

PENNSTATE



**Feasibility Analysis for Installing a Circulating Fluidized Bed Boiler for
Cofiring Multiple Biofuels and Other Wastes
with Coal at Penn State University**

Third Quarterly Technical Progress Report for the Period 12/15/2000 to 03/14/2001

By

Bruce G. Miller and Sharon Falcone Miller
The Energy Institute;

Robert Cooper, Douglas Donovan, John Gaudlip,
Matthew Lapinsky, and William Serencsits
Office of Physical Plant;

Neil Raskin and Dale Lamke
Foster Wheeler Energy Services, Inc.; and

Joseph J. Battista
Cofiring Alternatives

March 30, 2001

Work Performed Under Grant No. DE-FG26-00NT40809

For
U.S. Department of Energy
National Energy Technology Laboratory
P.O. Box 10940
Pittsburgh, Pennsylvania 15236

By
The Energy Institute
The Pennsylvania State University
C211 Coal Utilization Laboratory
University Park, Pennsylvania 16802

**Feasibility Analysis for Installing a Circulating Fluidized Bed Boiler for
Cofiring Multiple Biofuels and Other Wastes
with Coal at Penn State University**

Third Quarterly Technical Progress Report for the Period 12/15/2000 to 03/14/2001

By

Bruce G. Miller and Sharon Falcone Miller
The Energy Institute;

Robert Cooper, Douglas Donovan, John Gaudlip,
Matthew Lapinsky, and William Serencsits
Office of Physical Plant;

Neil Raskin and Dale Lamke
Foster Wheeler Energy Services, Inc.; and

Joseph J. Battista
Cofiring Alternatives

March 30, 2001

Work Performed Under Grant No. DE-FG26-00NT40809

For
U.S. Department of Energy
National Energy Technology Laboratory
P.O. Box 10940
Pittsburgh, Pennsylvania 15236

By
The Energy Institute
The Pennsylvania State University
C211 Coal Utilization Laboratory
University Park, Pennsylvania 16802

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

EXECUTIVE SUMMARY

The Pennsylvania State University, under contract to the U.S. Department of Energy, National Energy Technology Laboratory is performing a feasibility analysis on installing a state-of-the-art circulating fluidized bed boiler and ceramic filter emission control device at Penn State's University Park campus for cofiring multiple biofuels and other wastes with coal, and developing a test program to evaluate cofiring multiple biofuels and coal-based feedstocks.

The objective of the project is being accomplished using a team that includes personnel from Penn State's Energy Institute and the Office of Physical Plant, Foster Wheeler Energy Services, Inc., and Cofiring Alternatives.

The major emphasis of work during this reporting period was to complete the assessment of the quantity and location of potential woodwaste feedstocks from the surrounding region, complete the sample analyses, and begin the design of the conceptual fluidized bed system.

TABLE OF CONTENTS

	<u>Page</u>
LIST OF FIGURES	v
LIST OF TABLES	vi
1.0 INTRODUCTION	1
1.1 Penn State's Steam Plants	2
1.2 Project Outline	3
2.0 TASK 1. INFORMATION AND SAMPLE COLLECTION	8
3.0 TASK 2. BIOFUELS AND BIOFUEL/COAL CHARACTERIZATION	9
4.0 TASK 3. DEVELOP CONCEPTUAL DESIGN	11
5.0 TASK 4. DEVELOP PRELIMINARY TEST PROGRAM/BUDGET ..	12
6.0 TASK 5. DETERMINE SYSTEM/PROGRAM ECONOMICS	12
7.0 TASK 6. COMPLETE FEASIBILITY STUDY	12
8.0 TASK 7. PROJECT MANAGEMENT/REPORTING	12
9.0 NEXT QUARTERLY ACTIVITIES	14
10.0 REFERENCES	14
11.0 ACKNOWLEDGMENTS	14
APPENDIX A. POTENTIAL SAWDUST SUPPLIERS – TOTAL LISTING ..	A-1
APPENDIX B. POTENTIAL SAWDUST SUPPLIERS – PHONE SURVEY SHORT LIST BY ALPHABET (TABLE)	B-1
APPENDIX C. POTENTIAL SAWDUST SUPPLIERS – PHONE SURVEY SHORT LIST BY DISTANCE (TABLE)	C-1
APPENDIX D. DETAILS OF SELECTED SAWMILLS – PHONE SURVEY SHORT LIST BY ALPHABET (TEXT)	D-1
APPENDIX E. DETAILS OF SELECTED SAWMILLS – PHONE SURVEY SHORT LIST BY DISTANCE (TEXT)	E-1
APPENDIX F. COAL AND LIMESTONE ANALYSIS	F-1

LIST OF FIGURES

	<u>Page</u>
FIGURE 1. Penn State's West Campus and East Campus Steam Plants.....	4
FIGURE 2. Milestone Schedule.....	6

LIST OF TABLES

		<u>Page</u>
TABLE 1.	Description of Milestones	7
TABLE 2.	Potential CFB Feedstocks (as of Summer 2000)	10
TABLE 3.	Preliminary Fuel and Firing Rate Information	13

1.0 Introduction

The Pennsylvania State University, under contract to the U.S. Department of Energy (DOE), National Energy Technology Laboratory (NETL) is performing a feasibility analysis on installing a state-of-the-art circulating fluidized bed (CFB) boiler and ceramic filter emission control device at Penn State's University Park campus for cofiring multiple biofuels and other wastes with coal, and developing a test program to evaluate cofiring multiple biofuels and coal-based feedstocks. Penn State currently operates an aging stoker-fired steam plant at its University Park campus and has spent considerable resources over the last ten to fifteen years investigating boiler replacements and performing life extension studies. This effort, in combination with a variety of agricultural and other wastes generated at the agricultural-based university and the surrounding rural community, has led Penn State to assemble a team of fluidized bed and cofiring experts to assess the feasibility of installing a CFB boiler for cofiring biomass and other wastes along with coal-based fuels.

The objective of the project is being accomplished using a team that includes personnel from Penn State's Energy Institute and the Office of Physical Plant, Foster Wheeler Energy Services, Inc., and Cofiring Alternatives.

The CFB boiler system that will be considered in the feasibility analysis is unique in that it will:

- 1) be of compact versus traditional design;
- 2) include modules to evaluate ceramic filters, along with fabric filters, for particulate matter control (recent work at Penn State has shown that ceramic filters have potential advantages regarding fine particulate matter and trace elements, i.e., mercury removal);
- 3) contain an advanced instrumentation package including temperature and pressure sensors, deposition and slagging probes, heat flux meters, and corrosion/ erosion panels;
- 4) contain multi-fuel capabilities (making it a versatile test site for industry and government studies); and
- 5) be a commercial facility in a rural, agricultural setting that contains an engineering and agricultural-based university.

The state-of-the-art CFB boiler and ceramic filter device would allow the University the opportunity to do the following:

- to more economically supply heat to the University Park Campus;
- to reduce the amount of air-borne pollutants (i.e., NO_x , SO_2 , particulate matter, and potentially trace elements), thus helping to reduce the overall emissions from the University's central heating plant;
- to reduce the amount of agricultural and other waste products produced by the University that must be disposed;
- to help reduce the amount of CO_2 (a greenhouse gas) emissions by combusting waste biofuels; and

- to ultimately serve as a large-scale (commercial demonstration size) test facility for federally - and other outside source-funded research and development projects related to cofiring of biofuels with coal and other coal refuse.

It is the intent of the feasibility analysis to assess: the economics of producing steam; the economics of off-sets such as utilizing multiple biomass and other wastes (i.e., sewage sludge); the value of a unique CFB test facility to perform research for industry, such as Foster Wheeler, and government agencies, such as the DOE; the environmental aspects of the CFB boiler; and the availability of funding from multiple sources including University, state, and federal sources. The feasibility study will also include developing a multiple-year program to test biofuels as the boiler system will be unique in that it will be heavily instrumented and will be able to handle multiple fuels.

1.1 Penn State's Steam Plants

Penn State University, Office of Physical Plant (OPP) currently operates a coal-fired central steam plant at the University Park Campus. The installed coal-fired capacity is 450,000 lb/h (pph) steam generated by four vibra-grate stoker boilers at 250 psig/540°F, which are used as baseload units. Additional steam generating capacity is available with gas or oil fire in three other boilers, totaling 260,000 pph. Electricity is also produced, as a by-product, with a maximum installed generating capacity of 6,500 kW. Currently, at peak operation, which occurs when classes are in session and winter conditions experienced, 420,000 pph of steam are required. Steam requirements during the summer are 125,000 pph while approximately 200,000 pph of steam is required during the spring/fall.

Although the present total steam generating capacity is 710,000 pph, the University prefers not to operate the gas- and oil-fired boilers because the price of the natural gas and fuel oil is significantly higher than that of the coal. Ideally, the University would like to fire only coal and have sufficient coal firing capability to allow for one coal-fired boiler to be down without impacting steam production or forcing the operation of a gas/oil-fired boiler.

The four stoker-fired boilers at Penn State are all between 33 and 40 years old. When the units were installed (1961 to 1968), the projected life of a typical unit was expected to be approximately 40 years. Since that time, the life of the steam generating units has been reevaluated based on changing technology, economic, and regulatory factors. Life extension studies on many plants have now indicated that economic lives up to 50 to 60 years may be possible depending on the levels of maintenance, type of operation of the units, the cost of competing units, and other parameters related to these factors. Despite this, the University is exploring the possibility of installing a CFB boiler to cofire biomass and other waste streams with coal because of the following possible benefits:

- 1) Waste stream utilization. The CFB boiler would be multi-fuel capable with coal being the primary fuel and supplemented with waste streams. Waste stream disposal costs would be eliminated. For example, sewage sludge is currently landfilled at a cost of \$47/ton.
- 2) Lower overall fuel costs. This includes using a lower grade coal including bituminous coal refuse (i.e., gob), growing grasses or crops on University land and cofiring in the boiler, accepting biomass and other wastes from the municipality, and being a test site for industry (e.g., Foster Wheeler) to conduct various fuel tests where the test fuel would be used in place of fuels purchased by the University.
- 3) Higher efficiency boilers.
- 4) Lower boiler emissions.
- 5) Possible alternative to spreading manure on fields and the associated odor problem.
- 6) Potential external funding source for a boiler replacement project. A recent energy assessment for Penn State showed that a coal-fired cogeneration plant was not economically feasible. However, OPP is reconsidering a boiler replacement because there is the possibility that some of the funding may come from other sources, e.g., industrial sponsorship, state and federal agencies.
- 7) Research component. By being a test site for industry (e.g., Foster Wheeler), not only would there be a decrease in fuel costs but there is the possibility that other operating costs such as labor could be reduced when industry-funded testing occurs.

