BEFORE THE

OHIO ENVIRONMENTAL PROTECTION AGENCY

In the Matter of:

University of Cincinnati P.O. Box 210218 Cincinnati, Ohio 45221-0218	: : :	Director's Final Findings and Orders

PREAMBLE

It is agreed by the parties hereto as follows:

I. JURISDICTION

These Director's Final Findings and Orders ("Orders") are issued to the University of Cincinnati ("Respondent") pursuant to the authority vested in the Director of the Ohio Environmental Protection Agency ("Ohio EPA") under Ohio Revised Code ("ORC") § § 3704.03 and 3745.01.

II. PARTIES BOUND

These Orders shall apply to and be binding upon Respondent and successors in interest liable under Ohio law. No change in ownership of the Respondent or of the facility (as hereinafter defined) shall in any way alter Respondent's obligations under these Orders.

III. DEFINITIONS

Unless otherwise stated, all terms used in these Orders shall have the same meaning as defined in OAC Chapter 3704 and the rules promulgated thereunder.

IV. FINDINGS

The Director of Ohio EPA makes the following findings:

1. Respondent owns and operates a public research university located in Cincinnati, Ohio (Hamilton County). The university's Central Utility and East Campus Utility Plants are identified by Ohio EPA as facility identification number 1431070849. The facility is classified as a major source for the Title V and the prevention of significant deterioration ("PSD") programs. At the facility, Respondent operates or

operated, among other things, a 200 pounds per hour batch-loaded pathological waste incinerator (emissions unit N005) to dispose of waste materials generated by the medical college; a 2 MW diesel-fired internal combustion engine controlled with a catalyst oxidation system (emissions unit P007); and a 1.5 MW diesel-fired internal combustion engine controlled with a catalyst oxidation system (emissions unit P008). Respondent attempted to operate a new 96.5 million Btu per hour natural gas/number 2 fuel oil-fired boiler (emissions unit B109), but was unable to achieve normal operation.

2. The emissions units identified in Finding 1 emit or emitted particulate emissions ("PE"), oxides of nitrogen ("NOx" expressed as NO_2), and carbon monoxide ("CO") which are each included in the categories of items defined as an "air pollutant" or "air contaminant" in OAC Rule 3745-15-01(C). Additionally, the emissions units are or were "air contaminant sources" as defined in OAC Rule 3745-31-01(I) .

3. OAC Rule 3745-31-05(D) states that the Director of Ohio EPA may impose special terms and conditions in a permit-to-install ("PTI") that are appropriate or necessary to ensure compliance with applicable laws and to ensure adequate protection of environmental quality.

4. OAC Rule 3745-17-09 applies to any incinerator except incinerators regulated under OAC Chapter 3745-75. Emissions unit N005 is exempted from the requirements specified in OAC Chapter 3745-75 pursuant to the provisions in OAC Rule 3745-75-01(C)(6). OAC Rule 3745-17-09(B) limits the PE to not more than 0.10 pound per 100 pounds of material charged for an incinerator whose incineration capacity is equal or greater than 100 pounds per hour.

5. OAC Chapter 3745-105 applies to any pathological waste incinerator unless otherwise exempted in OAC Rule 3745-105-01(C). Emissions unit N005 is not exempt under OAC Rule 3745-105-01(C). OAC Rule 3745-105-02(B) requires a pathological waste incinerator with a capacity equal to or greater than 100 pounds per hour but less than 1,800 pounds per hour not to emit more than 0.10 pound of PE per 100 pounds of material charged. Similarly, OAC Rule 3745-105-02(D) limits CO emissions from any pathological waste incinerator to not more than 100 parts per million ("ppm"), by volume, on a dry basis, adjusted to seven per cent oxygen in the exhaust stream as an hourly average.

