HAP's for each piece of equipment listed in this permit. Calculations will be based on the emission factors calculated as detailed in Appendix B of this permit – Emission Factor Determination and Record Keeping Procedures.

6. The Permittee shall make and keep records showing compliance with RCSA Section 22a-174-29.

7. The Permittee shall make and keep records of monthly and 12 consecutive months emissions of each single and combined HAPs for the premises. The single and combined HAPs emissions shall be based on any consecutive 12 month time period and shall be determined by adding the current month's single and combined HAPs emissions to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

8. The Permittee shall maintain a list of equipment in the Synthesis Facility and will include **new and existing equipment added into the Synthesis Facility *or* its emission control equipment after the permit is issued**. Such additional equipment shall not result in an increase of the emissions limits contained in PART II. Section B. (Emission Limits) of this permit. Frequency of notification regarding the addition of such additional equipment and the information contained in these notifications shall be as follows:

    a. For equipment installed which falls **within the specifications listed in Appendix A**, New Equipment Specifications, the Permittee shall maintain a record of the equipment added to the premises. Information included in the record shall be as follows:

        (A) the reactor emission unit (EU) number, Equipment Identification number where the reactor will be placed,

        (B) the reactor type, capacity, and all specification details as it relates to Appendix A, and

(C) the date the reactor is placed into service. Notification shall be made to the Connecticut DEEP **within 90 days of placing equipment into service.**

b. For equipment which **does not fall within the specifications detailed in Appendix A,** but subject to the emission limits of the permit, notification shall be made to the Connecticut DEEP **30 days prior of placing equipment into service.** Information included in the notification shall be as follows:

(A) the equipment emission unit (EU) number and Group Emission Unit (GEU) number where the equipment will be placed,

(B) the type of unit and its capacity,

(C) a demonstration of compliance with RCSA, including, but not limited to, RCSA Section 22a-174-29, and

(D) a demonstration of compliance with all emission limitations included in this permit.

8. At a minimum, every five years from May 4, 2016, the Permittee shall submit a modification to update the list of equipment and control equipment in Part I of this permit.

9. The Permittee shall maintain records of the composition of all products manufactured at the premises in one confidential file.

10. The Permittee shall make and keep daily records of production. Such records shall contain the following information:

(A) date and time production was initiated;

(B) equipment used to produce the product;

(C) description of product, including name;

(D) quantity of product produced;

(E) date and time batch was completed;

(F) number of batches per day; and

(G) quantity of raw material usage, process waste, recovered solvents, and final product yields for each batch.

11. The Permittee shall keep records of all compounds used, Safety Data Sheets (SDS), technical data sheets, purchase orders, invoices, and other documents necessary to verify information and calculations for all materials which contain VOCs and/or HAPs which are used or stored at the premises.

12. The Permittee shall keep accurate annual records of all quantity and type of waste manifested as waste material.

13. The Permittee shall make and keep all required records on the premises to determine compliance with the terms and conditions of this permit in accordance with RCSA Section 22a-174-4. Such records shall be made available upon request by the commissioner and kept for the duration of the permit or for the previous five years, whichever is less.

PART IV. STACK EMISSION TEST REQUIREMENTS: None at this time

PART V. SPECIAL REQUIREMENTS

A. The Permittee shall comply with all applicable sections of the following National Emission Standards for Hazardous Air Pollutants Standard (NESHAP) at all times.

Title 40 CFR Part 63, Subpart A and VVVVVV – NESHAP for Chemical Manufacturing Area Sources

Copies of the Code of Federal Regulations (CFR) are available online at the U.S. Government Printing Office website.

B. The Permittee shall not cause or permit the emission of any substance or combination of substances which creates or contributes to an odor beyond the property boundary of the premises that constitutes a nuisance as set forth in RCSA Section 22a-174-23. [STATE ONLY REQUIREMENT]

C. The Permittee shall operate this facility at all times in a manner so as not to violate or contribute significantly to the violation of any applicable state noise control regulations, as set forth in RCSA Sections 22a-69-1 through 22a-69-7.4. [STATE ONLY REQUIREMENT]

PART VI. ADDITIONAL TERMS AND CONDITIONS

A. This permit does not relieve the Permittee of the responsibility to conduct, maintain and operate the regulated activity in compliance with all applicable requirements of any federal, municipal or other state agency. Nothing in this permit shall relieve the Permittee of other obligations under applicable federal, state and local law.