Penn State's seven boilers are housed at two locations on campus as shown in Figure 1. The four coal-fired boilers and one small natural gas and oil-fired boiler are located at the West Campus Steam Plant (WCSP). There is not any room for installing additional boilers at this location. Two 100,000 pph of steam boilers, designed for natural gas and No. 2 fuel oil, are located at the East Campus Steam Plant (ECSP). This facility is used for peaking purposes. This location has been identified for future boiler expansion. At this time, OPP is interested in installing a CFB boiler with 200,000 pph of steam capacity at the ECSP. This size of a boiler could be installed without extensive upgrades to the current steam, water, and condensate return infrastructure. Final selection of the boiler size will be determined as part of the feasibility study.

1.2 Project Outline

The work consists of gathering design-related information, collecting and analyzing representative biofuels, coal, and coal refuse samples, developing a conceptual CFB boiler system design, developing a preliminary three-year test program and associated budget, determining the system design/test program economics, and performing the feasibility study. The work is being performed via the following tasks:

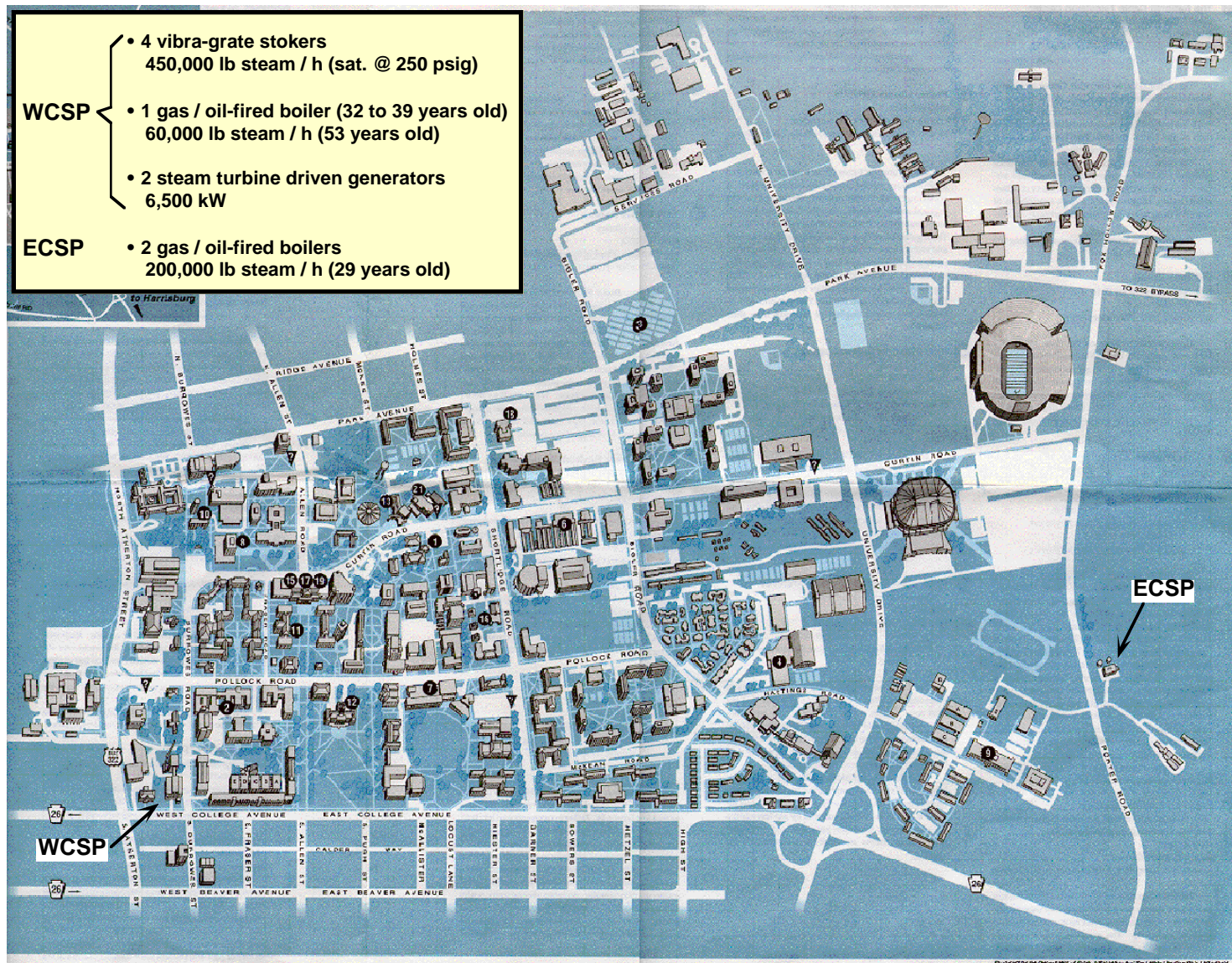


Figure 1. PENN STATE'S WEST CAMPUS AND EAST CAMPUS STEAM PLANTS

- Task 1. Information and Sample Collection
- Task 2. Biofuels and Biofuel/Coal Characterization
- Task 3. Develop Conceptual Design
- Task 4. Develop Preliminary Test Program/Budget
- Task 5. Determine System/Program Economics
- Task 6. Complete Feasibility Study
- Task 7. Project Management/Reporting

A summary of the activities being performed in each task includes:

Task 1. *Information and Sample Collection:* System requirements and infrastructure information will be assembled by Penn State and provided to Foster Wheeler. In addition, representative samples of biofuel and coal will be collected by Penn State and Cofiring Alternatives.

Task 2. *Characterize Biofuels and Biofuel/Coal Combinations:* Penn State will characterize the samples collected in Task 1 and use the analyses for assessing issues such as materials handling, deposition, and emissions.

Task 3. *Develop Conceptual Design:* A CFB boiler system will be designed to address the multiple project objectives. Foster Wheeler will perform the conceptual design with input from Penn State and Cofiring Alternatives.

Task 4. *Develop Preliminary Test Program/Budget:* A three-year test program will be designed and costed to use the state-of-the-art CFB boiler system for investigating a range of issues when cofiring multiple biofuels and possibly other waste materials. Penn State will develop the preliminary test program with consultation from Foster Wheeler and Cofiring Alternatives.

Task 5. *Determine System/Program Economics:* Capital and operating costs will be determined. In addition, the availability of funding for the system and test program will be assessed.

Task 6. *Complete Feasibility Study:* The feasibility study will be completed by incorporating the results from each of the tasks.

Task 7. *Project Management/Reporting:* The project will be managed and reported per DOE's contractual requirements. Reporting will include the quarterly program/project management and technical progress reports, and a final report.

The status of Tasks 1 through 7 is presented in Sections 2.0 through 8.0, respectively. Activities planned for the next quarterly period are listed in Section 9.0. References and acknowledgments are contained in Sections 10.0 and 11.0, respectively. The project schedule is given in Figure 2, with a description of the milestones contained in Table 1.

