ɔnnecticut Department of

ɴERGY &
ɴVIRONMENTAL
ROTECTION

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	The University of Connecticut
Address	31 LeDoyt Road – U 3038, Storrs, CT 06269
Equipment Location	240 Glenbrook Road, adjacent to the existing Central Heating Plant, Storrs, CT 06269
Equipment Description	Solar Taurus Model 70 T10301S combustion turbine with a Natural Gas fired duct burner – Dry Low NOx Combustion System, Selective Catalytic Reduction, and Oxidation Catalyst.
Town-Permit Numbers	098-0061
Premises Number	15
Stack Number	34
Collateral Conditions	**Part X** – Special Requirements has operational restrictions for the following pieces of equipment: EU 599, EU 606 and GEU-8 **Part XII** – Premises Wide Emission Cap for Hazardous Air Pollutants (HAPs)
Prior Permit Issue Dates	September 13, 2004 (Original Permit) December 13, 2005 (Minor Modification)
Modification Issue Date	December 24, 2015
Expiration Date	None

/s/Anne Gobin for
Robert J. Klee
Commissioner

December 24, 2015
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. OPERATIONAL CONDITIONS

A. Design Specifications

Combustion Turbine:

1. Maximum Fuel Firing Rates:
   Natural Gas: 91,977 ft^3/hr @ 0°F ambient temperature
   No. 2 Fuel Oil: 618.2 gal/hr @ 0°F ambient temperature

2. Maximum Gross Heat Input:
   Natural Gas: 94.37 MMBtu/hr (HHV) @ 0°F ambient temperature
   No. 2 Fuel Oil: 85.62 MMBtu/hr (HHV) @ 0°F ambient temperature

Duct Burner System:

1. Maximum Natural Gas Firing Rate: 58,480 ft^3/hr

2. Maximum Gross Heat Input: 60 MMBtu/hr (HHV)

Stack Parameters:

1. Minimum Stack Height: 180 ft

2. Minimum Exhaust Gas Flow Rate:
   Natural Gas: 56,158 acfm
   No. 2 Fuel Oil: 60,729 acfm

3. Stack Exit Temperature:
   No. 2 Fuel Oil: 284 °F
   Natural Gas: 221 °F

4. Minimum Distance from Stack to Property Line: 600 ft

B. Operating Limits

Combustion Turbine

1. Fuel Type(s): Natural Gas and No. 2 Fuel Oil

2. Maximum Fuel Oil Consumption over any Consecutive 12 Month Period: 2,781,900 gallons No. 2 Fuel Oil (*)

3. Maximum Operating Hours Firing Oil over any Consecutive 12 Month Period: 4,500 Hours (*)

4. Maximum Natural Gas Consumption over any Consecutive 12 Month Period: see equation below

   Maximum Annual Natural Gas Consumption (MMcf) = 2,089.37 MMcf – [(0.079504 MMcf/hr) x (Operating Hours Firing No. 2 Fuel Oil)] (*)

PART I. OPERATIONAL CONDITIONS, continued

Where:
0.079504 MMcf/hr = Maximum Natural Gas Firing Rate of one turbine at 59°F.

5. Maximum Fuel Sulfur Content (% by weight, dry basis): 0.05 No. 2 Fuel Oil

(*) Maximum Fuel Consumption and Operating Hours Firing Oil combined for Permit Nos. 098-0056, 098-0061 & 098-0062

Duct Burner System (**)

1. Fuel Type(s): Natural Gas

2. Maximum Fuel Consumption over any Consecutive 12 Month Period: 1,410.54 MMcf of Natural Gas (***)

(**) Maximum Fuel Consumption combined for Permit Nos. 098-0056, 098-0061 & 098-0062

(***) Maximum annual natural gas consumption for each duct burner was calculated assuming a maximum capacity factor of 91.78%.

PART II. CONTROL EQUIPMENT

A. Control Equipment

The following specifications need not be verified on a continuous basis, however, if requested by the Bureau, demonstration shall be shown.

