

217-782-2113

CONSTRUCTION PERMIT - NSPS SOURCE

PERMITTEE

New Heights Recovery & Power, LLC
Attn: John Knoke, Gen. Manager
1705 Cottage Grove Avenue
Ford Heights, Illinois 60411

Application No.: 99050003

I.D. No.: 031801AAE

Applicant's Designation: 10459-03

Date Received: May 4, 1999

Subject: Tire Combustion Facility

Date Issued: February 14, 2000

Location: 1705 Cottage Grove Avenue, Ford Heights, Illinois 60411

Permit is hereby granted to the above designated Permittee to CONSTRUCT emission sources and/or air pollution control equipment consisting of a waste tire fired boiler (nominal hourly capacity 17,700 pounds of tire fuel or approximately 700 passenger tire equivalents), equipped with a Selective Non-Catalytic Reduction system, fabric filter, and lime scrubber with two demisting sections; and ancillary operations including tire fuel storage and a cooling tower, as described in the above-referenced application. (See also Condition 17). This Permit is subject to the following condition(s) and the standard conditions attached hereto:

- 1a. The boiler is permitted to burn up to 240 million Btu per hour higher heating value of waste tires and natural gas for fuel.
- b.
 - i. The boiler shall not be operated at a load greater than the load measured as steam flow which is the maximum 1 hour load achieved during emissions testing.
 - ii. The boiler shall be maintained and operated to maintain a minimum combustion temperature of 1800°F on a 15 minute block average, while burning tire fuel, except during startup and shutdown as addressed below.
- c. The boiler shall be operated and maintained as follows to minimize emissions during periods of startup and shutdown. For purposes of this permit, startup is defined as setting the boiler in operation for any purpose, including transition from natural gas to tire fuel, provided that the period of time allowed from the first introduction of tire fuel to the boiler until stable operation with tire fuel at a normal steam flow rate is six hours. For purposes of this permit, shutdown is defined as the cessation of operation of the boiler, when the steam flow rate falls below a normal rate, provided that the period of time allowed from beginning shutdown to discontinuation of feeding tire fuel is two hours.

- i. The startup of the boiler shall be initiated with the natural gas burners. Tire fuel shall only be introduced when stable operating temperature is achieved with natural gas. All reasonable measures shall be taken to expeditiously achieve stable operation with tire fuel, once it is introduced.
 - ii. Prior to firing the tire fuel, all combustion air controls and equipment shall be operational, all necessary tire fuel feeding equipment shall be operational, the inventory of scrubbant shall be adequate, and the continuous monitoring systems required by Condition 7 shall be in service and reporting data.
 - iii. The boiler shall be operated during periods of startup and shutdown to maintain process conditions within limits established by the equipment manufacturers or as prescribed in the Standard Operating Procedures prepared pursuant to Condition 1(d).
 - iv. The boiler shall be fired only on natural gas until the combustion gas temperature reaches at least 1600EF.
- d.
- i. The facility shall be operated in accordance with written Standard Operation Procedures.
 - ii. These Standard Operating Procedures shall be maintained and updated by the Permittee at least annually and shall include those procedures necessary for operation of the boiler facility in compliance with applicable requirements, including:
 - A. Appropriate training for all employees, including training for all operators and shift supervisors.
 - B. A written Preventative Maintenance Plan for the facility.
 - C. Written Housekeeping Procedures for the facility to address nuisance dust, including a Fugitive Dust Operating Program in accordance with 35 Ill. Adm. Code 212.309.
- 2a. The boiler shall comply with Best Available Control Technology (BACT) as established by the Illinois EPA in this permit pursuant to the Environmental Protection Act Section 55(h) and Section 9.4. BACT for the boiler has been determined to require good combustion practices and the use of air pollution control equipment including a selective non-catalytic reduction system, fabric filter, and lime scrubber to comply with the limits in Conditions 1(b), 2(b) and (c).

- b. The boiler shall comply with the following emission limitations while burning tire fuel with compliance determined by emission testing in accordance with Condition 11.
 - i. Particulate matter emissions shall not exceed 0.0275 pounds per million Btu or 0.50 percent of the uncontrolled emissions (minimum fabric filter removal efficiency of 99.5%) whichever is greater. Compliance with this emission limit may be determined by testing in the ductwork between the filter outlet and the scrubber or in the stack.
 - ii. Hydrogen chloride (HCl) emissions shall not exceed 0.0055 lbs per million Btu or 9.0 percent of the uncontrolled emissions (minimum scrubber HCl removal efficiency of 91%), whichever is greater.
 - iii. Total hydrocarbon emissions shall not exceed 0.020 lbs per million Btu.
 - iv. Zinc emissions shall not exceed 0.0050 lbs per million Btu.

- c. The boiler shall comply with the following emission except during startup and shutdown as addressed in Condition 1(c) or if only firing natural gas with compliance determined by continuous emissions monitoring in accordance with Condition 7.
 - i. Sulfur dioxide (SO₂) emissions on a 24-hour daily block average shall not exceed 0.100 lbs per million Btu or 4.6 percent of the uncontrolled emissions (minimum scrubber SO₂ removal efficiency of 95.4%), whichever is greater.
 - ii. Carbon monoxide (CO) emissions on a 24-hour daily block average shall not exceed 0.100 lbs per million Btu.
 - iii. Nitrogen oxide (NO_x) emissions on a 24-hour daily block average shall not exceed 0.0925 lbs per million Btu or 60 percent of the uncontrolled emissions (minimum Selective Non-Catalytic Reduction system efficiency of at least 40%), whichever is greater.
 - iv. Opacity on a 6-minute block average shall not exceed 10 percent. Visual observation of stack opacity in accordance with USEPA Method 9 shall only be used to determine compliance with this limit when a steam plume from the scrubber does not interfere with such observation.

