28 September 2010

Mr. Kevin Schmidt
Vice-President, Manufacturing
Aspen Aerogels, Inc.
30 Forbes Road, Bldg A
Northborough, MA 01532

Dear Mr. Schmidt:

The Department of Environmental Management, Office of Air Resources has reviewed and approved your request for installation of process and air pollution control equipment at your facility located at 3 Dexter Road, East Providence, RI.

Enclosed is a revised minor source permit issued pursuant to our review of your request (Approval Nos. 1890, 1893 & 2111-2113).

Please note that beginning on 1 October 2010, your facility will be required to use diesel fuel oil with a sulfur content of 15 ppm or less in order to comply with 40 CFR Part 60 Subpart IIII.

The terms and conditions of your existing minor source permit (Approval Nos. 1890-1893), issued on 4 June 2010, shall remain in effect until the new air pollution control equipment (Approval Nos. 2112 & 2113) is installed and operational.

I can be reached at 401-222-2808, extension 7110 if there are any questions.

Sincerely,

Ruth A. Gold
Principal Air Quality Specialist
Office of Air Resources

cc: East Providence Building Official
Mike Feinblatt - ESS

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

MINOR SOURCE PERMIT

ASPEN AEROGELS, INC.

APPROVAL NOs. 1890, 1893 & 2111-2113

Pursuant to the provisions of Air Pollution Control Regulation No. 9, this minor source permit is issued to:

Aspen Aerogels, Inc.

For the following:

Installation of process equipment for the production of aerogel insulation materials (Approval No. 2111). Installation of an air pollution control system consisting of a CSSI V-P-8-5.5BN wet scrubber (Approval No. 2112) followed by a Megtech Cleanswitch 250-LT RTO regenerative thermal oxidizer (Approval No. 2113).

Located at: *3 Dexter Road, East Providence*

This permit shall be effective from the date the air pollution control system is installed and is operational and shall remain in effect until revoked by or surrendered to the Department. This permit does not relieve *Aspen Aerogels, Inc.* **from compliance with applicable state and federal air pollution control rules and regulations. The design, construction and operation of this equipment shall be subject to the attached permit conditions and emission limitations.**

Douglas L. McVay, Acting Chief
Office of Air Resources

Date of issuance

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

Permit Conditions and Emission Limitations

ASPEN AEROGELS, INC.

APPROVAL NOS. 1890, 1893 & 2111-2113
(September 2010 revision)

A. Emission Limitations

The following emission limitations are applicable to the process and ancillary equipment operated for the production of aerogel insulation materials.

1. Raw Material Storage Tanks

The following requirements are applicable to the storage and/or transfer of VOCs:

a. All storage tanks that store VOC shall have a vapor balance system that is designed and operated to route VOCs displaced from loading of the storage tank to the tank truck or railcar from which the storage tank is filled.

b. Tank trucks and railcars must have a current certification in accordance with the U.S. Department of Transportation (DOT) pressure test requirements of 49 CFR 180 for tank trucks and 49 CFR 173.31 for railcars.

c. VOCs must only be unloaded from tank trucks or railcars when vapor balance systems are connected to the storage tank's vapor balance system.

d. No pressure relief device on the storage tank, railcar or tank truck shall open during loading or as a result of temperature changes (breathing losses).

e. The pressure relief devices on all storage tanks that store VOC shall be set to no less than 1.25 psig at all times to minimize breathing losses.

2. Process Vessels (Solution Preparation, Aging, Extraction, Alcohol Recovery)

a. All process vessels shall be either totally closed vessels or equipped with tightly fitted covers that are vented to an air pollution control system.

b. All VOC emissions generated from any process vessel shall be captured and discharged to the air pollution control system consisting of a wet scrubber followed by a thermal oxidizer.

3. Casting Tables

All VOC and ammonia emissions generated at the two casting tables and roll windup areas shall be captured and discharged to the air pollution control system consisting of a wet scrubber followed by a thermal oxidizer.

4. Heat Treatment Ovens

All VOC, ammonia and particulate matter emissions generated from the two heat treatment ovens shall be captured and discharged to the air pollution control system consisting of a wet scrubber followed by a thermal oxidizer.