6. Emissions units P007 and P008 are subject to the applicable requirements of the National Emission Emissions units P007 and P008 are subject to the applicable requirements of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines (RICE) – 40 CFR Part 63, Subpart ZZZZ ("the Rice rule"). The Rice rule requires the owner or operator of a new (i.e., constructed on or after December 19, 2002) non-emergency compression ignition engine with greater than 500 horsepower output, that choses to comply the 70 percent CO emission reduction limitation, to conduct an initial emission performance test and to

conduct semiannually tests thereafter to demonstrate compliance the required CO destruction efficiency. The Rice rule allows subsequent performance tests to be conducted annually if compliance has been demonstrated with two consecutive tests. However, if the results of any subsequent annual performance test indicate noncompliance with the CO emission limitation or a deviation from any of the operating limitations, semiannual performance tests must resume. Emissions units P007 and P008 are currently required to conduct performance tests annually.

7. ORC § 3704.03(T) requires new or modified air contaminant sources that receive a PTI after August 3, 2009, to install best available technology ("BAT") in accordance with the requirements specified therein.

8. ORC § 3704.05(A) prohibits, in part, any person from emitting an air contaminant in violation of a rule adopted by the Director of Ohio EPA pursuant to ORC § 3704.03(E).

9. ORC § 3704.05(C) prohibits any person from violating any terms or conditions of any permit issued by the Director of Ohio EPA pursuant to ORC § 3704.03(F) or (G).

10. ORC § 3704.05(J)(2) prohibits any person from violating any applicable requirement of a Title V permit or any permit condition, except for an emergency as defined in 40 CFR 70.6(g).

11. OAC Rule 3745-77-08(E) states that, if the Director fails to take a final action on an application to renew a Title V permit and the owner or operator of the source filed a timely and complete renewal application, all provisions and authorizations of an expired Title V permit shall remain in effect until the Director's final action on the pending renewal application occurs. On March 9, 2005, and December 16, 2011, Respondent submitted timely and complete renewal Title V permit applications. Therefore, the provisions and requirements of Respondent's original Title V permit remained in effect, until the Director's final action on the pending Title V permit renewal applications on May 31, 2013. Respondent's renewal Title V permit became effective June 21, 2013.

Failure to comply with CO and PE limitations

12. On January 11, 1995, Ohio EPA issued PTI #14-3547 authorizing the installation of emissions unit N005. PTI #14-3547 and OAC Rules 3745-17-09(B) and 3745-105-02(B) limit emissions unit N005's PE to 0.10 pound per 100 pounds of material charged. OAC Rule 3745-105-02(D) also limits the CO from emissions unit N005 to 100 ppm, by volume, on a dry basis, adjusted to seven per cent oxygen. On June 20, 2001, Ohio EPA issued a final Title V permit to Respondent. The Title V permit identified emissions unit N005 as an insignificant emission unit, but required it to

comply with all applicable requirements contained in the State and federal regulations, as well as any emission limitation and/or control requirement contained in an applicable PTI.

13. On or around the first of March 2009, the Southwest Ohio Air Quality Agency ("SWOAQA"), a contractual representative of Ohio EPA for Hamilton County, noticed visible emissions being emitted from emissions unit N005 and on March 20, 2009, sent Respondent a letter requesting that a compliance test be conducted to determine if the PE emitted by emissions unit N005 complied with the 0.10 pound of PE per 100 pounds of material charged limitation.

14. On May 27, 2009, Respondent conducted the compliance test requested by SWOAQA. The compliance test showed that the average measured PE rate was 0.15 pound per 100 pounds of material charged.

15. On October 7, 2009, SWOAQA sent a Notice of Violation ("NOV") letter to Respondent regarding the May 27, 2009 failed compliance demonstration. The NOV letter requested Respondent to submit a plan and schedule to bring emissions unit N005 into compliance.

16. On November 12, 2009, Respondent replied to the October 7, 2009 NOV letter. Respondent stated that it believed that induced air associated with the incinerator's primary chamber higher temperature and the batch loading operations were causing the excess PE. Respondent also stated that it planned to reduce the temperature to correct the draft during the loading operations. Respondent planned to retest the incinerator to ensure compliance with the PE limitation.