- d. i. Emissions from the boiler shall not exceed the following limits. These limits have been established based upon the above BACT performance limits and maximum operation on an annual basis at a 93 percent capacity factor.

<u>Contaminant</u>	<u>(Lbs/Hr)</u>	<u>(Tons/Yr)</u>
Particulate Matter (PM) - Filter ¹	6.60	26.9
- Stack ²	15.0	61.1
Sulfur Dioxide (SO ₂)	24.0	97.8
Hydrogen Chloride (HCl)	1.32	5.4
Carbon Monoxide (CO)	24.0	97.8
Nitrogen Oxides (NO _x)	22.2	90.4
Total Hydrocarbons (THC) ³	4.80	19.6
Zinc	1.20	4.9

Notes:

- ¹ The filter limit applies in the ductwork after the baghouse. However, compliance with this limit may be demonstrated at the stack, e.g., by testing PM emissions at the stack in accordance with Condition 11.
- ² The stack limit applies at the stack, after both the baghouse and scrubber. Compliance with this limit must be separately demonstrated if compliance with the filter limit is being shown in the ductwork after the baghouse.
- ³ This limit on total hydrocarbons (THC) also restricts emissions of volatile organic material (VOM), as VOM is a subset of THC, which also includes methane, ethane and other organic compounds that are not considered VOM.

- ii. Notwithstanding the above, during startup and shutdown of the boiler as addressed by Condition 1(c), hourly emissions of NO_x shall not exceed 38.0 lb/hr.

Compliance with these emission limits for carbon monoxide, nitrogen oxides, and sulfur dioxide shall be based upon concentrations measured by the Continuous Emission Monitors and the measured stack gas flow rate required by Condition 7. Compliance with the particulate matter, hydrogen chloride, and total hydrocarbon emission limits shall be determined based upon the results of the required performance emission tests.

- 3a. i. This boiler is subject to the New Source Performance Standards (NSPS) for Industrial-Commercial-Industrial Steam Generating Units, 40 CFR 60, Subparts A and Db. The Illinois EPA is administering NSPS on behalf of the United States EPA under a

delegation agreement.

- ii. The boiler would also become subject to the NSPS for Fossil-Fuel Fired Steam Generators, 40 CFR 60, Subpart D, if it has the capability to fire natural gas (fossil fuel) at a heat input rate of 250 million Btu per hour.
 - b. The Permittee shall comply with all applicable requirements of the NSPS.
 - c. At all times, the Permittee shall operate and maintain the boiler, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions, pursuant to 40 CFR 60.11(d).
4. The ammonia emissions from the boiler (ammonia slip) shall not exceed 20 ppmv as determined based upon a 24 hour daily block average.
- 5a. Visible emissions of boiler ash to the atmosphere from the ash conveying system (including conveyor transfer points) shall not exceed more than 9 minutes in any 3-hour period, except during maintenance and repair when a system is not in operation. The Permittee shall conduct observations for visible emissions from ash conveying systems in accordance with USEPA Method 22 under representative operating conditions within 10 days of a written request from the Illinois EPA. The report for such observations, pursuant to an Illinois EPA request, shall be submitted to the Illinois EPA within 5 days of conducting observations.
- b. Particulate emissions from the material handling processes for ash and lime shall not exceed 1.0 ton per year. Compliance with this requirement will be based upon specifications for the associated fabric filter and absence of visible emissions.
6. The Permittee shall install, operate and maintain an Automatic Tire Fuel Feed Cutoff System that will control the feed of fuel into the boiler. Tire fuel shall only be fed to the boiler while it is operating under the following condition. These conditions have initially been set based upon boiler design and may be revised by the Illinois EPA based on actual operating data.
- a. The boiler combustion temperature is at least 1,800EF on a 15-minute block average.
 - b. The air pollution control equipment operating parameters are as follows on a 15-minute block average:
 - i. Fabric filter pressure drop no more than 14 inches water column.

- ii. Scrubbant flow at least 4,500 gpm.
 - c. The monitored stack gas parameters are as follows, on a one hour rolling average:
 - i. Oxygen concentration at least 7.0 percent.
 - ii. Carbon monoxide concentration no more than 200 ppm.
 - iii. Sulfur dioxide concentration no more than 80 ppm.
 - d. The monitored stack opacity is no more than 20 percent, 6-minute block average.
- 7. The Permittee shall install, operate, and maintain the following continuous monitors and instrumentation:
 - a. Continuous monitoring equipment for the boiler stack for following parameters:
 - i. CO concentration (ppmv).
 - ii. NO_x concentration (NO_x ppmv).
 - iii. SO₂ concentration (ppmv).
 - iv. Oxygen concentration (%).
 - v. Opacity (%).
 - vi. Stack gas flow (acfm).
 - vii. Stack temperature (°F).
 - viii. Ammonia concentration (ppmv).
 - b. Boiler instrumentation to continuously measure the following parameters:
 - i. Tire feedrate (lbs/hr, or equivalent).
 - ii. Boiler combustion temperature (°F).
 - iii. Steam flow (lbs/hr).
 - c. Air pollution control equipment instrumentation to continuously measure the following parameters:
 - i. SNCR reagent injection rate (gals/hr).