5. Emergency Generator

The following emission limitations are applicable to the engine/generator set.

a. Sulfur Dioxide

All diesel fuel burned in the engine/generator set shall contain no more than 15 ppm sulfur by weight.

b. Opacity

Visible emissions from the engine/generator set shall not exceed 10% opacity except for a period or periods aggregating no more than three minutes in any one hour. This visible emission limitation shall not apply during startup of the engine. Engine startup shall be defined as the first ten minutes of firing following the initiation of firing.

6. Volatile Organic Compounds (VOC)

a. The total quantity of volatile organic compound emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 52,572 pounds in any consecutive 12-month period.

b. The total quantity of volatile organic compound emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 6.09 pounds per hour.

c. The overall VOC control efficiency of the wet scrubber and thermal oxidizer air pollution control system shall be at least 98%.

7. Nitrogen Oxides (NOx)

a. The total quantity of NOx emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 47,655 pounds in any consecutive 12-month period.

b. The total quantity of NOx emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 5.44 pounds per hour.

8. Listed Toxic Air Contaminants

a. Isopropanol

The total quantity of isopropanol emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 18.94 pounds per hour.

b. Ammonia

(1) The ammonia control efficiency of the wet scrubber shall be at least 90%.

(2) The total quantity of ammonia emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed:

(a) 3.00 pounds per hour; and,

(b) 26,280 pounds in any consecutive 12-month period.

9. Other Air Contaminants

a. The total quantity of hexamethyldisiloxane (HMDS) emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed 229 pounds in any consecutive 12-month period.

b. The total quantity of hexamethyldisilizane (HMDZ) emissions discharged to the atmosphere from the production of aerogel insulation materials shall not exceed:

(1) 0.026 pounds per hour; and,

(2) 229 pounds in any consecutive 12-month period.

10. Odors

Any air contaminant or combination of air contaminants discharged to the atmosphere from the facility shall not create an objectionable odor beyond the property line of this facility. Odor evaluations shall be conducted according to the provisions of Air Pollution Control Regulation No. 17.

11. Opacity

Visible emissions discharged into the atmosphere from the production of aerogel insulation materials shall not exceed 10% opacity (six-minute average).

B. Operating Requirements

1. The owner/operator shall not produce more than 160 aerogel blankets per day. One aerogel blanket is defined as a roll of insulating material that is at least 5 feet wide and 36 inches in diameter.

2. Casting Table Enclosure

a. To ensure 100 percent capture of the VOC and ammonia generated, the two casting tables must be located within a total enclosure. This total enclosure must meet criteria for a permanent total enclosure in 40 CFR 51, Appendix M, Method 204 – "Criteria For and Verification of a Permanent or Temporary Total Enclosure".

b. All access doors and windows in the total enclosures for the casting tables shall be closed during routine operation. Brief, occasional openings of doors to allow for access and inspection are acceptable.

c. Air passing through any natural draft opening in the total enclosures for the casting tables shall flow into the enclosures continuously.

3. The operating temperature of the thermal oxidizer shall be maintained at or above 1500°F whenever VOC and/or ammonia are being discharged to the oxidizer, or at a lower temperature that has been demonstrated in the most recent compliance test to achieve the required control efficiency.

4. The wet scrubber and thermal oxidizer air pollution control system shall be operated according to their design specifications whenever the emission points vented to the control system are emitting air contaminants. The thermal oxidizer must operate at any time that air contaminants are being emitted to the wet scrubber.

5. Engine/Generator Set

a. The maximum firing rate of the engine/generator set shall not exceed 71.2 gallons per hour.

b. The engine/generator set shall not operate more than 500 hours in any consecutive 12-month period.

c. The emergency generator shall be used only during emergencies or for maintenance or testing purposes. Emergency means an electric power outage due to a failure of the electrical grid, on-site disaster, local equipment failure, or public service emergencies such as flood, fire, or natural disaster. Emergency shall also mean periods during which ISO New England, or any successor Regional Transmission Organization, directs the implementation of operating procedures for voltage reductions, voluntary load curtailments by customers or automatic or manual load shedding within Rhode Island in response to unusually low frequency, equipment overload, capacity or energy deficiency, unacceptable voltage levels or other such emergency conditions.

d. The emergency generator shall not be operated in conjunction with any voluntary demand-reduction program or any other interruptible power supply arrangement with a utility, other market participant or system operator unless such program is implemented at the same time as ISO New England, or any successor Regional Transmission Organization, directs the implementation of operating procedures for voltage reductions, voluntary load curtailments by customers or automatic or manual load shedding within Rhode Island in response to unusually low frequency, equipment overload, capacity or energy deficiency, unacceptable voltage levels or other such emergency conditions.