B. Any representative of the DEEP may enter the Permittee's site in accordance with constitutional limitations at all reasonable times without prior notice, for the purposes of inspecting, monitoring and enforcing the terms and conditions of this permit and applicable state law.

C. This permit may be revoked, suspended, modified or transferred in accordance with applicable law.

D. This permit is subject to and in no way derogates from any present or future property rights or other rights or powers of the State of Connecticut and conveys no property rights in real estate or material, nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the facility or regulated activity affected thereby. This permit shall neither create nor affect any rights of persons of municipalities who are not parties to this permit.

E. Any document, including any notice, which is required to be submitted to the commissioner under this permit shall be signed by a duly authorized representative of the Permittee and by the person who is responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under Section 22a-175 of the Connecticut General Statutes, under Section 53a-157b of the Connecticut General Statutes, and in accordance with any applicable statute."

F. Nothing in this permit shall affect the commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for violations of law, including but not limited to violations of this or any other permit issued to the Permittee by the commissioner.

G. Within 15 days of the date the Permittee becomes aware of a change in any information submitted to the commissioner under this permit, or that any such information was inaccurate or misleading or that any relevant information was omitted, the Permittee shall submit the correct or omitted information to the commissioner.

H. The date of submission to the commissioner of any document required by this permit shall be the date such document is received by the commissioner. The date of any notice by the commissioner under this permit, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three days after it is mailed by the commissioner, whichever is earlier. Except as otherwise specified in this permit, the word "day" means calendar day. Any document or action which is required by this permit to be submitted or performed by a date which falls on a Saturday, Sunday or legal holiday shall be submitted or performed by the next business day thereafter.

I. Any document required to be submitted to the commissioner under this permit shall, unless otherwise specified in writing by the commissioner, be directed to: Office of Director; Engineering & Enforcement Division; Bureau of Air Management; Department of Energy and Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.

APPENDIX A

NEW EQUIPMENT SPECIFICATIONS

Standard Reactor Specifications

Type: Glass lined or metal alloy vessels, complete with agitator and jacket for heating/cooling reactor contents

Capacity: 200 gallons or greater

Operating Ranges:
Reactor Pressure Rating: 25 psi minimum
Design Operating Pressures: 0-15 psia
Design Operating Temperatures: -20 °C to 250 °C

Vent Connections:
Main Vent: Stack 2 (scrubber) and/or Stack 3 (demister)
Emergency Release Vent: Stack 1 (Vent Catch Tank)

Utilities:
Heating: Steam or Hot Oil Closed Loop System
Cooling: Tower Water or closed loop refrigerant system

Pollution Control:
Primary Condenser: Size of condenser determined by the condenser ratio, as defined below:

$$\frac{\text{reactor jacket surface area (sq ft)}}{\text{condenser surface area (sq ft)}}$$

- A minimum ratio of 1.8 is required. (i.e. a 500 gal vessel w/jacket area of 80 sf -144 sf condenser min)

- Secondary Condenser: A minimum condenser ratio of 0.24 is required.

APPENDIX B

EMISSION FACTOR DETERMINATION AND RECORDKEEPING PROCEDURES

Material Usage and Production Data Available

Raw material usage, process waste, recovered solvents and final product yields are weighed and recorded for each production lot of material. Process specific Chemical Operating Procedure (COPs) forms are used to manually collect and record this data for each production batch. The COPs data is entered into an ERP Computer system that includes all purchasing, receiving and corporate accounting functions. Solvent/Hazardous waste mixtures are characterized in waste profiles determined through analytical testing. These waste profiles are reviewed annually and retested upon any process change.

Emission Factor Calculation

In summary, emission factors are determined utilizing mass balance calculations on individual products. The following steps are performed on each process:

- Assemble into a spreadsheet all the "Ins" and "Outs" of the process for each lot produced
- Determine a "standard" in/out for each lot either through averaging all lots or selecting representative lots (Backup mass balance calculations and statistics must be maintained).
- Utilize laboratory analysis and engineering judgement to determine any mixture ratios
- Calculate the Emission Factors using the following simple ratio:

$$\text{Emission Factor} = \frac{\text{Standard Lot Solvent Emission (lbs)}}{\text{Standard Lot Production (lbs)}}$$