- ii. Fabric filter pressure drop (in. water column).
 - iii. Fabric filter inlet temperature (EF).
 - iv. Lime scrubber pressure drop (in. water column).
 - v. Lime scrubber inlet temperature (EF).
 - vi. Scrubbant flow (gals/min).
8. The Permittee shall install, operate, and maintain a computer data logging system meeting the following data record keeping and reporting requirements. This operating data shall be kept for at least three years at the facility and be made available for inspection by Illinois EPA personnel upon request.
- a. The system shall store hourly averages of one minute data samples for the parameters monitored pursuant to Conditions 7(a), (b), and (c).
 - b. The Data Logger shall calculate the hourly and daily NO_x, SO₂, and CO emissions using the stack gas emission monitors, stack temperature and stack flow and store the result of those calculations.
9. The Permittee shall operate, maintain and calibrate the continuous monitors required by Condition 7 in accordance with written Continuous Monitoring Procedures, which the Permittee shall review at least annually and update as necessary. The continuous monitors shall be operated in a manner consistent with good air pollution control practice for emissions monitoring. Additional standards for data collection may be established in the Clean Air Act Permit Program (CAAPP) permit for the boiler facility. Records of monitoring activities, including all collected data, accuracy determinations, calibration drift test, and equipment repair, shall be maintained.
- 10a. i. Equipment covered by this permit may be operated under this Construction Permit for purposes of equipment shakedown, operational testing, emissions testing and reporting, and routine operation pending Illinois EPA action on an application for operating permit, as further specified below. Equipment shall not begin operation until construction, including construction of any associated air pollution control equipment, is complete, and reasonable measures short of actual operation have been taken to verify proper operation.

- ii. The Permittee shall notify the Illinois EPA of the anticipated date of initial firing of gaseous fuel in the boiler for the purpose of generating steam, i.e., for purposes other than curing refractory or cleaning boiler tubes, at least 30 days prior to such date and shall further notify the Illinois EPA of the actual date of such initial firing of gaseous fuel within 5 days after such date.

- b. i. For purposes of shakedown and testing of the boiler while firing tire fuel, the boiler may be fired with tire fuel for a Shakedown Period of 180 days pursuant to this Construction Permit, during which period the emissions testing required by Condition 11(a)(i) shall also be performed. This 180 day period shall begin on the day that tire waste fuel is first fired in the boiler. During this Shakedown Period, the boiler and associated control devices shall be operated in accordance with the Shakedown Plan submitted to the Illinois EPA and any conditions of the Illinois EPA's approval of the plan. The Illinois EPA may provide additional time for shakedown upon request from the Permittee which shows that it is not feasible to complete shakedown within the specified time period.

- ii. The Permittee shall submit three copies of the following documents at least 60 days prior to the initial firing of tire fuel in the boiler, for Illinois EPA review and approval. As part of the approval of the Start-up Plan, the Illinois EPA may allow emissions higher than the short-term limits in Condition 2 during the Shakedown Period, provided that the Permittee demonstrates that such operation is needed for the orderly and effective shakedown of the boiler (e.g., initial startup and shakedown of the nitrogen oxide control system cannot be initiated until consistent boiler operation is achieved) and reasonable measures will be taken to minimize the emissions associated with such operation (e.g., the boiler will be operating at a reduced firing rate).
 - A. A final Start-up Plan that includes any changes to the anticipated sequence of steps from initial firing of the boiler with tire fuel to emission testing, with description of step; purpose; expected duration; expected range of fuel firing rate(s); planned status of operating instrumentation, monitoring system, and data logging system, and control devices; special startup procedures, if any; alarm levels for operating parameters and possible corrective actions; criteria for terminating tire fuel feed; and special shutdown procedures, if any.

- B. Emission Testing Protocol, that includes identification of testing firm(s), test methods, sample calculations and data forms, and documentation for sampling locations.
 - C. Continuous Emission Monitoring Procedures and Monitor and Instrumentation Certification program which details how the instruments will be demonstrated to be accurate and how routine calibration will be completed.
- iii. The Permittee shall submit three copies of the following documents to the Illinois EPA for review and comment, at least 60 days prior to the initial firing of tire fuel in the boiler:
- A. Operator Training Program.
 - B. Boiler Operating Procedures, that include procedures for startup, normal operation, normal shutdowns and other shutdowns.
 - C. Boiler Preventative Maintenance Procedures.
 - D. Data logging system specifications (See also Condition 8).
- iv. A. The Permittee shall notify the Illinois EPA of the anticipated date of initial firing of tire fuel in the boiler at least 60 days but not more than 90 days prior to such date and shall further notify the Illinois EPA of the anticipated date of initial firing of tire fuel in the boiler 10 days prior to such date. This further notification shall confirm that the continuous emission monitoring systems required by Condition 7 and the data logging systems required by Condition 8 are operational.
- B. The Permittee shall provide confirmation of the actual date of initial firing of tire fuel in the boiler on the day before such date. This confirmation shall be given by telephone to the Illinois EPA's Regional Office.
- v. During the Shakedown Period, the Permittee shall submit a biweekly report to the Illinois EPA summarizing operation of the boiler during the preceding two weeks, including the periods of time during which tire fuels were burned, type and amount of such fuels burned, status of control devices and monitoring systems while burning such fuels; progress of shakedown; and significant events, if any. This report shall be submitted within 4 days of the end of the bi-weekly period.