1. Selective Catalytic Reduction (SCR)
   Make and Model:
   Housing: Rentech
   Injection Grid: Vector Systems
   Catalyst: Emerachem
   Catalyst Type: Coated ceramic honeycomb substrate
   Pressure Drop: 3.0 in H_2O (includes both catalysts)
   Expected Ammonia Injection Rate at Maximum Rated Capacity: 71.0 lb/hr
   Design Removal Efficiency: 90%

2. Low NOx Burner
   Make and Model: Solar Taurus Model 70 T10301s turbine with dry low-NOx combustor

3. Other: Oxidation Catalyst with control efficiency for CO: 80% and VOC: 45%

4. Pollutants controlled by Control Equipment

Equipment Controlled	Type of Control	Pollutant
Duct Burner	Selective Catalytic Reduction	NOx
	Oxidation Catalyst	VOC, CO
Combustion Turbine	Selective Catalytic Reduction	NOx
	Dry Low-NOx Combustor	NOx
	Oxidation Catalyst	VOC, CO

PART II. CONTROL EQUIPMENT, continued

B. Minimum Efficiency

Selective Catalytic Reduction, Dry Low NOx Combustor and Oxidation Catalyst shall be used to achieve limits in PART VIII, Allowable Emission Limits.

PART III. CONTINUOUS EMISSION MONITORING REQUIREMENTS AND ASSOCIATED EMISSION LIMITS (Applicable if -X- Checked)

CEM shall be required for the following pollutant/operational parameters and enforced on the following basis:

Pollutant/Operational Parameter	Averaging Times	Units
☒ Fuel Flow to turbine	continuous	scf; gallons
☒ Fuel Flow to duct burner	continuous	scf; gallons

PART IV. OPERATING REQUIREMENTS

A. The Permittee shall submit and maintain an updated standby plan pursuant to RCSA Section 22a-174-6, "Air Pollution" emergency episode procedures.

B. The turbine and duct burner shall be operated using good combustion practices.

C. The Permitee shall comply with the requirements of RCSA Section 22a-174-4, Source Monitoring, Record Keeping and Reporting.

PART V. MONITORING, RECORD KEEPING AND REPORTING REQUIREMENTS

A. Monitoring

The Permitee shall install a fuel-metering device to continuously monitor fuel flow to the turbine and duct burner (Turbine: Natural Gas and No. 2 Fuel Oil; Duct Burner: Natural Gas)

B. Record Keeping and Reporting

1. The Permittee shall keep records of annual fuel consumption for the turbine and duct burner separately. Annual fuel consumption shall be based on any consecutive 12 month time period and shall be determined by adding (for each fuel) the current month's fuel usage to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

2. The Permittee shall keep records of the fuel certification for each delivery of fuel from a bulk petroleum provider or a copy of the current contract with the fuel supplier supplying the fuel used by the equipment that includes the applicable sulfur content of the fuel as a condition of each shipment. The shipping receipt or contract shall include the date of delivery, the name of the fuel supplier, type of fuel delivered, the percentage of sulfur in such fuel, by weight, dry basis, and the method used to determine the sulfur content of such fuel.

3. The Permittee shall keep records of annual emission for the criteria pollutants, ammonia and formaldehyde listed in PART VIII of this permit. Annual emissions shall be based on any consecutive 12 month time period and shall be determined by adding the current month's emissions to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

4. The Permittee shall keep records of the annual operating hours of the combustion turbine for operations firing No. 2 fuel oil. Operating hours shall be recorded to the nearest 0.1 hour. The annual operating hours firing oil shall be based on any consecutive 12 month time period and shall be determined by adding the current month's operating hours firing oil 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 submit all required reports to the commissioner as required pursuant to RCSA Section 22a-174-22(l).

6. The Permittee shall keep records on premises indicating continual compliance with all above conditions at all times and shall make them available upon request by the commissioner for the duration of this permit, or for the previous five years, whichever is less.

PART VI. CONTROL EQUIPMENT MALFUNCTION

The Permittee shall comply with the requirements of RCSA Section 22a-174-7.

PART VII. EMISSIONS OPERATING AND MAINTENANCE (EO&M) PLAN

The owner/operator shall maintain a current EO&M Plan on-site and shall update it on a yearly basis and kept on site. The EO&M Plan shall apply to all equipment covered by this permit and shall include, but not be limited to, consideration of: maintenance of spare parts, start-up/shut-down provisions, procedures, protocols, and methodologies for demonstrating continuous compliance with applicable emission limitations. Any revision to this plan which conflicts or may conflict with any condition of this permit shall be reviewed by the commissioner and shall receive the commissioner's written approval prior to such revision.

PART VIII. ALLOWABLE EMISSION LIMITS

The Permittee shall not exceed the emission limits stated herein at any time, as determined in accordance with the applicable averaging times defined in Part III of this permit or as specified in an approved stack test protocol, except during periods of start-up, shut-down, and/or malfunction.