17. On March 2, 2010, Respondent retested emissions unit N005 to determine compliance with the PE limitation. The average measured PE rate was determined to be 0.11 pound per 100 pounds of material charged.

18. On May 10, 2010, SWOAQA sent an NOV letter to Respondent for the failure to demonstrate compliance with the PE limitation required by OAC Rule 3745-17-09(B), PTI #14-3547, and Respondent's Title V permit. The NOV letter requested Respondent to submit a new compliance plan and schedule for achieving compliance.

19. On June 15, 2010, Respondent submitted to SWOAQA a response to the May 10, 2010 NOV letter. The response stated that on April 16, 2010, emissions unit N005 was placed on out-of-service status until a plan to ensure compliance with the required PE limitation was designed, implemented, and tested.

20. On February 14, 2011, Respondent submitted to SWOAQA a proposed scope of work and design modifications ("proposed modifications") to improve the PE control for emissions unit N005. The main conclusion was that excess air in the incinerator's primary chamber was causing the entrainment of dust and increasing the

PE. The proposed modifications and upgrades to system were to bring emissions unit N005 into compliance.

21. On March 7, 2011, SWOAQA sent an electronic mail message ("email") to Respondent requesting the schedules for the proposed modification milestones contained in the February 14, 2011 submittal. On March 15, 2011, Respondent submitted a letter that contained the earliest and latest completion dates for the major milestones. A compliance retest was among the milestones and projected to occur between June 15, 2011 and August 2, 2011. On March 28, 2011, SWOAQA sent an email to Respondent accepting the proposed modifications and associated schedules.

22. On April 27, 2011, SWOAQA requested Respondent to submit emissions unit N005's daily charging logs from May 2009 through April 16, 2010. On April 29, 2011, Respondent submitted the requested daily charging logs indicating that emissions unit N005 was in operation during short portions of approximately 196 days during this time period.

23. On September 2, 2011, Respondent submitted to SWOAQA an intent-to-test notification to retest emissions unit N005. The compliance test was scheduled for October 4, 2011, and subsequently for November 8, 2011.

24. On November 4, 2011, SWOAQA received a notification from Respondent cancelling the scheduled compliance test for emissions unit N005. The notification stated that Respondent needed to conduct further evaluations of the incinerator to resolve issues with the tuning of the equipment in preparation for the compliance test. Respondent stated that a revised work schedule would be sent to SWOAQA as soon as it was developed.

25. On or around December 6, 2011, Respondent submitted to SWOAQA a report developed by Industrial Thermal System containing measures and recommendations to improve the performance of the incinerator. The report was based on the combustion system and general rules pertaining to incineration and not specific to emissions unit N005.

26. On or around June 16, 2012, Respondent informed SWOAQA that the work was competed on emissions unit N005, and a compliance demonstration test was scheduled for June 26, 2012.

27. On June 26, 2012, Respondent conducted compliance tests on emissions unit N005 to determine compliance with the PE and CO emission limitations. The average measured PE rate was determined to be 1.07 pounds per 100 pounds of material charged and the average measured CO emission rate was determined to be 137.37 ppm by volume, on a dry basis, adjusted to seven per cent oxygen. The incinerator was operated on June 26, 2012, solely for the purpose of emission testing

and was shut down on the same day, as soon as the preliminary test results were known. The incinerator has remained shut-down since.

28. Respondent has not operated emissions unit N005 since April 16, 2010, and has committed that it will not operate the existing incinerator in its current condition. Respondent may, however, replace it or upgrade it to meet all applicable Ohio EPA and U.S. EPA requirements (after obtaining any applicable preconstruction permits if required for such replacement or upgrade).