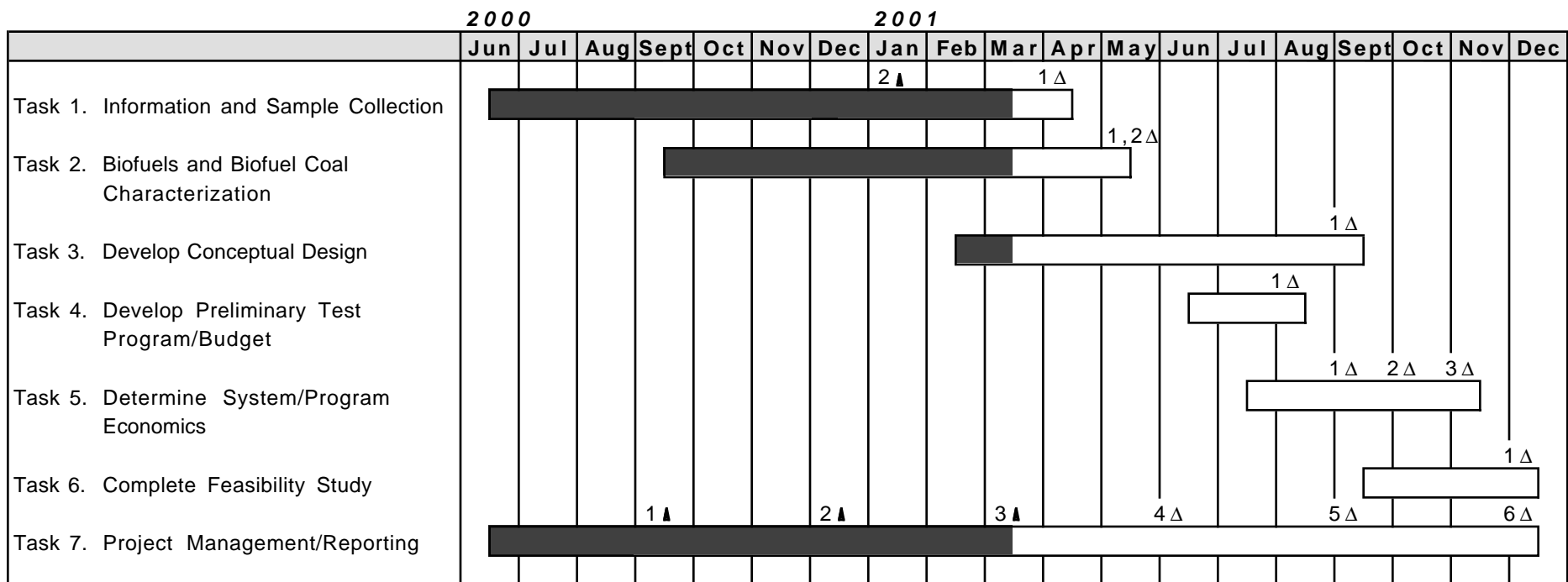


Figure 2. MILESTONE SCHEDULE

Table 1. Description of Milestones

<u>Milestone</u>	<u>Description</u>	<u>Planned Completion Date</u>	<u>Actual Completion Date</u>
Task 1, No. 1	Assemble system requirements and infrastructure information	04/15/01	
Task 1, No. 2	Collect representative biofuel and coal samples	11/15/00	01/15/01
Task 2, No. 1	Complete characterization of biofuel samples	08/15/01	
Task 2, No. 2	Complete characterization of biofuel/coal samples	08/15/01	
Task 3, No. 1	Complete conceptual design	09/15/01	
Task 4, No. 1	Develop preliminary task program/budget	08/15/01	
Task 5, No. 1	Determine capital cost	09/15/01	
Task 5, No. 2	Determine operating costs	10/15/01	
Task 5, No. 3	Assess availability of funding	11/15/01	
Task 6, No. 1	Complete feasibility study	12/15/01	
Task 7, No. 1	Prepare program/project management and technical report 1	09/15/00	10/15/00
Task 7, No. 2	Prepare program/project management and technical report 2	12/15/00	12/15/00
Task 7, No. 3	Prepare program/project management and technical report 3	03/15/01	03/30/01
Task 7, No. 4	Prepare program/project management and technical report 4; prepare final report	06/15/01	
Task 7, No. 5	Prepare program/project management and technical report 5	09/15/01	
Task 7, No. 6	Prepare program/project management and technical report 6; prepare final report	12/14/01	

2.0 Task 1. Information and Sample Collection

A subcontract was executed with Foster Wheeler on February 23, 2001. Originally, it was anticipated that the subcontract would be executed in December 2000. Hence, a kick-off design meeting was scheduled for January 10, 2001. Although Foster Wheeler was not under subcontract, the meeting was held. It was at this meeting that the design process started. Penn State reviewed Foster Wheeler's scope of work from the proposal and generated a list of questions on system requirements and termination points that was the basis for the meeting. Since this meeting, Penn State OPP has been in constant communication with Foster Wheeler providing them information for the design.

During the last reporting period, Cofiring Alternatives completed an assessment of sawmills and secondary wood processors with wood wastes available for marketing as well as other potential biomass feedstocks for the CFB (Miller et al., 2000). Appendices A through E in that report contain the results from the assessment.

As reported in the previous quarterly report, the assessment was started by identifying the counties that are within 75 miles of Centre County (county where Penn State's University Park campus is located). Next, companies that produce wood products/wastes that are located in these counties were identified (NREL report; Foster Wheeler 1998; The Pennsylvania Wood Residue Directory 1993). Approximately 325 companies were identified and are listed in the previous quarterly report (Miller et al., 2000).

The distance from University Park to the companies was then determined. Although all the original counties selected are within 75 miles of Centre County, many of the companies are farther than 75 miles from University Park. Therefore, all companies greater than 75 miles were removed from the list and the number of companies was reduced to 107. These companies were then called to gather more information than was reported in the previous quarterly report.

The results from the telephone calls are listed in the appendices. Appendix A is a list of potential suppliers by distance. The list contains only those parties where contact was made (not all parties returned calls or answered their telephones) and showed interest and/or are currently in business. However, note that the list now contains 158 companies compared to 107 reported in the previous quarterly report. This resulted from additional contacts that were provided verbally during the telephone contacts.

Appendices B through E contain the results from the final assessment. They include up-to-date listings of potential suppliers (31 companies) for the project that are within 45 miles (except for one company at 47 miles and another at 57 miles). The results are summarized in two tables, listed by alphabet and increasing distance from Penn State (Appendices B and C, respectively).

A summary sheet was prepared for each of the 31 companies from information received during the telephone calls. The summary sheets include the following information:

- Company name;
- Phone number;
- Town nearest company location;
- Contact person;
- Directions from University Park to company location;
- Quantity of sawdust or wood chips available;
- Transportation cost;
- What is done with the sawdust or wood chips; and
- Other notes.

The results from this survey show that there are $\approx 1,770$ tons/ week of sawdust and wood chips available. Of this total, ≈ 475 tons/ week ($\approx 27\%$ of total in the region) are being used in the preliminary design.

Penn State has also had discussions with CQ Inc. about supplying a fuel to the boiler. CQ Inc. is currently producing pellets (70% coal/ 28% waste paper sludge/ 2% plastics) at Westvaco's paper mill in Tyrone, Pennsylvania. The palletizing plant is ≈ 30 miles from University Park and its capacity can be increased in order to provide Penn State with pellets. Consequently, the boiler feed system will be designed to handle a palletized fuel.

Penn State previously identified the types and quantities of potential feedstocks at Penn State (except for the wood products which are from a supplier in the surrounding region and the estimate is based upon Cofiring Alternatives assessment) and collected samples for analysis (Miller and Jawdy, 2000). The results from this assessment are contained in Table 2.

3.0 Task 2. Biofuels and Biofuel/Coal Characterization

Analysis of the biofuels continued during this reporting period and the basic analyses were completed. The biofuel analyses, contained in the previous quarterly report (Miller et al., 2000) consisted of:

- 1) Proximate analysis;
- 2) Ultimate analysis;
- 3) Higher heating value;
- 4) Bulk density (where appropriate);
- 5) Chlorine content (where appropriate); and
- 6) Rheological characteristics (where appropriate).

Table 2. Potential CFB Feedstocks (as of Summer 2000)

Material	Quantity (tons/yr)
<i>Biomass/Biomass Waste at University Park</i>	
Animal Wastes:	
Dairy manure (tie stall and free stall mixed with leaves)	13,200
Manure from covered manure barn (poultry litter, horse barn, misc.)	1,180
Beef manure	1,033
Sheep manure	265
Swine waste	2,505
	(@ 2.2% solids)
Woodwaste/brush	150
Pallets	92
Reed canary grass	600
<i>Other Wastes at University Park</i>	
Sewage sludge	2,708
	(@ 12% solids)
Bottom ash	6,990
Fly ash	1,445
Plastics - total	2.1
Horticulture hard plastics	0.2
Horticulture plastic bags	1
Bale tarps	0.5
Silo bunker covers	0.4
Used oil	14
Tires	5
<i>Biomass from Surrounding Region (within 45 miles of University Park)</i>	
Wood products (chips/shavings)	> 90,000

In addition, the bulk chemical analysis of the biofuel ashes was determined. The results will be reported in the next quarterly report along with the chemical fractionation results.

Chemical fractionation analysis, originally not planned as part of this project but added later, is being performed on the following samples to determine the mode of occurrence of major and minor elements:

- 1) Pine shavings;
- 2) Red oak shavings;
- 3) Dairy tie-stall manure;
- 4) Dairy free-stall manure;
- 5) Miscellaneous manure (mixture of various small-quantity manure streams that are collected at a central storage barn);
- 6) Sewage sludge;
- 7) Sheep manure;
- 8) Reed canary grass;
- 9) Bottom ash; and
- 10) Fly ash.

The chemical fractionation process has been completed for all of the samples. The chemical composition of the solid and liquid fractions (a total of eight) from two of the chemically fractionated samples, sewage sludge and sheep manure, were analyzed and reviewed during the previous reporting period. This was done to check the material balances and variability of the analyses prior to submitting the remaining fractions. The closure on the material balances was acceptable and the remaining samples were submitted for analysis. A detailed description of the chemical fractionation procedure and the results will be reported in the next quarterly report.

Coal and limestone analyses were provided to Foster Wheeler for use in the design. The coal and limestone analyses used in the design were provided by Bradford Coal Company and Meckley Limestone Products, respectively. Appendix F contains the analyses.

4.0 Task 3. Develop Conceptual Design

During this reporting period, work started on developing the conceptual design. A series of formal meetings, teleconferences, and conference calls were held on a regular basis, typically every two weeks. In addition, during the last project design meeting (March 13, 2001), Foster Wheeler brought Parsons on board to perform the balance of plant design and permitting. The following work has been completed or is in progress:

- Have completed the boiler design and preliminary arrangements;
- Have reviewed the site topography and will be locating the plant on the site trying to minimize the civil costs. There will most likely be three levels for the plant;

- Have selected the fuel, limestone, and ash quantities that need to be considered for the material handling systems;
- Have decided on a preliminary arrangement for the fuels and limestone receiving, storage, and conveying requirements;
- Are determining the plant utility requirements – water, cooling water, electricity, instrument and station air;
- Have calculated emissions values for the base coal and biomass fuel mix and coal only; and
- Have begun preparing the plant P&IDs.

The preliminary design is based on the fuel combination and quantities shown in Table 3; however, the system is being designed with the flexibility to handle a variety of feedstocks from Penn State, the surrounding region, and outside the surrounding region (i.e., feedstocks from potential sponsors). The list shown in Table 3 is not inclusive and may be modified depending on input from the Pennsylvania Department of Protection.

5.0 Task 4. Develop Preliminary Test Program/Budget

No work was performed in Task 4 during this reporting period.

6.0 Task 5. Determine System/Program Economics

No work was performed in Task 5 during this reporting period.

7.0 Task 6. Complete Feasibility Study

No work was performed in Task 6 during this reporting period.

8.0 Task 7. Project Management/Reporting

During this reporting period, a subcontract was executed with Foster Wheeler. In addition, technical reporting was performed per the contractual requirements.

An abstract was prepared during this reporting period for the 5th Biomass Conference of the Americas to be held September 17-21, 2001 in Orlando Florida. The title of the manuscript is “The Occurrence of Inorganic Elements in Various Biomass Material and its Effect on Combustion Behavior,” coauthored by Sharon Falcone Miller, Bruce G. Miller, and Curtis Jawdy.