PART VIII. ALLOWABLE EMISSION LIMITS, continued

A. Criteria Pollutants

Combustion Turbine:

Natural Gas

Criteria Pollutants	ppmvd at 15% O_2	lb/hr
PM		2.10
PM-10		2.10
SOx		0.32
NOx	2.5	0.85
VOC		0.33
CO	10	2.08

No. 2 Fuel Oil

Criteria Pollutants	ppmvd at 15% O_2	lb/hr	TPY[a]
PM		3.00	6.75
PM-10		3.00	6.75
SOx		4.32	9.73
NOx	9.6[b]	3.25	7.31
NOx	12[c]		
VOC		5.41	12.18
CO	10[b]	3.44	7.73
CO	20[c]		
Pb		1.20E-3	2.70E-3

[a] Allowable Emissions in TPY @ 4,500 hrs/yr burning No. 2 Fuel Oil for Permits 098-0056, 098-0061 and 098-0062, combined.
[b] Operating on No. 2 Fuel Oil @ 80 - 100% load.
[c] Operating on No. 2 Fuel Oil @ 55 - 79.9% load.

Duct Burner

Natural Gas

Criteria Pollutants	lb/hr
PM	0.44
PM-10	0.44
SOx	0.04
NOx	0.58
VOC	0.18
CO	0.98
Pb	2.92E-05

PART VIII. ALLOWABLE EMISSION LIMITS, continued

Total Allowable Emissions[d]

Criteria Pollutants	TPY
PM	34.98
PM-10	34.98
SOx	13.17
NOx	22.35
VOC	17.38
CO	39.03
Pb	3.05E-03

[d] Total Allowable Emissions for Permit Nos. 098-0056, 098-0061 and 098-0062, combined.

B. Hazardous Air Pollutants

a. Ammonia: 10 ppmvd @15% O_2

b. This unit 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]

C. Demonstration of compliance with the above emission limits may be met by calculating the emission rates using emission factors from the following sources:

1. *Duct Burner Emissions: AP42 - 5th Edition (7/98)*
   NOx: 100 lb/MMcf - *Section 1.4, Table 1.4-1*
   CO: 84 lb/MMcf - *Section 1.4, Table 1.4-1*
   VOC: 5.5 lb/MMcf - *Section 1.4, Table 1.4-2*
   SOx: 0.6 lb/MMcf - *Section 1.4, Table 1.4-2*
   PM/PM10: 7.6 lb/MMcf - *Section 1.4, Table 1.4-2*

2. *Uncontrolled Turbine Emissions (Natural Gas) @ 50-100% load: Solar Turbines*
   NOx: 8.54 lb/hr, 25 ppmvd @ 15% O_2
   CO: 10.40 lb/hr, 50 ppmvd @ 15% O_2
   VOC: 0.60 lb/hr, 25 ppmvd @ 15% O_2
   SOx: 3.4E-3 lb/MMBtu – *AP42 Section 3.1, Table 3.1-2a, 5th Edition (4/00)*
   PM/PM10: 2.10 lb/hr

3. *Uncontrolled Turbine Emissions (No. 2 Fuel Oil) @ 55-79.9% load: Solar Turbines*
   NOx: 32.5 lb/hr, 120 ppmvd @ 15% O_2
   CO: 17.18 lb/hr, 100 ppmvd @ 15% O_2
   VOC: 9.84 lb/hr, 100 ppmvd @ 15% O_2
   SOx: 0.0505 lb/MMBtu – *AP42 Section 3.1, Table 3.1-2a, 5th Edition (4/00)*
   PM/PM10: 2.55 lb/hr
   Pb: 1.4E-05 lb/MMBtu - *AP42 Section 3.1, Table 3.1-5, 5th Edition (4/00)*

PART VIII. ALLOWABLE EMISSION LIMITS, continued

4. *Uncontrolled Turbine Emissions (No. 2 Fuel Oil) @ 80-100% load: Solar Turbines*
   NOx: 32.5 lb/hr, 96 ppmvd @ 15% O_2
   CO: 10.13 lb/hr, 50 ppmvd @ 15% O_2
   VOC: 2.90 lb/hr, 25 ppmvd @ 15% O_2
   SOx: 0.0505 lb/MMBtu – *AP42 Section 3.1, Table 3.1-2a, 5th Edition (4/00)*
   PM/PM10: 3.00 lb/hr
   Pb: 1.4E-05 lb/MMBtu - *AP42 Section 3.1, Table 3.1-5, 5th Edition (4/00)*