29. The Director finds that Respondent failed to comply with the PE limitation specified in OAC Rules 3745-105-02(B) and 3745-17-09(B) and PTI # 14-3547. Total excess particulate emissions from emissions unit N005 during the period from May 2009 through April 16, 2010, based on the results obtained during the May 27, 2009 and March 2, 2010 compliance tests, are estimated to be 31.77 lbs. In failing to comply with applicable PE limitations, Respondent also failed to comply with the requirement contained in the Title V permit for insignificant activity emissions units. The failures to comply with the applicable rules and permit requirements constitute violations of ORC §§ 3704.05 (A), (C) and (J)(2). The violations occurred from at least May 27, 2009 (i.e., the date of the first failed compliance test) and continued until April 16, 2010 (the date Respondent placed emissions unit N005 in out-of-service status, except for tuning and compliance testing).

Failure to timely conduct compliance testing for emissions unit B109

30. On November 4, 2010, Ohio EPA issued PTI #P0106093 authorizing the installation of a 96.5 million Btu per hour natural gas/number 2 fuel oil-fired boiler. The permit contained restricted NOx emission limitations to preclude the applicability of the PSD rules and requirements. It also contained CO emission limitations established pursuant to ORC § 3704.03(T). Additionally, PTI #P0106093 requires Respondent to conduct emission testing to determine compliance with the NOx and CO emission limitations. The tests were required to be conducted within three months of the start-up of the boiler. The boiler began operation on or about September 11, 2011. On October 27, 2011, Respondent sent an intent-to-test notification to SWOAQA scheduling the required emissions tests for December 2, 2011.

31. On December 6, 2011, SWOAQA received a letter from Respondent requesting to reschedule the emission tests for emissions unit B109 to no later than December 31, 2011. The reason for the rescheduling was due to problems associated with the On December 6, 2011, SWOAQA received a letter from Respondent requesting to reschedule the emission tests for emissions unit B109 to no later than December 31, 2011. The reason for the rescheduling was due to problems associated with the attempted start-up of the boiler (which problems resulted in improper operating performance and higher-than-expected emission rates).

32. On December 15, 2011, SWOAQA sent Respondent a NOV letter for the failure to conduct the compliance tests within the timeframe specified in PTI #P0106093. The NOV requested Respondent to provide detailed information regarding the problems that lead to the decision to cancel the emissions tests.

33. On December 21, 2011, Respondent replied to the December 15, 2011, NOV letter. The response provided the following timeline and problems associated with the commercial acceptability of the new boiler. The NOx and CO measurements mentioned below were taken with a portable gas analyzer and do not constitute a compliance demonstration test.

- October 6, 2011 - the boiler's manufacturer ("Johnston Boiler Company") measured the NOx and CO emissions in compliance with the permit limitations; however, the boiler was not able to produce the steam at its rated output capacity.
- November 10, 2011 - Johnston Boiler Company made repairs to the boiler and associated equipment to achieve full steam output. The measured NOx emissions were higher than the level previously measured. Johnston recommended replacement of the natural gas regulator spring. The boiler was shutdown.
- November 29, 2011 - installation of the regulator was completed and the boiler was retuned. NOx emissions were determined to be in compliance, but were close to the limitation specified in the PTI.
- December 2, 2011 - additional adjustments were made to the boiler. Higher NOx emissions were measured and burner observations indicated that it was malfunctioning. SWOAQA agreed with Respondent that rescheduling the compliance test was appropriate.
- December 12, 2011 - the burner was repaired and the boiler was restarted on December 13, 2011.
- December 15, 2011 - the NOx and CO emissions were measured at acceptable levels.

34. On December 28, 2011, SWOAQA visited Respondent to observe diagnostic work being conducted on emissions unit B109 to resolve problems associated with the boiler's performance that resulted in Respondent rescheduling the required emissions tests. Gas burner "spuds" were removed and found to be partially to fully blocked by soot buildup that occurred in less than 24 hours of operation, and high pressure readings were observed in the combustion zone. Respondent committed to providing the findings of the diagnostic evaluations to SWOAQA when the work was completed.