- c. Following performance of emission testing in accordance with Condition 11(a)(i) which testing demonstrates compliance with applicable emission limitations, the boiler may continue to be operated pursuant to this Construction Permit as allowed by Section 39.5(5) of the Environmental Protection Act.
 - d. This condition supersedes Standard Condition 6(b).
- 11a.
- i. Within 180 day of beginning the burning of tire fuel pursuant to this permit, the following boiler emissions shall be measured by an approved testing service, during conditions that are representative of maximum emissions.
 - ii. Within 60 days of a subsequent written request from the Illinois EPA, the emissions of the boiler shall be measured by an approved testing service.
 - iii. The Illinois EPA may provide additional time for performance of this testing upon request from the Permittee which shows that it is not feasible to perform representative testing within the specified time period.
- b. Emission testing shall provide for three replicate tests, in accordance with 40 CFR 60.8(f), using the following USEPA methods and procedures, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A for USEPA test methods.
- i. Particulate matter using Methods 5.
 - ii. Carbon monoxide using Method 10.
 - iii. Nitrogen oxides using Method 19.
 - iv. Sulfur dioxide using Method 6
 - v. Hydrogen chloride using Method 26.
 - vi. Total hydrocarbon using Method 18 or 25A.
 - vii. Polycyclic aromatic materials (PAH) and dioxin and furan (TCCD/TCDF) using Method 23
 - viii. Trace metals in accord with Method 29.
 - A. Arsenic
 - B. Beryllium
 - C. Cadmium

- D. Chromium
- E. Copper
- F. Lead
- G. Manganese
- H. Mercury
- I. Nickel
- J. Zinc

- c. At least 30 days prior to the actual date of testing a written test plan shall be submitted to the Illinois EPA for review and approval. This plan shall describe the specific procedures for testing including as a minimum:
 - i. The person(s) who will be performing sampling and analysis and their experience with similar tests.
 - ii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions and the means by which the operating parameters for the source and any control equipment will be determined.
 - iii. The specific determinations of emissions and operation which are intended to be made, including sampling and monitoring locations.
 - iv. The test methods which will be used, with different analysis methods, if the method can be used with different analysis methods.
 - v. Any proposed use of an alternative test method, with detailed justification.
- d. The Illinois EPA's Regional Office and Compliance Section shall be notified in writing a minimum of 30 days prior to the expected date of these tests and further notified a minimum of 5 working days prior to the test of the exact date, time and place of these tests, thus enable the Illinois EPA to observe these tests. The Illinois EPA may accept shorter notifications if it does not interfere with its ability to observe a test.

- e. Three copies of the final Test Report for these tests shall be submitted to the Illinois EPA's Compliance Section within 14 days after the test results are compiled and finalized. The Final Report shall include as a minimum:
 - i. General information (date of test, testing personnel, and observers).
 - ii. A summary of results.
 - iii. Description of test methods, including description of sampling points, sampling train, analysis equipment, and test schedule.
 - iv. Detailed description of test conditions, including:
 - A. Process information, i.e., fuel consumption, heat input rate, steam production, and electrical output.
 - B. Control equipment information, i.e., equipment operating parameters during testing.
 - C. Heat content of tire fuel (Btu per lb) during emission testing based on representative sampling and analysis of the fuel supply to the boiler.
 - v. Data and calculations, including copies of all raw data sheets and records of laboratory analysis, sample calculations, and data on equipment calibration.
 - vi. The results of all quality control evaluations, including a copy of all quality control data.
- 12a. Tire fuel, i.e., waste tires that have been shredded or otherwise prepared for use as fuel, shall only be stored inside buildings and on the existing outdoor concrete fuel storage pad (pad), which is approximately 100 feet wide and 200 feet long.
- b.
 - i. The Permittee shall not store more than 500,000 passenger tire equivalents (6,250 tons) of tire fuel on the pad at any time.
 - ii. The Permittee shall not pile tire fuel on the pad to a height more than 20 feet.
 - iii. Around the perimeter of the pad, the Permittee shall maintain:
 - A. An open area that is at least 25 feet wide, to allow unobstructed movement of personnel and equipment for visual inspection of the pile, housekeeping activities and firefighting operations;

- B. A clear area that is at least 50 feet wide that is generally free of vegetation and other combustible material; and
 - C. A protective area that is at least 250 feet wide within which open flames and other potential ignition sources, including cutting or welding, are not allowed except inside of a building or with comparable temporary enclosure and fire protection measures.
- iv. The Permittee shall maintain a fence, which is not less than 6 feet in height, in good repair around the pad area and at all times control access to the area by an attendant, locked gates, television monitors, controlled roadway access and other similar techniques. Alternatively, the Permittee shall take such actions for the facility as a whole or some portion of the facility so as to preclude unauthorized access to the pad area.
 - v. The Permitted shall maintain the level of the pad at no more than 1.0 percent slope or the Permittee shall install earthen berms or other structures at the edge of the pad capable of containing runoff associated with a fire.
- c.
 - i. The Permittee shall secure buildings used to store tire fuel to prevent unauthorized access or the Permittee shall maintain the area surrounding such buildings to prevent unauthorized access in accordance with Condition 12(b)(iv).
 - ii. The Permittee shall comply with the following provisions with respect to tire storage planning, unless storage of tire fuel in buildings is also fully addressed pursuant to the tire storage planning conducted by the Permittee for whole waste tires pursuant to 35 IAC 848.204(c), as confirmed by the Permittee in writing to the Illinois EPA.
 - A. The Permittee shall develop and implement a storage plan prepared in consultation with local fire departments that may be called upon in the event of fires involving tire fuel and the state fire marshal. This plan shall include, but not be limited to, the storage arrangements for tire fuel; aisle space if necessary; clearance distances between tire fuel and the building ceilings, heaters and furnaces, and sprinkler deflectors; location of extinguishers and hose stations; and access for fire fighting personnel.