Table 3. Preliminary Fuel and Firing Rate Information

Feedstock	Maximum Firing Rate (lb/h, wet)	Maximum Thermal Input (Btu/h)
Coal	16,667	200,000,000
	(assuming heating value (Btu/lb) =	12,000)
Sewage Sludge	780	475,700
Swine Waste	715	116,777
Dairy Manure	3,800	10,600,000
Beef Manure	295	944,000
		(assuming HHV=8,000 Btu/lb)
Sheep Manure	76	290,400
Coverd Barn Manure	336	507,800
Reed Canary Grass	171	369,189
Plastics	0.6	11,500
Wood Chips/Shavings	5,700	28,400,000
<hr/>		
Total boiler thermal ratio =		200,000,000 Btu/h
Thermal input from all non-coal streams =		41,715,366 Btu/h
Thermal input from coal after biomass/wastes removed =		158,284,634 Btu/h
Thermal ratio of biomass/wastes-to-total =		0.21
Thermal ratio of coal-to-total =		0.79
Coal equivalent displaced by biomass/wastes =		3,476.28 lb/h
Total lb/h (wet) from all biomass/waste streams =		11,874 lb/h
Coal feed rate =		13,190 lb/h
Total fuel rate =		25,064 lb/h
Fuel ratio of biomass-to-total =		0.47
Fuel ratio of coal-to-total =		0.53

9.0 Next Quarterly Activities

During the next reporting period, the following will be done:

- The design of the system will continue;
- A meeting will be held at the Pennsylvania Department of Environmental Protection's Williamsport office on April 2, 2001 to discuss permitting issues (i.e., air, water, and solids). This will be attended by Penn State, Foster Wheeler, and Parsons; and
- The analysis of all potential feedstocks will be completed.

10.0 References

Foster Wheeler, "Assessment of Fuel Availability in the Seward, Pennsylvania Region," 1998.

Miller, B.G. and C. Jawdy, "Feasibility Analysis for Installing a Circulating Fluidized Bed Boiler for Cofiring Multiple Biofuels and Other Wastes with Coal at Penn State University First Quarterly Technical Progress Report for the Period 06/15/2000 to 09/14/2000," Prepared for the U.S. Department of Energy National Energy Technology Laboratory, Pittsburgh, Pennsylvania, DE-FG26-00NT40809, October 9, 2000.

Miller, B.G., S. Falcone Miller, C. Jawdy, R. Cooper, D. Donovan, and J.J. Battista, "Feasibility Analysis for Installing a Circulating Fluidized Bed Boiler for Cofiring Multiple Biofuels and Other Wastes with Coal at Penn State University First Quarterly Technical Progress Report for the Period 09/15/2000 to 12/14/2000," Prepared for the U.S. Department of Energy National Energy Technology Laboratory, Pittsburgh, Pennsylvania, DE-FG26-00NT40809, December 21, 2000.

National Renewable Energy Laboratory, Renewable Resource Data Center – The Biomass Resource Information Clearinghouse, "Wood Chip Suppliers and Brokers – Pennsylvania," <http://rrdec.nrel.gov>.

Pennsylvania Department of Environmental Resources, Bureau of Forestry, Forest Advisory Services, and Pennsylvania Energy Office, Bureau of Sustainable Energy & Technical Services, "The Pennsylvania Wood Residue Directory, Sawmills & Secondary Wood Processors," 1993.

11.0 Acknowledgements

Funding for the work was provided by the U.S. Department of Energy under Grant No. DE-FG26-00NT40809. The project is being managed by the U.S. Department of Energy, National Energy Technology Laboratory (Pittsburgh). Philip Goldberg of NETL is the project manager.

Randy Swope from Penn State's College of Agricultural Sciences Farm services is acknowledged for his assistance in quantifying and sampling various potential feedstocks.

APPENDIX A. POTENTIAL SAWDUST SUPPLIERS – TOTAL LISTING

POTENTIAL SAWDUST SUPPLIERS FOR PENN STATE COMBUSTOR — Selected by Distance

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Correctional Industries PA Dept. Corrections	0	Box A Bellefonte, PA 16823	10		814-355-4874 ext 251	Greg Day
Francis R Bartley	0	RD2, Box 98 Bellefonte, PA 16823	10		814-355-1775	Francis Bartley
H & R Sawmill		RD Julian, PA 16844	10		814-863-3049	Phone not in service.
Robinson Lumber Company	20	776 Lucas Road Bellefonte PA 16823	10	\$15 delivered	814-355-9583	Richard N. Robinson
Thomas Timberlands Enterprises	40/300	Box 5075, Route 26 Pleasant Gap, PA 16823	10	\$10.50/13.33 delivered	814-359-2890	BJ & Richard Thomas, sawdust/chips
Dunkelberger Lumber	0	RD1, Box 510 Centre Hall, PA 16828	12		814-366-1012	Out of business
Miller Lumber		RD1, Box 491 Petersburg, PA 16669	14		814-667-2478	Can t make contact (phone is fax).
Wert Company		474 Gravel Point Road Howard, PA 16841	22		814-625-2168	No answer.
B & S Logging & Lumber		205 Havice Valley Rd, Milroy, PA 17063	23		717-667-0050	Phone not in service.
Hulburt & Savitts Lumber	0	P.O. Box 14 Reedsville, PA 17084	24		717-667-3306	Stanley Savitts — out of business
Peachey s Wood Products	70	209 Sawmill Road Reedsville, PA 17084	24	\$4.25	717-667-9373	John Peachey
Saw-rite Sawmill	30/60	74 Airstrip Drive Millheim, PA 16854	24	\$10/\$13 delivered	814-349-1210	Sam Stoltzfus, sawdust/chips
Allensville Planing Mill, Inc.	0	108 E Main St Allensville, PA 17002	25		717-483-6386	John Foster
Big Valley Hardwood	0	296 Whispering Oaks Rd, Allensville, PA 17002	25		717-483-6440	Joe Peachey
J M Wood Products	25	HC 61, Allensville, PA 17002	25	\$3.00	717-483-6700	Dave Zook
J & S Lumber		1341 Front Mountain Rd, Belleville, PA 17004	26		717-483-6000	
Kaufman s Mulch	0	42 Maple Street Belleville, PA 17004	26	\$10.50 delivered	717-667-6317	Pete Kaufman, generates 250 tpw sawdust — would sell excess above that.
Kish Lumber	25	157 Sawmill Road Belleville, PA 17004	26	\$2.15	717-667-6157	Dave Byler
Midway Forestry Products		762 Barrville Rd, Belleville, PA 17004	26		717-667-6771	No voicemail — no contact

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Kephart Bros Lumber Co.	50	RD1 Osceola Mills, PA 16666	29		814-853-3333	Gene & Morris Kephart Phone number incorrect.
W D Krause & Sons, Inc.		Route 53 Osceola Mills, PA 16666	29		814-339-7660	Wrong number — can t make contact.
Alexandria Wood Products	0	Brickyard Road PO Box 357 Alexandria, PA 16611	30		814-669-4469	E. Gary O Brien
C L Price Sawmill & Planning	40/40	319 W Alley St, Aaronsburg, PA 16820	30	\$4.00FOB/ \$15.00 delivered	814-349-4431 814-349-5505	C. L., Dennis and Fred Price — sawdust/slabs
McCabe & Sons Lumber	20	HC1 Box 26 Alexandria, PA 16611	30	\$4.50	814-832-2046	Roy McCabe
Meeker Lumber Company	40/40	HC 21A Moshannon, PA 16859	30	\$2.00/\$0	814-387-6342	Bruce Meeker — sawdust/slabs
American Hickory Corp	0	Lewistown, PA 17044	31	\$2.00	717-543-6070	Mark Colwell —generates 100 tpw — may consider supplying in future
CHJ Lumber	30	Box 187 Allport, PA 16921	31	\$2.00	814-345-5271	Clark Hubler
Donald Hoffmaster	10	Box 290A Huntingdon, PA 16652	32	\$0	814-667-2472	Don Hoffmaster
Grove Lumber, Inc.		RD1 Box 188 Huntingdon, PA 16652	32		814-627-2921	Roger Grove
Urbanik Lumber	25/75	Box 195 Clarence, PA 16829	33	\$10.00 delivered	814-387-6939	Sam Urbanik — sawdust/slabs
S & S Sawmill		Box 80, Rebersburg, PA 16872	34			Can t make contact.
Swistock Contracting		PO Box 145 Houtzdale, PA 16651	34		814-378-8621	
Phillip's Wood Products	60	RD 2 Mill Hall PA 17751	37	\$3.00	570-726-3515	Carl & Tina Phillips
Byler Brothers Sawmill		RD1, Box 115F Mill Hall, PA 17751	37			Can t make contact.
Independent Lumber	0	RR1 Box 328 Woodland, PA 16881	37		814-857-7143	No longer saws timber.
Max Forcey Lumber Company	0	RR 1 Box 214 Woodland, PA 16881	37		814-857-5002	Terry Forcey, Jr.
Maines Lumber Company	0	RR1 Box 231 Woodland, PA 16881	37		814-857-7751	No longer saws timber.
Pennsy Lumber Products	40	RD1, Box 204A Williamsburg, PA 16693	37	\$12.50	814-832-3404	Jerry Lower