35. On February 7, 2012, Respondent sent a letter to SWOAQA that contained the following information regarding emissions unit B109's condition and corrective actions. As stated above, the NOx and CO measurements mentioned below

were taken with a portable gas analyzer and do not constitute a compliance demonstration test.

- January 9, 2012, to January 13, 2012 - Johnston Boiler Company made changes to the boiler's burner configuration, adjusted the burner's diffuser, and installed plates in the outlet of the boiler and flue gas recirculation ("FGR") connection.
- January 13, 2012 - unacceptable NOx or CO emissions were measured.
- January 16, 2012 - Johnston Boiler Company recommended that the entire FGR intake system be modified.
- January 30, 2012 to February 2, 2012 - modifications were made to the boiler's FGR intake system. Acceptable CO and NOx emissions were measured, but the boiler could not produce steam at its rated output capacity. Johnston Boiler Company recommended a new combustion air handling system to resolve the problem. Respondent stated that the earliest the new combustion air handling system would be installed would be the end of April 2012.

36. On February 8, 2012, Johnston Boiler Company submitted plans to upgrade the boiler fan and motor. Respondent approved the plan.

37. On or around June 16, 2012, Respondent informed SWOAQA that work on the boiler was still being conducted. Respondent also indicated that it had given the boiler's manufacturer until June 21, 2012, to complete the work needed to bring the boiler into compliance. Johnston Boiler Company did not, however, complete the work.

38. From September 26 to 28, 2012, Johnston Boiler Company was on-site to fine-tune the boiler.

39. On November 29, 2012, unacceptable NOx emissions were measured.

40. From January 28, 2013, to February 1, 2013, Johnston Boiler Company was on-site to make final adjustments.

41. On February 1, 2013, unacceptable emissions were measured again.

42. On April 3, 2013, Johnston Boiler Company was on-site to make adjustments and perform a mock compliance demonstration test. They did not complete the test because unacceptable emissions were measured again.

43. In subsequent communications between Johnston Boiler Company and Respondent, Respondent requested engineering data to demonstrate that further suggested adjustments will bring the boiler into compliance. Johnston failed to provide the requested engineering data.

44. On September 27, 2013, the Ohio Attorney General's office sent a letter to Johnston Boiler Company on behalf of Respondent, rejecting the boiler as non-conforming goods and revoking any implied acceptance of the boiler. The letter demanded that the State collect back all moneys it had paid for the boiler, along with all incidental and consequential damages.

45. On November 19, 2013, Ohio EPA issued Respondent PTI #P0115531, authorizing the installation for temporary placement, for a period of 120 days, of a 99.9 MMBtu per hour (natural gas) / 96.8 MMBtu per hour (No. 2 fuel oil) boiler for institutional space heat.

46. Respondent is working to negotiate a resolution to its claims against Johnston Boiler Company.

47. The Director finds that Respondent failed to timely conduct the compliance tests required by PTI #P0106093, in violation of ORC § 3704.05(C). The failure to comply with the permit terms and conditions to conduct compliance tests occurred from December 11, 2011, and is ongoing. Respondent does not admit these violations or any issue of fact or law, but has agreed to resolve Ohio EPA's allegations through these Findings and Orders.

Failure to timely conduct compliance testing for emissions units P007 and P008

48. On November 17, 2005, Ohio EPA issued PTI #14-05757 authorizing the installation of emissions unit P007. On February 16, 2006, Ohio EPA issued PTI # 14-05780 authorizing the installation of emissions unit P008. In accordance with the Rice rule, both PTIs required the respective emissions unit to be tested semiannually and allowed for annual testing, with SWOAQA's approval, after two consecutive tests demonstrated compliance. If the results of any subsequent annual emission test indicated the emissions units were not in compliance with the CO emission limitation or control efficiency requirement, semiannual emission testing was required be resumed. The PTIs required the performance tests to be conducted each year by June 30 and December 31. Emissions units P007 and P008 are currently allowed to conduct annual performance tests which must be conducted each year by December 31.