- B. The Permittee shall maintain a copy of this storage plan and all revisions to the plan at the site and submit copies to the local fire departments and the Illinois EPA.
- iii. Areas in buildings used for storage of tire fuel shall be constructed to comply with the applicable standards of the National Fire Protection Association, e.g., Standard 231D for Storage of Rubber Tires.
- d. The Permittee shall comply with the following provisions with respect to contingency planning, unless fires involving tire fuel are also fully addressed pursuant to the contingency planning conducted by the Permittee for storage of whole waste tires pursuant to 35 IAC 848.202(c)(1) and 848.203, as confirmed by the Permittee in writing to the Illinois EPA.
 - i. The Permittee shall prepare and maintain a separate contingency plan designed to minimize the hazards to human health and the environment that could result from fires involving tire fuel, that describes the actions that site personnel must take in response to any such fires.
 - ii. The Permittee shall maintain a copy of this contingency plan and all revisions to the plan at the site and submit copies to the local fire departments, police departments, the Illinois EPA, and local and state emergency response teams that may be called upon in the event of fires involving tire fuel.
 - iii. The Permittee shall at all times have at least one employee, either at the facility or on call, with responsibility for coordinating emergency response measures, which individuals shall be listed in this contingency plan. These individuals must be familiar with all aspects of this contingency plan, all operations and activities at the site, the location of all records within the site and site layout and have the authority to commit the resources needed to carry out the contingency plan.
 - iv. The Permittee shall immediately carry out the relevant portions of this contingency plan in response to a fire involving tire fuel.
 - v. Within 30 days of any fire involving tire fuel, the Permittee must review and appropriately amend this contingency plan to address the experience gained during such incident.

- e. The Permittee shall make submittals of storage plans and contingency plans, as may be required by this condition, to the Illinois EPA, Bureau of Land. At the same time, the Permittee shall provide a copy of the transmittal letter accompanying these submittals to the Illinois EPA, Bureau of Air.
 - f. The above provisions do not relieve the Permittee of the responsibility to comply with all applicable requirements of 35 IAC Part 848, Management of Used and Waste Tires.
- 13a. The Permittee shall keep records for emission testing and observations of visible emissions, including:
- i. Copies the Test Reports for the emissions testing conducted pursuant to Condition 11.
 - ii. Copies of the reports for its observations pursuant to Condition 5(a) of visible emissions by USEPA Method 22 (40 CFR 60 Appendix A) from ash conveying systems.
- b. The Permittee shall keep the following operating records for the boiler facility on a monthly basis:
- i. Amounts of tire fuel produced, shipped off-site, in total inventory, and in inventory on the pad (tons tire fuel, with supporting data);
 - ii. Amount of natural gas burned (million scf); and
 - iii. Amounts of scrubbant received, used, and in storage.
- c. The Permittee shall keep the following records with respect to startup and shutdown of the boiler or periods of time when the boiler only fires natural gas:
- i. A log or other file that identifies each startup and shutdown of the boiler, and provides the date, circumstances, time startup or shutdown initiated, time tire fuel introduced or discontinued, time stable operation on shutdown achieved, steam flow rates, significant events or occurrences during the startup or shutdown, and other information to address the requirements of Condition 1(c) and (d) and 3(c).
 - ii. Records identifying each period of time during startups and shutdowns for which emission or opacity data were excluded from the determination of emissions for purposes of Condition 2(c), with supporting data and calculations to document how emissions were determined for purposes of Condition 2(c).

- d. The Permittee shall keep records for periods of time when the boiler facility did not comply with applicable emission limits or operating requirements.
 - i. These records shall include the date, duration, and description of the incident.
 - ii. These records shall also include the likely cause for the incident and shall identify the corrective actions that were taken, the repairs that were made, and the steps that were taken to prevent reoccurrence.
- 14. All records, logs, procedures and plans required by this permit shall be kept as follows:
 - a. All documents shall be retained for at least five years from the date of entry (unless a longer retention period is specified by a particular provision), shall be kept at a location at the facility that is readily accessible to the Illinois EPA, and shall be made available for inspection and copying by the Illinois EPA and USEPA upon request.
 - b. All information retained in a computer database shall be capable of being retrieved and printed on paper during normal facility office hours so as to be able to respond to an Illinois EPA request for data during the course of an inspection.
- 15a.
 - i. The Permittee shall fulfill applicable notification requirements of the NSPS, 40 CFR 60.7(a) for initial startup of the boiler when it undertakes its initial startup of the boiler.
 - ii. The Permittee shall fulfill applicable reporting requirements of the NSPS (60.7 and 60.49b(b)) for operation of the boiler.
- b. The Permittee shall also report the following information to the Illinois EPA on a quarterly basis:
 - i. Tire feed to the boiler, in tons, on a monthly basis.
 - ii. Total monthly emissions of NO_x, SO₂, and CO (tons/month), determined from information in the Data Logger.
 - iii. A summary of automatic waste feed cutoffs, if any, with the cause of the feed cutoffs and their duration, as well as corrective actions taken to minimize or eliminate chronic waste feed cutoff.

- iv. A summary of any exceedance which shall include the date, time, and duration of the event, a description of the event, a copy of the applicable monitoring data or record, the corrective action taken, and the reason for or cause of the exceedances, if known.
 - v. A detailed description of any fires involving tire fuel.
 - c. The Permittee shall submit an Annual Emission Report to the Illinois EPA not later than May 1 of each year, as required by 35 Ill. Adm. Code Part 254.
 - d. The Permittee shall promptly notify the Illinois EPA if it determines that it must install new boiler grates or make alterations to the tire fuel feed systems. This notification shall include a description of the changes, the reasons for the changes, and the planned schedule for the changes.
 - e. i. The Permittee shall promptly notify the Illinois EPA of the results of the initial sampling and analysis pursuant to 35 IAC Part 721, Identification and Listing of Hazardous Wastes, separately conducted for the bottom ash, flyash, and scrubber residue from the boiler to determine whether any of these wastes qualify as a hazardous waste.
 - ii. If any of the wastes individually qualify as hazardous waste under applicable rules, this notification shall also include a detailed description of the Permittee's planned procedures to comply with 35 IAC Part 728, Land Disposal Restrictions.
 - iii. This notification shall be sent to the Illinois EPA, Bureau of Land, Land Permit Section, with a copy sent to the Illinois EPA, Bureau of Air.
- 16a. All notifications, submissions and reports required pursuant to this permit shall be sent to the following address unless otherwise specified:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Compliance Section (#40)
P.O. Box 19276
Springfield, Illinois 62794-9276