5. *Hazardous Air Pollutants – Turbine Firing No. 2 Fuel Oil*
   i. Arsenic, Beryllium, Cadmium, Chromium, Lead, Mercury, Nickel: AP42, Table 3.1-5, 5th Edition (4/00) and AP42, Table 1.4-4, 5th Edition (7/98)
   ii. Formaldehyde: AP42, Table 3.1-4, 5th Edition (4/00) and AP42, Table 1.4-3, 5th Edition (7/98)
   iii. Sulfuric Acid: DEP Memo – 8/5/87
   iv. Copper: Emission factors not available for turbine firing No. 2 fuel oil. Maximum emission rate (lb/hr) from each turbine/duct system was calculated as the sum of the duct burner emissions and the maximum emissions from the turbine (oil-fired or gas-fired) at 0 °F ambient temperature.
   v. Ammonia: most recent approved stack test result.

6. *Hazardous Air Pollutants – Turbine Firing Natural Gas*
   i. Ammonia: most recent approved stack test result.

   ii. Formaldehyde: AP42, Table 3.1-3, 5th Edition (4/00) and AP42, Table 1.4-3, 5th Edition (7/98)

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.

PART IX. STACK EMISSION TEST REQUIREMENTS

A. Stack emission testing shall be performed in accordance with the Emission Test Guidelines available on the DEEP website.

Stack testing shall be required for the following pollutants: ☒ NOx ☒ CO ☒ PM_{10} ☒ Ammonia

B. Stack testing is required for all fuels and for combined operations of the turbine and duct burner to show compliance with the allowable emission limits for NOx, CO, PM_{10} and Ammonia in Part VIII of this permit.

C. Recurrent stack testing for NOx, CO, PM_{10} and Ammonia shall be performed within five years from the previous stack test to demonstrate compliance with the limits in Part VIII of this permit.

PART IX. STACK EMISSION TEST REQUIREMENTS, continued

D. The maximum rated capacity of the turbine may be corrected for the ambient temperature at the time of stack testing using Equation 1 and 2 below.
Note: The equation is applicable at temperatures between 0°F and 100°F

Equation 1: Natural Gas

$Y: -0.0004T^2 - 0.1988T + 94.37$

Equation 2: No. 2 Fuel Oil

$Y: -0.0003T^2 - 0.1879T + 85.62$

Where Y= Heat Input (MMBtu/hr)
T= Ambient Air Temperature (°F)

E. Stack test results shall be reported in units of lb/hr and ppmvd at 15% O_2.

F. The commissioner retains the right to require stack testing of any pollutant at any time to demonstrate compliance.

PART X. SPECIAL REQUIREMENTS

A. The Permittee shall operate and maintain this equipment in accordance with the manufacturer's specifications and written recommendations.

B. *Noise (for non-emergency use)*

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.

C. The Permittee shall comply with all applicable sections of the following New Source Performance Standard at all times.

Title 40 CFR Part 60, Subparts A (General Provisions), Dc[1] (Standard of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) and GG[2] (Standards of Performance for Stationary Gas Turbines)

[1] For Duct Burner
[2] For turbine

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

D. Emergency Engines

i. Equipment: Cummins Model 35GGFD natural gas-fired generator **(EU 599)**
Location: 1386 Storrs Road, Storrs
Operating Limit: Maximum Hours of Operation over any Consecutive 12 Month Period shall not exceed 300 hours

ii. Equipment: Cummins Model 60GGHE or equivalent natural gas-fired emergency generator **(EU 606)**
Location: Football Complex
Operating Limit: Maximum hours of operation over any consecutive 12 month period shall not exceed 300 hours

iii. Record Keeping Requirements
The Permittee shall monitor and keep records of monthly and annual operating hours for each engine listed above. Annual operating hours shall be based on any 12 consecutive month time period and shall be determined by adding the current month's operating hours to that of the previous 11 months. The Permittee shall make these calculations within 30 days of the end of the previous month.

The Permittee shall keep records on the premises indicating continual compliance with the above conditions at all times and shall make them available upon request by the Commissioner for the duration of this permit, or for the previous five years, whichever is less.