49. On December 14, 2012, Respondent submitted a letter to SWOAQA requesting that the December 14, 2012 annual CO destruction efficiency test for emissions unit P007 be rescheduled to a later date because primary testing showed a low pressure drop across the catalyst and less than expected CO control efficiency. On December 14, 2012, Respondent sent a letter to SWOAQA to provide notice that the CO annual control efficiency test for emissions unit P008, scheduled for December 12, 2012, could not be conducted due to excess heating in the exhaust header. Respondent stated that an inspection had concluded that the engine's exhaust header

was damaged beyond repair and a new one needed to be installed. Respondent stated that both engines were shut down.

50. On January 15, 2013, SWOAQA sent NOVs to Respondent for the failure to timely conduct the required annual performance tests and requested Respondent to submit compliance plans and schedules to return the emissions units to compliance.

51. On January 30, 2013, Respondent submitted the requested compliance plans, stating it would install catalyst element gaskets and associated hardware for emissions unit P007 and an engine exhaust manifold, seals, gaskets and hardware for emissions unit P008 by February 20, 2013. Respondent also committed to have the required compliance tests completed by March 29, 2013.

52. The Director finds that Respondent failed to timely conduct the annual performance tests required by PTI #14-05757 and PTI #14-05780, in violation of ORC § 3704.05(C) and the Rice rule. Respondent does not admit these violations or any issue of fact or law, but has agreed to resolve Ohio EPA's allegations through these Findings and Orders.

53. On April 2, 2013, Respondent conducted the required semiannual performance tests and demonstrated compliance with the required CO destruction efficiency.

54. The Director has given consideration to, and based his determination on, evidence relating to the technical feasibility and economic reasonableness of complying with the following Orders and the benefits to the people of the State to be derived from such compliance.

V. ORDERS

The Director hereby issues the following Order:

1. In lieu of paying a potential civil penalty, Respondent shall, within sixty (60) days of the effective date of these Orders, fund or commit to funding the Supplemental Environmental Project ("SEP") described in Appendix A in an amount of no less than $24,000.

2. Proof of the funding or commitment of funding shall be sent to Bruce Weinberg, Manager, Compliance/Enforcement Section, or his successor, at the following address:

Ohio EPA
Division of Air Pollution Control
P.O. Box 1049

Columbus, Ohio 43216-1049

And to:

Southwest Ohio Air Quality Agency
250 William Howard Taft Road
Cincinnati, Ohio 45219
Attn: Kerri Castlen, Permits & Enforcement Area Supervisor

VI. TERMINATION

Respondent's obligations under these Orders shall terminate when Respondent certifies in writing and demonstrates to the satisfaction of Ohio EPA that Respondent has performed all obligations under these Orders and the Chief of Ohio EPA's Division of Air Pollution Control acknowledges, in writing, the termination of these Orders. If Ohio EPA does not agree that all obligations have been performed, then Ohio EPA will notify Respondent of the obligations that have not been performed, in which case Respondent shall have an opportunity to address any such deficiencies and seek termination as described above.

The certification shall be signed by Respondent and contain the following attestation: "I certify, to the best of my information and belief formed after reasonable inquiry, that the information contained in or accompanying this certification is true, accurate and complete."

This certification shall be signed by a responsible official of Respondent and submitted by Respondent to Ohio EPA. For the purposes of these Orders, a responsible official is a principal executive officer of at least the level of vice president, or his or her duly authorized representative.

VII. OTHER CLAIMS

Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership or corporation, not a party to these Orders, for any liability arising from, or related to, the operation of Respondent's facility.

VIII. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to these Orders shall be undertaken in accordance with the requirements of all applicable local, State and federal laws and

regulations. These Orders do not waive or compromise the applicability and enforcement of any other statutes or regulations applicable to Respondent.

IX. MODIFICATIONS

These Orders may be modified by agreement of the parties hereto. Modifications shall be in writing and shall be effective on the date entered in the journal of the Director of Ohio EPA.