- b. A copy of these notifications, submissions and reports, other than the Annual Emission Report addressed by Condition 14(c) and the Test Reports required by Condition 11(e), shall also be sent to the Illinois EPA's Air Regional Office at the following address, unless otherwise specified:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Eisenhower Tower
1701 South First Avenue
Maywood, Illinois 60153

- 17a. This permit supersedes Construction Permit 92090009 previously issued to CGE Ford Heights, L.L.C., for this boiler facility and pursuant to which the facility was constructed and initially operated by CGE Ford Heights.
 - b. As this permit addresses a boiler facility that has already been constructed and operated, this permit allows the Permittee, the new owner of this facility, to undertake construction activities associated with returning the facility to an operable condition and to again undertake shakedown and initial operation of the facility after a period of several years during which the boiler has been idle.
- 18. This permit does not relieve the Permittee of the responsibility to comply with all applicable local, state, and federal requirements. In particular, the boiler is an affected unit under the Acid Rain Deposition Control Program pursuant to Title IV of the Clean Air Act, because it burns natural gas, a fossil fuel, in conjunction with waste tires, to generate electricity, and is subject to certain control requirements and emissions monitoring requirements pursuant to 40 CFR Parts 72, 73, and 75. As an affected unit under the Acid Rain Program, the Permittee must also obtain an Acid Rain Permit.

If you have any questions on this permit, please contact Jim Cobb at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

DES:JDC:jar

cc: Region 1

Illinois Environmental Protection Agency
Bureau of Air
Divisions of Air Pollution Control
1021 North Grand Avenue East
Springfield, Illinois 62702-4059

PROJECT SUMMARY
FOR ISSUANCE OF
AIR POLLUTION CONTROL
CONSTRUCTION PERMIT
TO
New Heights Recovery & Power, LLC

August 6, 1999

Applicant

Name: New Heights Recovery & Power, LLC
Address: 1705 Cottage Grove Ave.
Ford Heights, IL 60411

Project: Burning waste tires for energy recovery
Location: 1705 Cottage Grove Ave.
Ford Heights, Illinois 60411

I.D. No.: 031801AAE
Appl. No.: 99050003

Ambient Air Quality

This facility is located in an area that is attainment of air quality standards for particulate matter, sulfur dioxide, nitrogen oxides and carbon monoxide. This area is designated non-attainment for ozone which is produced by atmospheric reactions of organic materials and nitrogen oxides.

Public Comment

The Illinois Environmental Protection Agency (Agency) has given public notice, requested public comment, and will conduct a public hearing prior to finalizing its permit decision. A Responsiveness Summary will be prepared answer questions and issues raised by public comments and questions during the public comment period.

Illinois EPA Contracts

For information concerning the application and draft permit, please contact:

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For information concerning the hearing and hearing procedures, please contact:

John Williams
Hearing Officer
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Significant Dates:

Application Received: May 4, 1999
Public Comment Begins: August 8, 1999
Public Hearing: September 21, 1999
Public Comment Ends: October 21, 1999

I. INTRODUCTION

New Heights Recovery & Power, L.L.C. (New Heights) has requested a permit for the waste tire burning boiler in Ford Heights Illinois. This boiler was built by Chewton Glen Energy who went bankrupt. New Heights is the new owner of the Chewton Glen facility including the boiler. The steam produced by the boiler will be used to generate electricity.

Because the boiler will emit air contaminants, an air pollution control construction permit had to be obtained from the Illinois EPA prior to commencing construction. New Heights has applied for a revised construction permit to allow it to complete construction and conduct shakedown and initial operation of the boiler. This document presents a summary of the Illinois EPA's review of this application.

As New Heights has only requested to burn natural gas and waste tires in the boiler, the boiler does not require a permit from the Bureau of Land. However, whole tires received by this facility and shredded tires after they are prepared for use as fuel must be and stored in accord with applicable state rules governing storage of tires, 35 Ill. Adm. Code Subtitle G: Waste Disposal, Subchapter m: Used and Waste Tires.

If a permit application demonstrates that a facility will comply with all applicable air pollution control regulation, the Illinois EPA must issue the permit. The Illinois EPA's preliminary determination is that the New Heights application for this boiler shows compliance with all applicable air pollution control regulations. Therefore, the Illinois EPA is proposing to issue a revised Air Pollution Control Construction Permit for the boiler facility.

II. DESCRIPTION OF BOILER

Boiler

This Zurn grate fired boiler is designed to burn tires. The steam produced by the boiler will be used to generate up to 20 megawatts (MW) of electricity, of which it is estimated that 10% will be needed for operation of the facility and the remaining 90% will be sold. The boiler is rated at a maximum heat input of 240 million Btu per hour. Tire heating values varies from 11,478 Btu/lb for steel belted tires to 16,870 Btu/lb for Kevlar belted tires. Calculations in this application use an average value of 13,552 Btu/lb to represent the expected mix of tires.

Operation

The boiler has two natural gas-fired burners to bring the boiler up to operating temperature before beginning the feeding of tire shreds. This boiler is intended to normally fire only tires.

Natural gas will be used if necessary to maintain the required operating temperature while burning tires and while tire fuel remains on the grate during a controlled shut down.