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Pine Creek Lumber, Inc.	45	60 Lizardville Road RD1, Box 35B, Mill Hall, PA 17751	37	\$5.50	570-726-7795	Darrel Reibson
Walker Lumber & Supply Company	45	Bigler PA 16825	37	\$16 delivered	814-857-7642	Mark Shaw
Wetzel Bros Lumber Co., Inc.	1	RD1, Box 268E Mill Hall, PA 17751	37		570-726-3473	
J M Smith & Son Lumber		RD 1, Box 70 McVeytown, PA 17051	40		814-542-9877	James M. Smith
J E Culbertson Co, Inc.	25	P.O. Box A Mill Creek, PA 17060	40	\$0	814-643-4519	Pat Rux
Grubco	50	RD1, Box 57A Hesston, PA 16647	40	\$7.00	814-658-3291	Mike Grub
K M Smith & Son		90 Pine Hill Rd, McVeytown, PA 17051	40		814-542-9936	No answer — no voicemail.
Kim Brion Lumber			40		570-769-1634	Replaces Saylor Lumber
Parchey s Sawmill	0	RD2, Box 138-1A McVeytown, PA 17051	40		717-899-6062	Out of business
Saylor Lumber	0	RD1, Box A344 Lock Haven, PA 17745	40		570-769-6567	Phone disconnected-Out of business per Peg Saylor
Spigelmyer Lumber	45	2316 Hawstone Rd, Lewistown, PA 17044	40	\$4.00 FOB \$10.50 delivered	717-248-6555	Toby Spigelmyer
Zook Lumberworks	6	RD2, Box 223 McVeytown, PA 17051	40		717-899-6543	No answer — no voicemail.
Dean P Otto Lumber		RR 3 Altoona, PA 16601	42		814-944-5447	Retired — out of business.
Ed s Logging		RD1, Box 214 Olanta, PA 16863	42		814-236-3279	
Robbins Lumber Co	40	RR 1, Olanta, PA 16863	42	\$3.50 FOB \$15.00 delivered	814-236-3384	Lynn Robbins
Suter's Portable Bandsaw Mill	0	306 Aldrich Ave, Altoona, PA 16601	42		814-943-3326	Steve Suter
Anthonic Lumber Co		Route 53, Glen Hope, PA 16645	44	\$14.00	814-672-5100	Ray Coates
Garner Lumber Co	0	P.O. Box 462 James Creek PA 16657	44		814-658-3700	J. Robert Garner, generates 80 tpw, may consider supplying in future
Greenwood Lumber Company	25	RR1 Box 378 Morrisdale, PA 16858	44		814-345-4160	Dan Curley

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Kitko Wood Products, Inc.	20	Route 53 Box 3 Glen Hope PA 16645	44	\$12.00	814-672-3606	Robert Kitko, Ken
Lyle McVey Lumber		280 McVey Road Mount Union, PA 17066	44	\$0	814-542-4887	Lyle McVey
J W Kitko & Sons	20	Route 53, Rose St Glen Hope, PA 16645	44	\$0 FOB \$6.50 delivered	814-672-3590	Chuck Kitko
Samuel J McMath	0	RD, Box 140 Mount Union, PA 17066	44		814-542-4779	Out of business.
Smith Bros. Sawmill	40	Route 522, S. Mount Union PA 17066	44	\$0	814-542-8320	Bernard Smith
Crown Hardwood West	0	RR 5, Mifflintown, PA 17059	45		717-436-9677	Monty Syjud
Gray s Pallets	150/20/40	Mifflintown, PA 17059	45	\$0/\$0/\$0	717-436-8585	Jill Swartz, sawdust/chips/slabs
Kovalick Lumber Co	60	RD1, Box 258 Frenchville, PA 16836	45	\$13.60 delivered	814-263-4928	Richard Kovalick
Quehanna Hardwoods, Inc.	0	Box 297 Frenchville, PA 16836	45		814-263-4919	Out of business per Son, Ed Plubell 814-263-4145
R H Morgan Lumber Co.	20	HCR 60, Box 370 Orbisonia PA 17243	45	\$8.00 delivered	814-447-5662	Ramon & Linda Morgan & Clyde Cisney
Treen Box & Pallet Corp	100	Mifflintown, PA 18966	45	\$4.50	717-535-5800	Vernon Troyer
Bickel Wood Products, Inc.	90	E Ohio St, Box 416 McClure, PA 17841	46		717-658-8343	Phone disconnected, presumed out of business
Fishel s Pallet Mill	35	Box 37 Blandburg, PA 16619	46		814-687-4251	
HC 67		Mifflin, PA 17058	46		717-734-3294	J.M. Junk — phone disconnected presumed out of business
Snook's Rhine & Arnold Sawmill	0	RR 2 Box 807, Mc Clure, PA 17841	46		570-658-3410	Robert Snook
Wood Chips, Inc.	120	Route 150 Avis, PA 17721	46		717-769-6441	James H. Maguire — Phone number is a fax — can t make contact.
Helsel Lumber Mill, Inc.	0	3446 Johnstown Road RD2, Box 173 Duncansville, PA 16635	47	\$4.00	814-696-0869	Joel Jackson — may consider supplying inthe future.
Shomo Lumber Company		241 Shadey Lane Fallentimber, PA 16639	47		814-687-3875	
Railaworks Wood Products (formerly H P Mc Ginley, Inc.)		Box 251 Route 235 McAlisterville, PA 17049	50		717-463-2131	Doug Ryan
J C McGough & Son		RD Dysart, PA 16636	51		814-674-8914	Edgar J. McGough

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Weber Lumber	50	RD1, Box 426 Ashville, PA 16613	51		814-674-5124	
James Shallenburger Lumber	60	527 Mountain Road RD1, Box 43 McAlisterville, PA 17049	52		717-463-2546	James Shallenberger
Ralph A Hepner Lumber		RD1, Box 140 McAlisterville, PA 17049	52		717-463-2439	
D W Shadel Logging & Lumber		11 Cody Ln, Mc Alisterville, PA 17049	52		717-463-9818	
Heeter Lumber Co	17	RD1, Box 148 Beavertown, PA 17813	52		717-658-3292	John D. Heeter
Appleton Papers, Inc.	120	100 Paper Mill Road Roaring Spring, PA 16673	54		814-224-6411	wood fines
George S Rabenstein & Son	6	PO Box 236 Orbisonia, PA 17243	54		814-447-3465	
High Point Hardwoods		1070 Dogwood Lane Roaring Spring, PA 16673	54		814-224-4171	
Seven D Wholesale		302 Saint Thomas St. Gallitzin, PA 16641	54		814-886-8352	
Van Voorhis Lumber		Tannery Road Penfield, PA 15849	54		814-637-5388	
Weaver Brothers Lumber	55	RD1, Box 188 Beaver Springs, PA 17812	54		570-658-8371 or (658-7740)	Mel & Abe Weaver
Lee Brothers Lumber Company		RR1 Box 448 Grampian, PA 16838	55		814-236-2809	
Stanley Woodworking	0	White Top Road Middleburg, PA 17842	56		570-837-6434	Tom Fitzgerald (generates 150 tpw — all committed)
Brumbaugh Lumber	30	RD1 Box 1068 Mapleton Depot, PA 17052	57	\$9.00 delivered	814-542-8880	Chester Brumbaugh
Wood Word Forest Products	25	RD1, Box 458 Linden, PA 17744	57		717-322-1312	
Blair Sterer Rough Lumber Products		RD1 Saxton, PA 16678	58		814-658-3400	
Brode Lumber	6	RD1 Saxton, PA 16678	58		814-653-3624 or 814-635-3436	
Dean W Brouse & Sons Lumber		E Main St Ext, Kreamer, PA 17833	58		570-374-7695	
Dressler Lumber		RR 2, Millerstown, PA 17062	59		717-444-7402	
Juniata Forest Products		RR 1, Millerstown, PA 17062	59		717-567-7226	

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Meiser Lumber Co	75	Drawer F Millerstown, PA 17062	59		717-589-3122	Mike Meiser
Bowser Lumber Co.		Route 36 N, RR1, Box 240 Mahaffey, PA 15757	60		814-277-9956	Ron or Ed
George W Long & Sons Lumber Co.	50	RR 1, Box 1 Patton, PA 16668	60		814-674-3615	Joseph A. Long, Robert
Lynn L Bouch	10	RD1, Box 149 Mahaffey, PA 15757	60		814-277-6087	
Snyder Lumber Co	200	RD1, Box 717 Mahaffey, PA 15757	60		814-277-6640	
White Lumber Co	10	Mahaffey, PA 15757	60		814-277-6098	
Roy Miller		RD 1 Mahaffey, PA 15757	60		814-277-6055	
Nora White & Son		RR 2 Mahaffey, PA 15757	61		814-277-6093(also 8870)	Ted
Wade Cisney Lumber Company, Inc.		Box 75, HCR 61B Shade Gap, PA 17255	61		814-542-9757	Wade Cisney
Ralph Stuck Lumber		Box 23 Richfield, PA 17086	62		570-539-8666	Harold Stuck
A D Renninger Lumber Co	75	PO Box 95 Richfield, PA 17086	62		717-694-3351	
Delbert L Renninger & Sons Wood Products	180	RD1, Box 118 Richfield, PA 17086	62		717-539-8120	
E & E Lumber Company, Inc.		RD 1, Box 29 Loretto, PA 15940	62		814-886-4440	Eugene F. Krug
Hoffman Brothers Lumber, Inc.	90	RR1 Box 86 Richfield, PA 17086	62		717-694-3340	Delbert Hoffman
R J Junk Lumber		RR 1 Box 444, Honey Grove, PA 17035	62		717-734-3838	
Sherwood Sawmill	1	RD2, Box 177 Dubois, PA 15801	62		814-371-9492	
Strawser Brothers Logging		Star Route 35, Richfield, PA 17086	62		717-694-3117	
Walter L Stuck Sawmill		Hc 72 Box 19, Richfield, PA 17086	62		570-539-4481	
A & L Woods, Inc.	60	Mount Pleasant Mills, PA 17853	64		717-539-8922	
Babcock Lumber Co.		421 S. West Street Ebensburg, PA 15931	64		814-472-6911	

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Carey Lumber & Pallet	5	Box 179, HC-31 Williamsport, PA 17701	64		717-435-5051	
Fred Sherry Lumber Company	8	RD2, Box 123 Ebensburg, PA 15931	64		814-948-7468	Ken
Keystone Land & Timber Co.	50	RD1, Box 701 Portage, PA 15946	64		814-495-9398	
Long s Hardwoods, Inc.		3133 New Germany Road Ebensburg, PA 15931	64		814-472-4740	
Louis Long Lumber Company, Inc.		1984 New Germany Road RR 3, Box 299 Ebensburg, PA 15931	64		814-472-9219	Joe Seliga
Martindale Lumber Co.	75	1047 Puritan Road, Box 207 Portage, PA 15946	64		814-736-3032	Ray McCabe
Portzline's Pallets		RR 2 Box 197, Mt Pleasant Mills, PA 17853	64		717-694-3274	
R J Hoffman & Sons	50	RD 2, Box 350 Mt. Pleasant Mills, PA 17853	64		717-539-2428	Rudolph J. Hoffman
Troyer's Saw Mill		RR 1 Box 229, Mt Pleasant Mills, PA 17853	64		570-539-8167	
Goshorn Lumber Company		HCR 62, Box 62 Neelyton, PA 17239	65		814-259-3716	Randy Goshorn
Mundricks Sawmill		RR 2 Box 281, Jersey Shore, PA 17723	65		570-745-3625	
Palmer Wetzel Lumber Co		RR 3, Jersey Shore, PA 17723	65		570-398-7771	
Steele s Lumber Co.	50	Box 79 Riddlesburg, PA 16672	66		814-928-4497	James & Donald Steele
Superior Wood Products		RD 1, Box 258 Summerhill, PA 15958	67		814-472-9348	
D L Bussard Forest Products		RR 2 Hopewell, PA 16650	67		814-652-5566	
G & S Lumber Co	140	HCR 61, Box 51 Blairs Mills, PA 17213	67		814-259-3763	
Samuel M Koban		RD1, Box 258 Summerhill, PA 15958	67		814-482-9348	
Clugston Lumber		RR1 Box 190 East Waterford, PA 17021	70		717-734-3215	
George White Planing Mill		Main Street East Waterford, PA 17021	70		717-734-3816	