E. Other equipment (GEU-8)

i. Equipment:

- Nine Laars RHEOS+ Model 1600 natural gas-fired condensing boilers, each rated at 1.6 MMBtu/hr or equivalent

- Three Laars RHEOS+ Model 2000 natural gas-fired condensing boilers, each rated at 2.0 MMBtu/hr or equivalent

Location: Hilltop Apartments

Operating Limit: Total natural gas consumption over any consecutive 12 month period shall not exceed 536,112 ccf for this equipment combined.

ii. Equipment: All natural gas-fired heating equipment

Location: Charter Oak Apartments and Suites, Husky Village, Hilltop Apartments Community Center (2353 Alumni Drive), and Hilltop Apartments Building No. 22 (22 Husky Circle)

Operating Limit: Total natural gas consumption over any consecutive 12 month period shall not exceed 689,482 ccf for all heating equipment at these locations combined.

iii. Equipment: All natural gas-fired heating equipment

Location: Hilltop Suites

Operating Limit: Total natural gas consumption over any consecutive 12 month period shall not exceed 142,700 ccf for all heating equipment at this location combined.

PART X. SPECIAL REQUIREMENTS, continued

iv. Record Keeping Requirements

The Permittee shall monitor and keep records of the total monthly and total annual fuel consumption for each group of equipment at the locations listed above. These records shall be obtained from monthly utility billing records. Annual fuel consumption shall be based on the fuel consumption determined from any 12 consecutive months of billing records and shall be calculated by adding the fuel consumption from the current month's billing records to the fuel consumption obtained from the previous 11 months of billing records. The Permittee shall make these calculations within 30 days after the date that each month's billing records become available.

The Permittee shall keep records on the premises indicating continual compliance with the above conditions at all times and shall make them available upon request by the Commissioner for the duration of this permit, or for the previous five years, whichever is less.

PART XI. NOx Offsets

To avoid the requirements of RCSA Section 22a-174-3a(l) (Permit Requirements For Non-attainment Areas), the University of Connecticut secured NOx offsets from the shutdown of Bigelow Boiler No. 8 (Serial No. 13000, EMU 018) at the Central Heating Plant. A total of 16.83 TPY of NOx offsets were obtained from the shutdown of Bigelow Boiler No. 8.

Bigelow Boiler No. 8 has DEEP issued Registration (Registration No. 098-0021). Registration No. 098-0021 was revoked on December 31, 2005.

PART XII. PREMISES WIDE EMISSION CAP FOR HAZARDOUS AIR POLLUTANTS (HAPs)

A. Annual HAP emissions for the premises shall be less than 10 TPY of a single hazardous air pollutant and less than 25 TPY of any combination of HAPs.

B. The Permittee shall calculate and record the monthly and consecutive 12 month HAP emissions, both by single HAP and total HAPs, from the premises. The consecutive 12 month emissions of HAPs shall be determined by adding the current month's emissions to that of the previous 11 months for the premises.

PART XIII. 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.

PART XIII. ADDITIONAL TERMS AND CONDITIONS, continued

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 or 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.

NSR Engineering Evaluation

CT Department of Energy and Environmental Protection
Bureau of Air Management

Company Name:	The University of Connecticut	**Permit Nos.:**	098-0056, 098-0061 and 098-0062
Equipment Location:	240 Glenbrook Road, adjacent to existing Central Heating Plant, Storrs	**Date App Received:**	10/14/2015
Mailing Address:	31 LeDoyt Road – U 3038, Storrs, CT 06269	**SIMS No.:**	201507918, 201507921 and 201507837
Contact Person:	Mr. Mark Bolduc	**Date Prepared:**	10/27/2015
Contact Title:	Environmental Compliance Analyst	**Prepared By:**	Lidia Howard
Contact Phone:	(860) 486-8148	**Single or Multiple Units:**	Multiple
Contact Email:	mark.bolduc@uconn.edu	**Permit Type:**	Minor Mod (prepaid)
Ozone:	serious non-attainment	**Premises Size:**	Major
PM2.5:	attainment	**Equipment Size:**	Minor
Equipment Description	Three Solar Taurus with duct burners	**TV/GPLPE Permit No:**	098-0029-TV

Step 1: Complete all the fields above

Step 2: Generate Eval Step 3: Update Fields

Introduction

Reason for Application: The University of Connecticut (UCONN) submitted three applications to modify Permit Nos. 078-0056, 0061 and 0062. Specifically, UCONN is requesting to incorporate equations into the permits that will reflect the relationship between inlet temperature and heat input for natural gas and No. 2 fuel oil.