The boiler is equipped with an operating system that will automatically prevent feeding of tires during malfunction or upset conditions in the boiler or air pollution control equipment. The occurrence of such conditions will be determined by monitors on key boiler operating parameters and by continuous emissions monitors for the principal pollutants.

Air Pollution Control Equipment

Potential emissions from burning of any material are particulate matter (dust, soot, flyash), sulfur dioxide, nitrogen oxides, organic materials, and carbon monoxide. The amount of emissions is determined by the nature and composition of the fuel material, the nature and effectiveness of the combustion process, and the effectiveness of added control equipment.

A series of three air pollution control systems are used to reduce emissions from this boiler in addition to the good combustion practices required for the boiler itself.

The nitrogen oxides (NO_x) emission control system injects urea into the boiler to reduce NO_x by selective non-catalytic reduction (SNCR). At the temperatures in the boiler, the urea is converted to carbon dioxide and ammonia. The ammonia reacts with NO_x to form nitrogen and water.

A fabric filter removes dust or particulate matter from the combustion gas stream before discharge to the atmosphere. The layer of particulate material that builds up on the fabric filter surface is periodically cleaned by air flow in the reverse direction. The particulate matter cake then falls into hoppers. The flyash is expected to be sent off site for processing for recovery of its zinc content. If this does not occur, flyash will have to be shipped off site for proper disposal as a waste material.

A lime scrubber system controls emissions of the acid gases sulfur dioxide (SO₂) and hydrogen chloride (HCl) from the combustion gas. This is done by "spraying" a water solution of calcium hydroxide. The calcium hydroxide reacts to "absorb" the acid gases in the combustion gas stream, retaining and removing them in a liquid slurry. The spent calcium hydroxide, which now consist of calcium sulfate (gypsum) and sodium chloride (salt) will be shipped offsite as a waste.

Auxiliary Equipment

Associated with the boiler are several items of miscellaneous equipment for lime storage and ash storage and removal. Emissions of dust from this equipment will be controlled by enclosure of the materials and venting any air discharge through fabric filters.

III. APPLICABLE EMISSION LIMITS

In Illinois, the Illinois Pollution Control Board (Board) promulgates State air emission regulations. The application demonstrates that the boiler will readily comply with applicable Board emission limits.

This boiler is capable of burning natural gas at greater than 100 million Btu/hr so the boiler is subject to the New Source Performance Standards Commercial-Institutional Steam Generating Units, 40 CFR 60 Subparts A and Db. Compliance with applicable emission standards will be verified by emission testing.

The boiler will not be a major source for any pollutant and is not subject to review under 35 Ill. Adm. Code Part 203 or 40 CFR 52.21 Prevention of Significant Deterioration (PSD).

IV BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Section 55(h) of the Environmental Protection Act requires new boilers burning tires to comply with Best Available Control Technology (BACT) as BACT is further defined in Section 9.4 of the Act. BACT can include emission limits, operating standards and equipment standards to address emissions of particulate matter, sulfur dioxide, nitrogen oxides, acid gases, heavy metals and organic materials. The Illinois Environmental Protection Act contains the following definition of BACT:

"An emission limitation (including a visible emission standard) based on the maximum degree of pollutant reduction which the Illinois EPA, on a case-by-case basis, taking into account energy, environmental and economic impacts, determines is achievable through the application of production processes or available methods, systems and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques. If the Illinois EPA determines that technological or economic limitations on the application of measurement methodology to a particular class of sources could make the imposition of an emission standard not feasible, it may instead prescribe a design, equipment, work practice or operational standard, or combination thereof, to require the application of best available control technology."

New Heights is now requesting a Construction Permit allowing it to take over and complete the boiler facility that Chewton Glen constructed and in fact operated for a short period of time. Although the boiler has not been operated for over four years, a variety of measures have been taken to preserve and maintain the boiler for use. As part of its application, New Heights has reevaluated BACT, based on its experience with burning tires. This material confirms that the control measures originally installed on the boiler constitutes BACT. It also generally confirms the appropriateness of the emission limits originally established. The exception is nitrogen oxides, for which control efficiencies of only 40 to 45 percent have been shown at other facilities.

BACT is determined as part of the application review process, Chewton Glen submitted a proposal for BACT as part of the original construction permit application for the boiler. The Illinois EPA reviewed this proposal and also conducted its own review of the emission rates being achieved by tire burning boilers and associated control equipment. The Illinois EPA's BACT determination was contained in the original Construction Permit issued to Chewton Glen for the boiler. Following is a summary of the Illinois EPA's considerations in establishing BACT for this boiler.

Good Combustion Practices

The first aspect of BACT is effective combustion of the waste tire, seeking 100% conversion of the organic material in the whole tires to carbon dioxide and water, without any organic products of incomplete combustion. These measures are normally termed "Good Combustion Practices." The BACT determination sets pollutant emission limits for products of incomplete combustion including carbon monoxide and hydrocarbons and establishes operating parameter limits that will be used to maintain good combustion conditions.

For Good Combustion Practices the following operating parameters are to be monitored and recorded. The boiler load and combustion temperature during the stack emission testing may be used to review the operating limits for these parameters:

1. Boiler load measured as steam output (lb/hr).
2. Boiler combustion temperature (°F).
3. Excess oxygen (%).
4. Carbon monoxide (ppm).

The formation of carbon monoxide (CO) and volatile organic material (VOM) during combustion is the result of inadequate combustion air, improper mixing of air in the boiler, or inadequate temperature. The combination of uniform feeding of tires and control of overfire and underfire air has been shown to be effective in reducing CO emissions. The BACT performance standard for carbon monoxide

emission is proposed to be set at 0.10 lbs/MBtu based upon a 24 hour daily block average. Combustion temperature is important for VOM emissions. The BACT VOM performance standard for this boiler is set at 0.020 lbs/MBtu measured as total hydrocarbons.