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
John M Fink Lumber		HC 31, Box 179 Williamsport, PA 17701	70		717-435-5051	
Lauchle Logging & Lumber	4	RD1, Box 110 Montoursville, PA 17754	70		570-435-3352	
McNaughton & Sons Lumber		RR 1, Elliottsburg, PA 17024	70		717-582-2543	
Robinson Lumber Co	8	RD1 Elliottsburg, PA 17024	70		717-789-3265	
Wingate Lumber Co	25	RD1, Box 176 East Waterford, PA 17021	70		717-734-3812	Roy Wingate
Feaster Lumber Co.	80	RD1 New Paris, PA 15554	71		814-839-2648	
Highland Land & Minerals Inc		100 Merodith Rd, Kersey, PA 15846	71		814-885-8600	
Kuhns Bros. Lumber Company, Inc.	140	Route 2, Box 406 Lewisburg, PA 17837	71		717-568-1412	Larry Kuhns
Rummel Brothers		112 Red Mill Road Belsano, PA 15922	71		814-749-7021	
Winter Lumber Co		6765 Pleasant Valley Rd, Cogan Station, PA 17728	71		570-435-2231	
Doliveira Lumber Co.	3	430 Expedite Road RD1, Box 144 Nanty Glo, PA 15943	72		814-749-0910	James Doliveria
Rorabaugh Lumber Co	15	Box 321 Burnside, PA 15721	72		814-845-2277	Roger D. Rorabaugh
Amberson Valley Lumber Products	10	17891 Cold Spring Rd Spring Run, PA 17262	73		717-349-7359	
Merritt Burdge Company		17891 Cold Spring Rd. Spring Run, PA 17262	73		717-349-7359	
Rosenberry Bros. Lumber Co., Inc.		Drawer A Fannettsburg, PA 17221	74		717-349-7196	Glen Rosenberry
Eagle Mountain Lumber Company		15568 E. Fannettsburg Road Box 332 Fannettsburg PA 17221	74		717-349-2375 or 349-2862	John C. Rosenberry
Ondrizek Lumber Co.		Box 46 Strongstown, PA 15957	74		814-749-0996	Ted Ondrizek
Shirk's Lumber		RR 1, Liverpool, PA 17045	74		570-539-8430	
Weaver s Sawmill	30	RD2, Box 649 Liverpool, PA 17045	74		717-444-2232 Earl/-7772 Ivan/ -0186 John	
J Nevin White Lumber Company	40	P.O. Box 99 Duncannon PA 17020	75		717-957-2182	J. Nevin White

J Nevin White Lumber Co	40	RD3, PO Box 99 Duncannon, PA 17020	75		717-834-4242	
Krumenacker Lumber Co.	25	327 Krumenacker Lane RD1, PO Box 24 Carrolltown, PA 15722	75		814-948-6858	Dave Krumenacker

02/27/01

**APPENDIX B. POTENTIAL SAWDUST SUPPLIERS – PHONE SURVEY
SHORT LIST BY ALPHABET (TABLE)**

POTENTIAL SAWDUST SUPPLIERS FOR PENN STATE COMBUSTOR

Phone Survey Short List by alpha — Table

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
*American Hickory Corp	0	Lewistown, PA 17044	31	\$2.00	717-543-6070	Mark Colwell —generates 100 tpw — may consider supplying in future
Brumbaugh Lumber	30	RD1 Box 1068 Mapleton Depot, PA 17052	57	\$9.00 delivered	814-542-8880	Chester Brumbaugh
C L Price Sawmill & Planning	40/40	319 W Alley St, Aaronsburg, PA 16820	30	\$4.00FOB/ \$15.00 delivered	814-349-4431 814-349-5505	C. L., Dennis and Fred Price — sawdust/slabs
CHJ Lumber	30	Box 187 Allport, PA 16921	31	\$2.00	814-345-5271	Clark Hubler
*Garner Lumber Co	0	P.O. Box 462 James Creek PA 16657	44		814-658-3700	J. Robert Garner, generates 80 tpw, may consider supplying in future
Gray s Pallets	150/20/40	Mifflintown, PA 17059	45	\$0/\$0/\$0	717-436-8585	Jill Swartz, sawdust/chips/slabs
Grubco	50	RD1, Box 57A Hesston, PA 16647	40	\$7.00	814-658-3291	Mike Grub
*Helsel Lumber Mill, Inc.	0	3446 Johnstown Road RD2, Box 173 Duncansville, PA 16635	47	\$4.00	814-696-0869	Joel Jackson — may consider supplying inthe future.
J E Culbertson Co, Inc.	25	P.O. Box A Mill Creek, PA 17060	40	\$0	814-643-4519	Pat Rux
J M Wood Products	25	HC 61, Allensville, PA 17002	25	\$3.00	717-483-6700	Dave Zook
J W Kitko & Sons	20	Route 53, Rose St Glen Hope, PA 16645	44	\$0 FOB \$6.50 delivered	814-672-3590	Chuck Kitko
*Kaufman s Mulch	0	42 Maple Street Belleville, PA 17004	26	\$10.50 delivered	717-667-6317	Pete Kaufman, generates 250 tpw sawdust — would sell excess above that.
Kish Lumber	25	157 Sawmill Road Belleville, PA 17004	26	\$2.15	717-667-6157	Dave Byler
Kitko Wood Products, Inc.	20	Route 53 Box 3 Glen Hope PA 16645	44	\$12.00	814-672-3606	Robert Kitko, Ken
Kovalick Lumber Co	60	RD1, Box 258 Frenchville, PA 16836	45	\$13.60 delivered	814-263-4928	Richard Kovalick
McCabe & Sons Lumber	20	HC1 Box 26 Alexandria, PA 16611	30	\$4.50	814-832-2046	Roy McCabe

POTENTIAL SAWDUST SUPPLIERS FOR PENN STATE COMBUSTOR

Phone Survey Short List by alpha — Table

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Meeker Lumber Company	40/40	HC 21A Moshannon, PA 16859	30	\$2.00/\$0	814-387-6342	Bruce Meeker — sawdust/slabs
Peachey s Wood Products	70	209 Sawmill Road Reedsville, PA 17084	24	\$4.25	717-667-9373	John Peachey
Pennsy Lumber Products	40	RD1, Box 204A Williamsburg, PA 16693	37	\$12.50	814-832-3404	Jerry Lower
Phillip's Wood Products	60	RD 2 Mill Hall PA 17751	37	\$3.00	570-726-3515	Carl & Tina Phillips
Pine Creek Lumber, Inc.	45	60 Lizardville Road RD1, Box 35B, Mill Hall, PA 17751	37	\$5.50	570-726-7795	Darrel Reibson
R H Morgan Lumber Co.	20	HCR 60, Box 370 Orbisonia PA 17243	45	\$8.00 delivered	814-447-5662	Ramon & Linda Morgan & Clyde Cisney
Robbins Lumber Co	40	RR 1, Olanta, PA 16863	42	\$3.50 FOB \$15.00 delivered	814-236-3384	Lynn Robbins
Robinson Lumber Company	20	776 Lucas Road Bellefonte PA 16823	10	\$15 delivered	814-355-9583	Richard N. Robinson
Saw-rite Sawmill	30/60	74 Airstrip Drive Millheim, PA 16854	24	\$10/\$13 delivered	814-349-1210	Sam Stoltzfus, sawdust/chips
Smith Bros. Sawmill	40	Route 522, S. Mount Union PA 17066	44	\$0	814-542-8320	Bernard Smith
Spigelmyer Lumber	45	2316 Hawstone Rd, Lewistown, PA 17044	40	\$4.00 FOB \$10.50 delivered	717-248-6555	Toby Spigelmyer
Thomas Timberlands Enterprises	40/300	Box 5075, Route 26 Pleasant Gap, PA 16823	10	\$10.50/13.33 delivered	814-359-2890	BJ & Richard Thomas, sawdust/chips
Treen Box & Pallet Corp	100	Mifflintown, PA 18966	45	\$4.50	717-535-5800	Vernon Troyer
Urbanik Lumber	25/75	Box 195 Clarence, PA 16829	33	\$10.00 delivered	814-387-6939	Sam Urbanik — sawdust/slabs
Walker Lumber & Supply Company	45	Bigler PA 16825	37	\$16 delivered	814-857-7642	Mark Shaw

*Not willing to supply sawdust right now but may consider supplying sawdust in the future.