C. Monitoring

1. The thermal oxidizer operating temperature shall be continuously monitored and recorded. The temperature monitoring device shall be calibrated annually. The device must be capable of monitoring temperature with an accuracy of ±1 percent of the temperature being monitored in °C or ±1°C, whichever is greater.

2. The wet scrubber pH and pressure drop shall be monitored and indicated continuously. The owner/operator shall record the wet scrubber pH and pressure drop a minimum of once per day. The date, time and measurement shall be recorded.

3. The engine/generator set shall be equipped with a non-resettable elapsed time meter to indicate, in cumulative hours, the elapsed engine operating time.

4. The owner/operator shall perform an annual leak inspection of all equipment in VOC service. For this inspection, detection methods incorporating sight, sound, and smell are acceptable. Each piece of equipment that is in VOC service shall be inspected when in service.

D. Stack Testing

1. Within 180 days of the startup of the equipment installed under this approval, emissions testing shall be conducted for VOCs, nitrogen oxides and each listed toxic air contaminant.

2. A stack testing protocol shall be submitted to the Office of Air Resources for review at least 60 days prior to the performance of any stack tests. The owner/operator shall provide the Office of Air Resources at least 60 days prior notice of any stack test.

3. All test procedures used for emissions testing shall be conducted in accordance with Appendix A of 40 CFR 60 or another method approved by the Office of Air Resources and U.S. Environmental Protection Agency (EPA) prior to the performance of any emissions tests.

4. The owner/operator shall install any and all test ports or platforms necessary to conduct the required testing, provide safe access to any platforms and provide the necessary utilities for sampling and testing equipment.

5. All testing shall be conducted under operating conditions deemed acceptable and representative for the purposes of assessing compliance with the applicable emissions limitations.

6. A final report of the results of stack testing shall be submitted to the Office of Air Resources no later than 60 days following completion of testing.

7. All stack testing must be observed by the Office of Air Resources or its authorized representative to be considered acceptable, unless the Office of Air Resources provides authorization to the owner/operator to conduct the testing without an observer present.

E. Fuel Oil Testing

1. Compliance with the diesel fuel sulfur limits may be determined based on a certification from the fuel supplier. Fuel supplier certifications shall include the following information:

    a. The name of the fuel supplier;

    b. The sulfur content of the fuel from which the shipment came or the shipment itself;

    c. The location of the fuel when the sample was drawn for analysis to determine the sulfur content of the fuel, specifically including whether the fuel was sampled as delivered to Aspen Aerogels, Inc. or whether the sample was drawn from fuel in storage at the fuel supplier's facility or another location;

    d. The method used to determine the sulfur content of the fuel.

2. As an alternative to fuel supplier certification, the owner/operator may elect to sample the fuel prior to combustion. Sampling and analysis shall be conducted for the fuel in the initial tank(s) of fuel to be fired in the engine and after each new shipment of fuel is received. Samples shall be collected from the fuel tank immediately after the fuel tank is filled and before any fuel is combusted.

F. Recordkeeping and Reporting

1. The owner/operator shall maintain the following records:

    a. The number of blankets of aerogel insulation produced each day.

    b. The operating temperature of the thermal oxidizer.

    c. The pH and pressure drop of the wet scrubber used to comply with the requirements of this permit.

    d. A maintenance log for the capture systems, control devices, and monitoring equipment detailing all routine and non-routine maintenance performed including dates and duration of any outages.

2. The owner/operator shall, on a monthly basis, no later than 5 business days after the first of the month, determine the total quantity of VOCs discharged to the atmosphere from the production of aerogel insulation materials. The owner/operator shall keep records of this determination and provide such records

to the Office of Air Resources upon request.

3. The owner/operator shall notify the Office of Air Resources in writing, within 15 days, whenever the total quantity of VOCs discharged to the atmosphere from the production of aerogel insulation materials exceeds 6.09 pounds per hour or 52,572 pounds in any consecutive 12-month period.