NO_x Emissions

NO_x is formed both from the nitrogen present in the tires, and from the combination of nitrogen in the air with oxygen at elevated combustion temperatures. The thermal NO_x can be reduced by alteration of the combustion process, to reduce temperature or available oxygen. However, this is only possible to the extent that such alteration is possible without interfering with combustion performance. NO_x due to nitrogen in the tires can not be significantly altered with combustion modifications thus most new boilers burning nitrogen bearing fuels, e.g., coal or tires are being required to use an add-on control system for NO_x emission reduction. The selective non-catalytic reduction (SNCR) process injects urea into the boiler where at the elevated temperatures it is converted to ammonia that reacts with the NO_x to form nitrogen (N₂) carbon dioxide (CO₂) and water (H₂O).

Since SNCR control technology has been used successfully on tire-burning-boilers, it is being required as BACT. SNCR has been shown to be effective on similar tire burning boilers in Sterling Connecticut and Modesto California. The BACT NO_x emission rate limit is set at 0.0925 lb/MBtu or not less than 40% emission reduction.

Particulate Emissions

The BACT particulate emissions limit from the boiler has been set at 0.0275 pounds per million Btu, that is approximately equal to 0.01375 grains per dry standard cubic foot. An alternate standard is also established based on removal efficiency by the filter of at least 99.5% removal efficiency for emissions from the boiler.

Acid Gas Control Technology

The acid gases are sulfur dioxide and hydrogen chloride are emitted from burning of tires. Scrubbing to control acid gases is well established for burning fuels containing significant amounts of sulfur and chlorine. The sulfur dioxide BACT emission limit established for this boiler is 0.10 lb/MBtu or 95.4 % control efficiency average with compliance determined by monitor and the hydrogen chloride BACT emission limit established at 0.0055 lbs/MBtu or 91% removal based upon stack emission testing.

V. BOILER FACILITY EMISSIONS

The potential emissions of boiler are provided below in more detail. These emissions are calculated based upon operating at 240 million Btu/hr heat input operating with an annual capacity factor of 93%.

<u>Contaminants</u>	<u>BACT Limit Options</u>		<u>Emission Limits</u>	
	<u>Control %</u>	<u>(Lbs/mmBtu)</u>	<u>(Lbs/Hr)</u>	<u>(T/Yr)</u>
Particulate Matter(PM) @ Filter	99	0.0275	6.60	26.9
@ Stack	-	-	15.0	61.1
Carbon Monoxide (CO)	-	0.1000	24.0	97.8
Nitrogen Oxides (NO _x)	40	0.0925	22.2	90.4
Sulfur Dioxide (SO ₂)	95.4	0.1000	24.0	97.8
Hydrogen Chloride (HCl)	91	0.0055	1.32	5.4
Total Hydrocarbons (HC)	-	0.0200	4.8	19.6

In addition, the permit would allow annual particulate matter emissions from lime and ash handling of 1.0 ton.

VI. PROPOSED PERMIT

The proposed construction permit contains appropriate conditions to define the emission limits and performance standards applying to the boiler facility. The permit also specified the procedures which must be used to show compliance with the applicable limits. The control method and compliance procedures specified in the draft permit are generally consistent with limits imposed on Chewton Glen in the original Construction Permit for the boiler facility. However certain changes have been made to improve the effectiveness of the permit and its clarity as well as to better address applicable requirements. In this regard the draft permit reflects both the Illinois EPA's experience with this facility and experience with and information from other facilities over the last five years.

The compliance procedures specified by the permit:

1. Emissions testing.
2. Emissions monitoring.
3. Monitoring of operation.
4. Operating records.
5. Periodic reporting.

Inspection and review of all air pollution control activities may be also conducted by the Illinois EPA and other environmental authorities.

The most rigorous compliance procedure is continuous monitoring. In continuous monitoring, a device automatically measures and records the value of a parameter on a frequent basis. Continuous monitoring

is required for the majority of operating limits, established for the boiler and the control equipment, including the limits on temperature and load. This type of monitoring is very well developed for some parameters. However, some parameter will need to be monitored indirectly, e.g., using pumping energy as a measure of scrubber flow rate. Continuous monitoring is required for those contaminants for which emission monitoring methods are developed. The contaminants include sulfur dioxide, nitrogen oxide and carbon monoxide. In addition, continuous monitoring is required for opacity which serves as a surrogate for particulate matter.

For other contaminants, e.g., particulate matter and hydrogen chloride (HCl), compliance will be verified by periodic emissions testing as specified in the permit. Emission testing takes an accurate sample from exhaust gases and then analyze the sample for the amount of contaminant present. In the time between emissions tests one looks at the surrogate parameters that are continuously monitored, to assure that the boiler continues to be operated in the manner it was operated during testing. For example, opacity of the stack gases is a direct surrogate for monitoring of particulate matter emissions; sulfur dioxide emission monitoring is a surrogate for hydrogen chloride emissions.

The records of the monitoring system will be maintained by the computer data system. The results of this monitoring and testing can be readily reviewed by the Illinois EPA. Any exceedance of the emission limits or failure of the monitoring equipment itself must be explained with the corrective action taken to prevent likely occurrence of such events in the future.

VIII. REQUEST FOR PUBLIC COMMENT

It is the Illinois EPA's preliminary determination that the project meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft permit. The Illinois EPA therefore is proposing to issue a construction permit for this project.

Comments are requested on this proposed action by the Illinois EPA. Comments are particularly requested on the determinations made by the Illinois EPA and the proposed conditions of the draft permit.

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