X. RESERVATION OF RIGHTS

Ohio EPA and Respondent each reserve all rights, privileges and causes of action, except as specifically waived in Section XII of these Orders.

XI. WAIVER

In order to resolve disputed claims, without admission of fact, violation or liability, and in lieu of further enforcement action by Ohio EPA for only the alleged violations specifically cited in these Orders, Respondent consents to the issuance of these Orders and agrees to comply with these Orders. Compliance with these Orders shall be a full accord and satisfaction for any liability for the alleged violations specifically cited herein.

Respondent hereby waives the right to appeal the issuance, terms and conditions, and service of these Orders and Respondent hereby waives any and all rights Respondent may have to seek administrative or judicial review of these Orders either in law or equity.

Notwithstanding the preceding, Ohio EPA and Respondent agree that if these Orders are appealed by any other party to the Environmental Review Appeals Commission, or any court, Respondent retains the right to intervene and participate in such appeal. In such an event, Respondent shall continue to comply with these Orders notwithstanding such appeal and intervention unless these Orders are stayed, vacated, or modified.

XII. EFFECTIVE DATE

The effective date of these Orders is the date these Orders are entered into the Ohio EPA Director's journal.

XIII. SIGNATORY AUTHORITY

Each undersigned representative of a party to these Orders certifies that he or she is fully authorized to enter into these Orders and to legally bind such party to these Orders.

ORDERED AND AGREED:

Ohio Environmental Protection Agency

Craig W. Butler
Director

6/12/14
Date

AGREED:

University of Cincinnati

Signature

5/12/14
Date

JAMES PLUMMER
Printed or Typed Name

VP - FINANCE
Title

Supplemental Environmental Project (SEP)

Moving Beyond Coal with Engineered Pelletized Fuel

In an attempt to "move beyond coal", Respondent has considered an engineered pelletized fuel as an alternative solid fuel for an existing coal-fired boiler (Boiler #3) located at the East Campus Utility Plant.

Engineered pelletized fuel is made mainly from non-recyclable pre-consumer paper and to a lesser extent, non-recyclable plastics, helping manufacturers of these materials to avoid unnecessary additional use of landfills. These industrial "leftover" materials are engineered into an alternative solid fuel with similar characteristics to coal except for the fact that the pellets, unlike coal, have insignificant amounts of sulfur and mercury.

Respondent requested and completed a trial burn of pelletized fuel in 2013 and concluded that it is operationally feasible to burn 100% pellets in the existing coal-fired boiler. However, in order to comply with an upcoming Boiler MACT rule, HCl emission needs to be reduced either by a conventional dry sorbent injection process or an in-situ sorption of pellets doped with alkaline earth materials or a combination of the two processes. Respondent's Supplemental Environmental Project is to test both of these processes.

Doped-Pellets Research Plan and Budget

A research and development project is proposed by The University of Cincinnati College of Engineering and Applied Science and will consist of evaluating selected alkaline earth materials as potential acid sorbent materials for use as doping agents for the pelletized fuel. The laboratory experiments will involve coating non-doped pellets with various concentrations of selected doping agents. All samples to be used will be tested for both chlorine content and heat content. The doped pellets will be combusted in a tube furnace operated at 2000°F which is the maximum temperature expected to occur on the furnace grate. Ash generated from these combustion tests will be saved for analysis of the chlorine content. The heat content (BTU/lb) and chlorine concentration of the raw (un-doped) pellets will be determined to provide a baseline of the potential chlorine emission rate in lbs of $HCl/10^6BTU$. The chlorine content of the ash from the combustion tests will be used to determine the potential percent removal of chlorine as a result of the doping agent. As a result of these tests the best candidate doping agent will be determined based on removal efficiency and bulk costs of the agent, as well as the optimum doping concentration required, and physical ability of the pellet manufacturer to add the doping agent to the pellets

The following budget is estimated to cover the expenses over the 20-week period of the project.