Regulatory Applicability: RCSA §22a-174-2a(e)

Discussion of Modification: UCONN requested to include two equations, one for natural gas and one for No. 2 fuel oil to reflect the relationship between the inlet temperature and heat input. This will allow the stack testing group to stack test the turbine at 90% of its maximum rated capacity and adjust parameters in the permit as a function of ambient temperature.

Additionally, the following changes were incorporated:

1. The first page of the permit now reflects the two collateral conditions that are in Part X and XII of the permits.

2. Part VII - Emissions Operating and Maintenance Plan, Part IX – Stack Emission Test Requirements and Part XI – NOx Offsets were updated to reflect current requirements.

3. Part VIII – Allowable Emission Limits: the language for HAPs: the tables were replaced with the current HAPs requirement language from the masters as follows:
   a. Ammonia: 10 ppmvd @15% O_2

   b. This unit 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]

4. Part X – Special Requirements: to provide UCONN with the flexibility of replacing heating equipment the EU numbers were removed from the permits.
   The nine boilers (less than 2.0 MMBtu/hr) located at Hilltop Apartments and the heating equipment located at Charter Oak Apartments and Suites, Husky Village, Hilltop Apartments Community Center (2353 Alumni Drive), Hilltop Apartments Building No. 22 (22 Husky Circle) and Hilltop Suites have a fuel limit allocated to each group.

   Individually, none of the pieces of equipment triggers the requirements of RCSA §22a-174-3a. Since each group of equipment has a cap on the fuel, the replacement of equipment will not increase emissions. The cap was evaluated and included in the 2005 modification to the permits (see Attachment A).

   The Title V permit is the document that keeps track of emission units by identifying each piece by EU number. Moving forward, the emission units mentioned above will be identified as GEU-8 in Section II – Table II.A. of the Title V Permit.

The requested changes do not affect emissions from the premises.

Pursuant to RCSA §22a-174-2a(e)(6) the minor modification to Permit Nos. 098-0056, 098-0061 and 098-0062 will be issued without published notice, public comment or hearing.

Permit Fee(s) (Double Click to edit)

Equipment Size	○ Major		◉ Minor
Permit Type	Minor Permit Mod		
Permit Fee		$1,750	ea.
Municipality	☐ Yes		
# of Permits/Applications		3	$5,250
Application Fee Submitted	☑ Yes		-$2,820
Was Permit Fee paid with Application Fee?	☑ Yes		-2430

Additional Application Fees ($1750 Each)

	Quantity	
BACT Review	0	$0
LAER Review	0	$0

Money Owed	**$0**

Compliance History Review

Was the SIMS Enforcement Report run and reviewed for this applicant?	Yes
Were other bureaus contacted to resolve any outstanding enforcement actions shown in the SIMS Report?	N/A
What is the date on the Enforcement Section's review of air compliance email?	10/21/2015
Was the compliance record reviewed in accordance with the Environmental Compliance History Policy?	Yes

Approvals

Based on the information submitted by the applicant, this engineering evaluation and the compliance history review, the granting of permits is recommended for The University of Connecticut.

Lidia J. Howard 11/17/15
Lidia J. Howard
APCE II

Susan E. Amarello 11/17/2015
Susan E. Amarello
Supervising APCE

Jaimeson Sinclair 11/23/15
Jaimeson Sinclair
Assistant Director

Attachment A

MEMORANDUM

TO: Gary S. Rose, Director
Anne R. Gobin, Bureau Chief

Date Rec'd: June 17, 2005
PAMS Nos.: 200501585-87
EPE Nos.: 22125-27

FROM: Lidia Howard, APCE
Richard A. Pirolli, SAPCE

SUBJECT: Minor Permit Modifications to Permit Numbers 098-0056, 098-0061 & 098-0062

DISCUSSION:

The University of Connecticut (UCONN) submitted a written request on June 16, 2005 for a minor modification to incorporate collateral conditions to Permit Numbers 098-0056, 098-0061 & 098-0062 for several pieces of equipment located at the Storrs Campus.

Permit Numbers 098-0056, 098-0061 & 098-0062 for three (3) Solar Taurus Turbines (Cogeneration facility) were issued on September 13, 2004. During the technical evaluation it was determined that the project did not trigger the requirements for nonattainment New Source Requirement (NSR) permitting. Pursuant to the "de minimis rule" of Section 182(c)(6) and (f) of the Clean Air Act and Section 22a-174-3a(a)(6) of the Regulations of Connecticut State Agencies (RCSA), that demonstration was made by showing that the sum of all of the emissions increases and decreases at the UCONN premises over the past five (5) years was less than twenty-five (25) tons per year of nitrogen oxide (NOx) and Volatile Organic Compound (VOC).