02/28/01

**APPENDIX C. POTENTIAL SAWDUST SUPPLIERS – PHONE SURVEY
SHORT LIST BY DISTANCE (TABLE)**

POTENTIAL SAWDUST SUPPLIERS FOR PENN STATE COMBUSTOR

Phone Survey Short List by distance - Table

Company Name	Tons/week available	Location	Miles to State College	FOB\$/ton	Phone	Contact
Robinson Lumber Company	20	776 Lucas Road Bellefonte PA 16823	10	\$15 delivered	814-355-9583	Richard N. Robinson
Thomas Timberlands Enterprises	40/300	Box 5075, Route 26 Pleasant Gap, PA 16823	10	\$10.50/13.33 delivered	814-359-2890	BJ & Richard Thomas, sawdust/chips
Peachey s Wood Products	70	209 Sawmill Road Reedsville, PA 17084	24	\$4.25	717-667-9373	John Peachey
Saw-rite Sawmill	30/60	74 Airstrip Drive Millheim, PA 16854	24	\$10/\$13 delivered	814-349-1210	Sam Stoltzfus, sawdust/chips
J M Wood Products	25	HC 61, Allensville, PA 17002	25	\$3.00	717-483-6700	Dave Zook
*Kaufman s Mulch	0	42 Maple Street Belleville, PA 17004	26	\$10.50 delivered	717-667-6317	Pete Kaufman, generates 250 tpw sawdust — would sell excess above that.
Kish Lumber	25	157 Sawmill Road Belleville, PA 17004	26	\$2.15	717-667-6157	Dave Byler
C L Price Sawmill & Planning	40/40	319 W Alley St, Aaronsburg, PA 16820	30	\$4.00FOB/ \$15.00 delivered	814-349-4431 814-349-5505	C. L., Dennis and Fred Price — sawdust/slabs
McCabe & Sons Lumber	20	HC1 Box 26 Alexandria, PA 16611	30	\$4.50	814-832-2046	Roy McCabe
Meeker Lumber Company	40/40	HC 21A Moshannon, PA 16859	30	\$2.00/\$0	814-387-6342	Bruce Meeker — sawdust/slabs
*American Hickory Corp	0	Lewistown, PA 17044	31	\$2.00	717-543-6070	Mark Colwell —generates 100 tpw — may consider supplying in future
CHJ Lumber	30	Box 187 Allport, PA 16921	31	\$2.00	814-345-5271	Clark Hubler
Urbanik Lumber	25/75	Box 195 Clarence, PA 16829	33	\$10.00 delivered	814-387-6939	Sam Urbanik — sawdust/slabs
Phillip's Wood Products	60	RD 2 Mill Hall PA 17751	37	\$3.00	570-726-3515	Carl & Tina Phillips
Pennsy Lumber Products	40	RD1, Box 204A Williamsburg, PA 16693	37	\$12.50	814-832-3404	Jerry Lower
Pine Creek Lumber, Inc.	45	60 Lizardville Road RD1, Box 35B, Mill Hall, PA 17751	37	\$5.50	570-726-7795	Darrel Reibson
Walker Lumber & Supply Company	45	Bigler PA 16825	37	\$16 delivered	814-857-7642	Mark Shaw

POTENTIAL SAWDUST SUPPLIERS FOR PENN STATE COMBUSTOR

Phone Survey Short List by distance - Table

Company Name	Tons/week available	Location	Miles to State College	FOBS/ton	Phone	Contact
J E Culbertson Co, Inc.	25	P.O. Box A Mill Creek, PA 17060	40	\$0	814-643-4519	Pat Rux
Grubco	50	RD1, Box 57A Hesston, PA 16647	40	\$7.00	814-658-3291	Mike Grub
Spigelmyer Lumber	45	2316 Hawstone Rd, Lewistown, PA 17044	40	\$4.00 FOB \$10.50 delivered	717-248-6555	Toby Spigelmyer
Robbins Lumber Co	40	RR 1, Olanta, PA 16863	42	\$3.50 FOB \$15.00 delivered	814-236-3384	Lynn Robbins
*Garner Lumber Co	0	P.O. Box 462 James Creek PA 16657	44		814-658-3700	J. Robert Garner, generates 80 tpw, may consider supplying in future
Kitko Wood Products, Inc.	20	Route 53 Box 3 Glen Hope PA 16645	44	\$12.00	814-672-3606	Robert Kitko, Ken
J W Kitko & Sons	20	Route 53, Rose St Glen Hope, PA 16645	44	\$0 FOB \$6.50 delivered	814-672-3590	Chuck Kitko
Smith Bros. Sawmill	40	Route 522, S. Mount Union PA 17066	44	\$0	814-542-8320	Bernard Smith
Gray s Pallets	150/20/40	Mifflintown, PA 17059	45	\$0/\$0/\$0	717-436-8585	Jill Swartz, sawdust/chips/slabs
Kovalick Lumber Co	60	RD1, Box 258 Frenchville, PA 16836	45	\$13.60 delivered	814-263-4928	Richard Kovalick
R H Morgan Lumber Co.	20	HCR 60, Box 370 Orbisonia PA 17243	45	\$8.00 delivered	814-447-5662	Ramon & Linda Morgan & Clyde Cisney
Treen Box & Pallet Corp	100	Mifflintown, PA 18966	45	\$4.50	717-535-5800	Vernon Troyer
*Helsel Lumber Mill, Inc.	0	3446 Johnstown Road RD2, Box 173 Duncansville, PA 16635	47	\$4.00	814-696-0869	Joel Jackson — may consider supplying in the future.
Brumbaugh Lumber	30	RD1 Box 1068 Mapleton Depot, PA 17052	57	\$9.00 delivered	814-542-8880	Chester Brumbaugh

*Not willing to supply sawdust right now but may consider supplying sawdust in the future.

02/28/01

**APPENDIX D. POTENTIAL SAWDUST SAWMILLS– PHONE SURVEY
SHORT LIST BY ALPHABET (TEXT)**

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

*American Hickory Corp
 Lewistown, PA 17044

717-543-6070

Contact: Mark Colwell

Directions: 31 miles — Take Route 322E to the Burnham exit. Go through Burnham (3 lights) and turn left onto 522 N or E. Go 6 miles to Vira. Go through Vira 3 miles to mill on right side of road.

Tons sawdust available/week: 0 tons

Sawdust cost: \$ 2.00/ton FOB mill

Transportation cost: NA

What s done with sawdust?: They have a contractor pick up all sawdust, shavings and chips. They generate 100 tons of sawdust per week. They may be willing to talk about changing contracts at some future time.

Note: Talked with Bob Niven.

Brumbaugh Lumber
 RD1 Box 1068
 Mapleton Depot, PA 17052

814-542-8880

Contact: Chester Brumbaugh

Directions: 57 miles — Take Route 26 to Huntingdon. Take Route 22E to Mount Union. Take 522S out of Mount Union. The mill is 5 miles down the road on the right side (red building). Don t cross the bridge.

Tons sawdust available/week: 30 tons/week

Sawdust cost: \$200/load (about \$9/ton delivered)

Transportation cost: See above.

What s done with sawdust?: They take the sawdust to Mellot s Wood Preserving Corp., 1398 Sawmill Road, Needmore, PA 17238 (717-573-2516) (a wood creosoting plant about 35 miles from Brumbaugh Lumber). Mellott s has means to lift a box trailer. They use the sawdust for process heat. There is no contract. They take all comers.

Note: Brumbaugh has 8 box trailers. The mill is near Shirleysburg.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

C L Price Sawmill and Planning 814-349-4431 and 814-349-5505
 319 W Alley St,
 Aaronsburg, PA 16820

Contact: C L Price, Dennis and Fred

Directions: 30 miles — Take Route 45 to Millheim. Turn right at red light then go 3 miles to Country store on the right. Turn left and go 1.5 miles then turn right across the bridge to the mill.

Tons sawdust available/week: 40 tons

Sawdust cost: \$4.00/ton FOB mill

Transportation cost: Sawdust and woodhog ground slabs \$15.00 delivered (slabs ground to 1.5 x 1/4 to 1/2).

What is done with sawdust?: About 30 tons of sawdust per week is sold to farmers. The rest is sold to Jesse Thomas from Thomas Timberlands then to the PSU waste treatment plant.

Note: They have one tri-axle and one dump truck. They have no walking floor vans. the sawdust is stored in a covered bin.

CHJ Lumber	814-345-5271
Box 187	
Allport, PA 16821	

Contact: Clark Hubler

Directions: 31 miles — Take Route 80W to Snowshoe, then Route 144N to Moshannon. Turn right at blinker light, turn left at next stop sign and take Route 879W to Karthaus. Just out of Karthaus with gas station on left, turn right on first dirt road. Keep to right, sawmill is at the end of the road (before Meeker's Mill).

Tons sawdust available/week: 30 tons

Sawdust cost: \$2.00/ton FOB mill

Transportation cost: NA

What is done with sawdust?: The sawdust is generally sold to farmers in the area.

Note: They have no trucks but have access to a trucking firm. The sawdust is stored outside uncovered.

Note: They have no trucks. They are looking into purchasing two tractor trailers (possibly walking floors) in the future to both ship pallets and transport chips. They would still contract out the trucking.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Grubco
RD1, Box 57A
Hesston, PA 16647

814-658-3291

Contact: Mike Grub

Directions: 40 miles — Take Route 26S. Go 8 miles beyond Huntingdon turn right on racetrack road to stop sign turn right then shortly make a left on sawmill road.

Tons sawdust available/week: 50 tons

Sawdust cost: \$7.00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: Sawdust is sold to farmers

Note: He has a tractor trailer. But he can contract out for a walking floor. His operation is year round. He stores the dust indoors. He has a front-end loader. The price of his chips is \$28/ton (high quality for carbonless paper).

Helsel Lumber Mill, Inc.
3446 Johnstown Road
Duncansville, PA 16635

814-696-0869

Contact: Joel Jackson

Directions: 47 miles — Take Route I-99 to Roaring Spring exit. Turn right at end of ramp (old 220S). Turn right at blinking yellow light (Route 164W). Go 7 miles, the mill is on the left.

Tons sawdust available/week: None available at this time.

Sawdust cost: \$ 4.00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: In the winter, they use all their sawdust for heat and to operate 7 kilns. In the summer (March through October) they sell to the farmers.

Note: They are willing to discuss the situation with us as we get closer to having a project. They may have an interest in the future.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

J E Culbertson Co, Inc.
P.O. Box A
Mill Creek, PA 17060

814-643-4519

Contact: Pat Rux

Directions: 40 miles — Take Route 45S or W to Water Street. Turn left onto Route 22E. The mill is on 2E near Mill Creek.

Tons sawdust available/week: 25 tons

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: The sawdust is given to farmers. They also burn their sawdust in winter so there would be none available in wintertime.

Note: They have a small dump truck and a standard box trailer. They manufacture pallets from green wood. The sawdust is blown into a 30 ton silo.