4. The owner/operator shall, on a monthly basis, no later than 5 business days after the first of the month, determine the total quantity of nitrogen oxides (NOx) discharged to the atmosphere from the thermal oxidizer. The owner/operator shall keep records of this determination and provide such records to the Office of Air Resources upon request.

5. The owner/operator shall notify the Office of Air Resources in writing, within 15 days, whenever the total quantity of nitrogen oxides (NOx) discharged to the atmosphere from the thermal oxidizer exceeds 47,655 pounds in any consecutive 12-month period.

6. The owner/operation shall, on a monthly basis, no later than 5 business days after the first of the month, determine the total quantity of the ammonia, isopropanol, hexamethyldisilizane and hexamethyldisiloxane discharged to the atmosphere. The owner/operator shall keep records of this determination and provide such records to the Office of Air Resources upon request.

7. The owner/operator shall notify the Office of Air Resources in writing, within 15 days, whenever the total quantity of ammonia, isopropanol, hexamethyldisilizane or hexamethyldisiloxane discharged to the atmosphere exceeds any of the following limitations:

    a. Isopropanol: 18.94 pounds per hour

    b. Ammonia: 3.00 pounds per hour or 26,280 pounds in any consecutive 12-month period.

    c. Hexamethyldisiloxane: 229 pounds in any consecutive 12-month period.

    d. Hexamethyldisilizane: 0.026 pounds per hour or 229 pounds in any consecutive 12-month period.

8. The owner/operator shall, on a monthly basis, no later than 5 days after the first of each month, determine and record the hours of operation and fuel use for the engine/generator set for the previous 12-month period.

9. The owner/operator shall notify the Office of Air Resources, in writing, whenever the hours of operation in any 12-month period exceed 500 hours for the

engine/generator set.

10. For any leak detected pursuant to condition C.4, the owner/operator shall record the following information:

    a. The name of the leaking equipment;

    b. The date and time the leak is detected;

    c. The action taken to repair the leak;

    d. The date and time the leak is repaired.

11. For any leak inspection conducted pursuant to condition C.4 during which no leaks are detected, the owner/operator shall record the following information:

    a. A record that the inspection was performed;

    b. The date and time of the inspection; and,

    c. A statement that no leaks were detected.

12. The owner/operator shall notify the Office of Air Resources of any anticipated noncompliance with the terms of this permit or any other applicable air pollution control rules and regulations.

13. The owner/operator shall notify the Office of Air Resources, in writing, of the anticipated date of the initial start-up of the air pollution control equipment covered by this permit not more than 60 days nor less than 30 days of the anticipated date.

14. The owner/operator shall notify the Office of Air Resources, in writing, of the date of actual start-up of the air pollution control equipment covered by this permit no later than 15 days after such date.

15. The owner/operator shall maintain copies of all fuel supplier certifications or fuel analyses and these copies shall be made accessible for review by the Office of Air Resources or its authorized representative and EPA. These records shall include a certified statement, signed by the owner/operator of the facility, that the records represent all of the fuel combusted at the facility.

16. The owner/operator shall notify the Office of Air Resources, in writing, of any noncompliance with the terms of this permit within 30 calendar days of becoming aware of such occurrence and supply the Director with the following information:

    a. The name and location of the facility;

b. The subject source(s) that caused the noncompliance with the permit term;

c. The time and date of first observation of the incident of noncompliance;

d. The cause and expected duration of the incident of noncompliance;

e. The estimated rate of emissions (expressed in lbs/hr or lbs/day) during the incident and the operating data and calculations used in estimating the emission rate.

f. The proposed corrective actions and schedule to correct the conditions causing the incidence of noncompliance.

17. The owner/operator shall notify the Office of Air Resources in writing of any planned physical or operational change to any equipment covered under this approval that would:

a. Change the representation of the facility in the application.

b. Alter the applicability of any state or federal air pollution rules or regulations.

c. Result in the violation of any terms or conditions of this permit.

d. Qualify as a modification under APC Regulation No. 9.

Such notification shall include:

- Information describing the nature of the change.
- Information describing the effect of the change on the emission of any air contaminant.
- The scheduled completion date of the planned change.

Any such change shall be consistent with the appropriate regulation and have the prior approval of the Director.