However, after the permits were issued UCONN determined that a number of emission sources were inadvertently omitted from the five (5) year emissions aggregation calculations submitted in support of the permit applications for the Cogeneration facility. Additionally, UCONN is also proposing the installation of some new emission sources. As such, UCONN is seeking enforceable limits on these sources, so the aggregated net emission increases of NOx and VOC can be kept below the twenty-five (25) tons per year to avoid nonattainment NSR.

Most of the new and omitted sources do not trigger the need to obtain permits under Section 22a-174-3a. The enforceable allowable limitations for these sources will be incorporated into Permit Numbers 098-0056, 098-0061 & 098-0062.

Pursuant to Section 22a-174-2a(e) the incorporation of enforceable allowable limits for the omitted sources constitute a minor modification because the increase of potential emissions, above allowable emissions, is less than fifteen (15) tons per year. Pursuant to Section 22a-174-2a(e)(6), a notice of Tentative Determination will be published in the newspaper to allow for public comment.

Table No.1 and Table No. 2 below show the updated five (5) year aggregation for NOx and VOC emissions:

Table No.1: Five (5) year NOx Aggregation Review

Year	Equipment Removed	Actual Emissions Decreases (TPY)	Equipment Installed/ Modified	Actual Emissions Increases (TPY)	Net Emissions [a]
2001	Diesel Fire Pump Engine - Wilbur Cross [d]	0.01	100 kW Natural gas Fired Generator Capstone Apartments [d]	0.11	
	Diesel Fire Pump Engine - Jorgensen Aud.[d]	0.01	*NG Heaters - Hilltop Apts (47 units)*	0.32	
			Hilltops Apts. (310 units)	0.76	
			NG boilers – Hilltop Suites	0.71	
		- 0.02		**+ 1.90**	**+ 1.88**
2002	350 kW Diesel Generator - Torrey Life Science (Permit No. 098-0017) Revoked	0.08	150 kW LPG-Fired Generators - Alumni Quad [d]	0.42	
			65 kW LPG-Fired Generator - Buckley Hall [d]	0.26	
			17 kW LPG-Fired Generator - Hilltop Dorms [d]	0.07	
			35 kW LPG-Fired Generator - McMahon Hall [d]	0.14	
			60 kW LPG-Fired Generator - Shippee Hall [d]	0.25	
		- 0.08		**+ 1.14**	**+ 1.06**
2003	600 kW Diesel Generator – Pharmacy Building (Permit No. 098-0013) Revoked	0.07	250 kW NG fired generator – Towers Dorms	1.92	
			GF heating equip – Husky Village	0.52	
			GF heating equip – Charter Oak Apts. and Suites	2.40	
	275 kW Diesel Generator – Castleman Building (Permit No. 098-0014) Revoked	0.10			
		- 0.17		**+ 4.84**	**+ 4.67**
2004	Insignificant Activities		Poultry Facility Heating units	0.33	
			Poultry Facility Generator	0.26	
		- 0.0		**+ 0.59**	**+ 0.59**
2005	Boiler #8 -Central Heating Plant [c] (Reg. 098-0021)	16.83	1,500 kW Emergency Diesel Generator	8.47	
	Natural gas-fired heaters – Hilltops Apts. (310 units)	0.76	Cogeneration Facility (Permit Nos. 098-0056, 098-0061, 098-0062)	22.35	
			Hilltop Apts. – 12 Laars NG fired condensing boilers	0.38	
			Football Complex – 60 kW NG fired emergency engine	0.48	
		- 17.59		**+ 31.68**	**+ 14.09**
TOTAL NET EMISSIONS INCREASES (2001 – 2005) [b]					**+ 22.29**

a. Net Emissions = Emissions Increases – Emissions Decreases

b. Total Net Emissions = Net Emissions (2001 + 2002 + 2003 +2004 + 2005)

c. Boiler #8 will be removed from the Central Heating Plant upon start of commercial operation of the Cogeneration facility

d. NPR = No Permit Required

Italics indicates sources for which new collateral permit conditions are being proposed by UCONN