18. All records required in this permit shall be maintained for a minimum of five years after the date of each record and shall be made available to representatives of the Office of Air Resources upon request.

G. Malfunctions

1. Malfunction means a sudden and unavoidable breakdown of process or control equipment. In the case of a malfunction of any air pollution control system, all reasonable measures shall be taken to assure resumption of the designed control efficiency as soon as possible. In the event that the malfunction of an air pollution control system is expected or may reasonably be expected to continue for longer than 24 hours and if the owner or operator wishes to operate the source on which it is installed at any time beyond that period, the Director shall be petitioned for a variance under Section 23-23-15 of the General Laws of Rhode Island, as amended. Such petition shall include, but is not limited to, the following:

    a. Identification of the specific air pollution control system and source on which it is installed;

    b. The expected period of time that the air pollution control system will be malfunctioning or out of service;

    c. The nature and quantity of air contaminants likely to be emitted during said period;

    d. Measures that will be taken to minimize the length of said period;

    e. The reasons that it would be impossible or impractical to cease the source operation during said period.

2. The owner/operator may seek to establish that a malfunction of any air pollution control system that would result in noncompliance with any of the terms of this permit or any other applicable air pollution control rules and regulations was due to unavoidable increases in emissions attributable to the malfunction. To do so, the owner/operator must demonstrate to the Office of Air Resources that:

    a. The malfunction was not attributable to improperly designed air pollution control equipment, lack of preventative maintenance, careless or improper operation, or operator error;

    b. The malfunction was not part of a recurring pattern indicative of inadequate design, operation, or maintenance;

    c. Repairs were performed in an expeditious fashion. Off-shift labor and overtime should be utilized, to the extent practicable, to ensure that such repairs were completed as expeditiously as practicable.

    d. All possible steps were taken to minimize emissions during the period of time that the repairs were performed.

e. Emissions during the period of time that the repairs were performed will not:

(1) Cause an increase in the ground level ambient concentration at or beyond the property line in excess of that allowed by Air Pollution Control Regulation No. 22; and

(2) Cause or contribute to air pollution in violation of any applicable state or national ambient air quality standard.

f. The reasons that it would be impossible or impractical to cease the source operation during said period.

g. The owner/operator's action in response to the excess emissions were documented by properly signed, contemporaneous operating logs or other relevant evidence.

This demonstration must be provided to the Office of Air Resources, in writing, within two working days of the time when the malfunction occurred and contain a description of the malfunction, any steps taken to minimize emissions and corrective actions taken.

The owner/operator shall have the burden of proof in seeking to establish that noncompliance was due to unavoidable increases in emissions attributable to the malfunction.

H. Other Permit Conditions

1. To the extent consistent with the requirements of this permit and applicable federal, state, and local laws, the facility shall be designed, constructed, and operated in accordance with the representation of the facility in the permit application prepared by ESS Group dated 8 April 2010.

2. Employees of the Office of Air Resources and its authorized representatives shall be allowed to enter the facility at all times for the purpose of inspecting any air pollution source, investigating any condition it believes may be causing air pollution or examining any records required to be maintained by the Office of Air Resources.

3. At all times, including periods of startup, shutdown and malfunction, the owner/operator shall, to the extent practicable, maintain and operate the facility in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Office of

Air Resources which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures and inspection of the source.

4. The emission and dispersion characteristics of all sources of listed toxic air contaminants at the facility shall be consistent with the parameters used in the air quality modeling to demonstrate that the emissions of each listed toxic air contaminant does not cause an impact, at or beyond the property line of the facility, which exceeds the Acceptable Ambient Level for that substance. The Office of Air Resources, in its sole discretion, may reopen this minor source permit if it determines that the emission and dispersion characteristics have changed significantly and that emission limitations must be revised and/or added to this permit to ensure compliance with Air Pollution Control Regulation No. 22.

5. Approval No. 1891 & 1892 issued on 26 June 2006 for the installation of a TEC/KATEC Model No. 016060 recuperative thermal oxidizer and a Ceilcote Model No. SPT-84-168 wet scrubber shall be rescinded effective with the start-up of the CSSI V-P-8-5.5BN wet scrubber (Approval No. 2110) and the Megtech Cleanswitch 250-LT RTO regenerative thermal oxidizer (Approval No. 2111).