Table No.2: Five (5) year VOC Aggregation Review

Year	Equipment Removed	Actual Emissions Decreases (TPY)	Equipment Installed/ Modified	Actual Emissions Increases (TPY)	Net Emissions [a]
2001	Insignificant Activities		100 kW Natural gas Fired Generator Capstone Apartments [d]	0.06	
			NG Heaters - Hilltop Apts (47 units)	0.02	
			Hilltops Apts. (310 units)	0.04	
			NG boilers – Hilltop Suites	0.04	
		- 0.00		**+ 0.16**	**+ 0.16**
2002	350 kW Diesel Generator - Torrey Life Science (Permit No. 098-0017) Revoked	0.01	150 kW LPG-Fired Generators - Alumni Quad [d]	0.10	
			65 kW LPG-Fired Generator - Buckley Hall [d]	0.06	
			17 kW LPG-Fired Generator - Hilltop Dorms [d]	0.02	
			35 kW LPG-Fired Generator - McMahon Hall [d]	0.03	
			60 kW LPG-Fired Generator - Shippee Hall [d]	0.06	
		- 0.01		**+ 0.27**	**+ 0.26**
2003	275 kW Diesel Generator – Castleman Building (Permit No. 098-0014) Revoked	0.01	250 kW NG fired generator – Towers Dorms	0.05	
			GF heating equip – Husky Village	0.03	
			GF heating equip – Charter Oak Apts. and Suites	0.14	
		- 0.01		**+ 0.22**	**+ 0.21**
2004	Insignificant Activities		Poultry Facility Heating units	0.02	
			Poultry Facility Generator	0.01	
		- 0.0		**+ 0.03**	**+ 0.03**
2005	Boiler #8 -Central Heating Plant [c] (Reg. 098-0021)	1.42	1,500 kW Emergency Diesel Generator	0.36	
	Natural gas-fired heaters – Hilltops Apts. (310 units)	0.04	Cogeneration Facility (Permit Nos. 098-0056, 098-0061, 098-0062)	17.38	
			Hilltop Apts. – 12 Laars NG fired condensing boilers	0.15	
			Football Complex – 60 kW NG fired emergency engine	0.04	
		- 1.48		**+ 17.93**	**+ 16.47**
TOTAL NET EMISSIONS INCREASES (2001 – 2005) [b]					**+ 17.13**

a. Net Emissions = Emissions Increases – Emissions Decreases
b. Total Net Emissions = Net Emissions (2001 + 2002 + 2003 +2004 + 2005)
c. Boiler #8 will be removed from the Central Heating Plant upon start of commercial operation of the Cogeneration facility
d. NPR = No Permit Required
Italics indicates sources for which new collateral permit conditions are being proposed by UCONN

The five (5) year net emissions increase of NOx and VOC is 22.29 TPY and 17.13 TPY respectively. These numbers take into account the requested enforceable collateral conditions on omitted and new proposed equipment. Neither VOC nor NOx net emissions increase trigger nonattainment review, thus the update of the omitted and new proposed equipment does not change the outcome of the issued permits for the cogeneration facility. Table No. 3 summarizes the equipment and proposed operating limits:

Table No.3 Equipment and Proposed Operating Limit

Location/Equipment	**Proposed Operating Limit**
Football Complex – 60 kW Emergency Generator	Maximum Annual Operating Hours = 300
Hilltop Apartments – 12 Laars Boilers	Maximum Annual natural Gas Consumption = 536,112 ccf
Charter Oak Apts. & Suites, Husky Village, Hilltop Apts. Bldg. No. 22, Hilltop Apts. Community Center	Combined Maximum Annual Natural Gas Consumption = 689,482 ccf
Hilltop Suites	Maximum Annual Natural Gas Consumption = 142,700 ccf

The compliance record was reviewed in accordance with the Environmental Compliance History Policy. The applicant's submitted compliance information form was reviewed along with agency records, including the PAMS Enforcement database, for information to evaluate the applicant's compliance history and the relevance of such history to the activity for which authorization is being sought. Additionally, a review of air program compliance was requested from the Compliance and Field Operations Division and that response forms a part of this record.

Based on the information submitted by the applicant, this engineering evaluation and the compliance history review, the granting of minor modifications to Permit Numbers 098-0056, 098-0061 & 098-0062 is recommended for The University of Connecticut - Storrs.

Lidia Howard 9/22/05

Lidia Howard
APCE II

Date

REVIEW:

Richard A. Pirolli
Supervising APCE