J M Wood Products
HC 61,
Allensville, PA 17002

717-483-6700

Contact: Dave Zook

Directions: 25 miles — Take Route 322E to 655S. Gæbout 15 miles — turn left off 655 to the mill.

Tons sawdust available/week: 25 tons

Sawdust cost: \$75/trailer load or \$3.00/ton FOB mill

Transportation cost: NA

What s done with sawdust?: A trucker with walking a floor van picks up sawdust and sells it to farmers.

Note: He has no trucks and has one year contracts with the trucker that he would be willing to end.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

J W Kitko and Sons
 Route 53 Rose St
 Glen Hope, PA 16645

814-672-3590

Contact: Chuck Kitko

Directions: 44 miles — Take Route 322W to Phillipsburg then Route 53S to mill on left side of the road.

Tons sawdust available/week: 20 tons (March thru October)(generates 50 tons/week).

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: \$6.50 delivered

What s done with sawdust: None available in winter months (used in boilers and kilns).

Note: They don t have walking floor vans or open top trailers.

Kaufman s Mulch
 42 Maple Street
 Belleville, PA 17004

717-667-6317

Contact: Peter Kaufman

Directions: 26 miles — Take Route 322E to 655/Reedsville exit. Turn right (south) 3 miles to Barrville Road for 2 miles. At stop sign, turn right (3/10 mile into woods)(near Peachey s Wood Products.

Tons sawdust available/week: None available at this time.

Sawdust cost: \$11.50/ton delivered

Transportation cost: See above.

What s done with sawdust?: He buys sawdust and then sells it to farmers in southern PA. He also sells as much as he can to Temple Inland which uses chips and sawdust to make fiberboard. Peter s dad is Paul Kaufman.

Note: He has 7 walking floor vans. He currently sells 250 tons/week of sawdust. He is not willing to reduce the supply to his current customers. He would be willing to consider selling us additional sawdust if it should come available. We will leave him on the list as a possible future supplier.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Kish Lumber 717-667-6157
 157 Sawmill Road
 Belleville, Pa 17004

Contact: Dave Byler

Directions: 26 miles — Take Route 322E to Route 655S. Go 3 miles and turn right onto Barrville Road. Go 2 miles to sawmill road and follow signs to mill (on hill).

Tons sawdust available/week: Tentatively 25 tons (out of 75 tons). He also generates 120 tons of chips but he gets \$30/ton.

Sawdust cost: \$2.15/ton FOB mill

Transportation cost: NA

What s done with sawdust?: Most of the sawdust goes to Paul Kaufman (Kaufman s Mulch). The rest goes to farmers.

Note: He has no trucks and no silo. The sawdust is stored in a shed on concrete. Kish Lumber is listed under L. E. Peachey in the phone book.

Kitko Wood Products 814-672-3606
 Route 53 Box 3
 Glen Hope, PA 16645

Contact: Ken and Robert

Directions: 44 miles — Take Route 322W to Phillipsburg then Route 53S to mill on left side of the road.

Tons sawdust available/week: 20 tons (March thru October)(generates 80 tons/week).

Sawdust cost: \$12:00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: They burn most of their sawdust in their boiler system but not all of it. Some sawdust is sold to Allegheny Particle Board along with their chips.

Note: No sawdust is available in winter months (used in boilers and kilns). They don t have walking floor vans. Sawdust is stored in a concrete bin with a roof. It is loaded with a front end loader.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Meeker Lumber Company
 HC 21A
 Moshannon, PA 16859

814-387-6342

Contact: Bruce Meeker

Directions: 30 miles — Rte. 80W to Snowshoe, then 144N to Moshannon. Turn right at blinker light, turn left at next stop sign and take Rte. 879W thru Karthaus. One or two miles out of Karthaus, Rte. 879W goes left, you turn right and go 3 miles past road to Pottersdale (dont turn, go straight). Turn right at next macadam road. Mill is 100 yards down the road.

Tons sawdust available/week: 40 tons sawdust and 40 tons slab wood

Sawdust cost: \$2.00 /ton FOB mill (sawdust, \$0 FOB mill (slab wood)

Transportation cost: NA

What s done with sawdust?: Tom Capparella from Bellefonte transports his sawdust.

Note: He has no trailers.

Peachey s Wood Products
 209 Sawmill Road,
 Reedsville, PA 17084

717-667-9373

Contact: John Peachey

Directions: 24 miles — Take Route 322E to Reedsville exit. Turn right of ramp to Route 65S. Turn right at 3 miles onto Barrville Road and go one mile. Then take first right (Green Lane) and then first left (see sign for mill).

Tons sawdust available/week: 70 tons

Sawdust cost: \$4.25/ton FOB mill

Transportation cost: NA

What s done with sawdust?: The dust is sold to a broker and to farmers.

Note: They have no trucks. The broker is Paul Kaufman (717-667-6317). He buys sawdust and chips for Oaks Forestry, Temple Inland, Clarion, PA.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Pennsy Lumber Products
 RD1, Box 204A
 Williamsburg, PA 16693

814-832-3404

Contact: Jerry Lower (as in power)

Directions: 37 miles — Take Route 45S or W to Water Street. Go 22W (right?) to Yellow Spring. Turn left onto Beagle club road. The mill is 2 miles down road on left.

Tons sawdust available/week: 40 tons

Sawdust cost: \$12.50/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: They are planning an expansion of their operation. Sawdust will be under roof after the expansion.

Note: They are custom kiln drying at the moment. They plan to start up a pallet manufacturing plant. They have box trailers but no walking floor vans.

Phillip's Wood Products
 RD 2,
 Mill Hall, PA 17751

570-726-3515
 Box 279

Contact: Carl and Tina Phillips

Directions: 37 miles — Take Route 150N to Laurel Run Road (2mi before Mill Hall on left). Turn left On Laurel Run Road and go 3 miles to stop sign. Go straight through sign - 3/4 mile on left.

Tons sawdust available/week: 60 tons

Sawdust cost: \$ 3.00/ton FOB mill (\$0.75/cubic yard)

Transportation cost: NA

What s done with sawdust?: The sawdust is currently bought by farmers in the area.

Note: No delivery vehicle at present but would consider getting one.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Pine Creek Lumber, Inc. 570-726-7795
 60 Lizardville Road
 RD1, Box 35B,
 Mill Hall, PA 17751

Contact: Darrel Reibson

Directions: 37 miles — Take Route 26N to Route 64N toward Mill Hall. Turn right on Route 477 and go 1/4 mile. Turn left on Lizardville Road. The mill is 300 yards down the road.

Tons sawdust available/week: 45 tons (he generates 90 tons/week and he estimates that they could divert half of that for sale to PSU initially). If a long term contract could be in the cards, they would consider weaning the farmers off the dust.

Sawdust cost: \$5.50/ton FOB mill

Transportation cost: NA

What s done with sawdust?: All sawdust is sold to farmers at \$10/ bucket .

Note: No trucks available. Could contract out for transportation.

(Info from Lou Sycz at mill. He will have Darrel call back if there is a correction.

R H Morgan Lumber Co. 814-447-5662
 HCR 60, Box 370
 Orbisonia, PA 17243

Contact: Ramon and Linda Morgan and Clyde Cisney Co-owners

Directions: 45miles —Take Route 26 to Huntingdon. Take Route 22E to Mount Union. Take 522S out of Mount Union to Orbisonia. Go through town and make a sharp left before the bridge on a curve. Go 1.5 miles down Blacklog Valley Road on the left hand side.

Tons sawdust available/week: 20 tons

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: \$2.00/mile (about \$180/load to PSU or \$8.00/ton delivered).

What s done with sawdust?: The sawdust is given to farmers.

Note: They have 3 box trailers: two for chips and 1 for sawdust.

Note: They contract out transportation with walking floor vans.

Note: They have one walking bed. They have one 70 ton silo. A load of sawdust weighs 23 tons. A load of chips weighs 24 tons.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Treen Box and Pallet Corp
 Mifflintown, PA 18966

717-535-5800

Contact: Vernon Troyer

Directions: 45 miles —Take Route 322E to Port Royal. At stop sign off the ramp turn right. At 4-way blinker light, turn left and go 3.5 miles to Center village. Turn left at the two story farm house with maroon trim. Go 1/4 mile under 322 bridge. The mill is on the right.

Tons sawdust available/week: 100 tons

Sawdust cost: \$4.50/ton FOB mill

Transportation cost: NA

What s done with sawdust?: The dust is sold to farmers in the area.

Note: They don t have trucks. They do have a large silo.

Called main office in Ben Salem, PA (Phila.)(215-639-5100) and talked with Keith Geiges. He told me they have two mills in PA: Ken Geromi is the mgr. at Williamsport (570-584-4512) and John Walton is mgr. of the mill in Mifflintown (717-535-5800). I talked with Mary Walton at the Mifflintown mill.

Urbanik Lumber
 Box 195
 Clarence, PA 16829

814-387-4098

Contact: Sam Urbanik

Directions: 33 miles — Take Route 80W to Snowshoe, then Route 144N to Moshannon blinker light. Turn right and go 2 miles to tee. Turn right onto first road on left.

Tons sawdust available/week: 25 tons sawdust and 75 tons slabs

Sawdust cost: \$ 10.00/ton delivered (both)

Transportation cost: See above.

What s done with sawdust?: Sawdust is sold to farmers.

Note: They contract out their shipping. In their area, he believes that most of the mills have twice as much slabs as sawdust and they typically burn it just to get rid of it.

Details of Selected Sawmills for PSU
Phone Survey Short List by alpha - Text

Walker Lumber and Supply Co. 814-857-7642
Route 322 Bigler
Bigler, PA 16825

Contact: Mark Shaw

Directions: 37 miles — Take 322W to Bigler. Mill is on left side of road.

Tons sawdust available/week: 45 tons

Sawdust cost: \$16/ton delivered.

Transportation cost: See above.

What s done with sawdust?: They burn their own sawdust but could set aside about two truckloads/week.

Note: The sawdust is kept under roof. They have one 18-wheeler dump trailer. They are owned by Hardwoods of Michigan (their only mill in the area).

*Not willing to supply sawdust right now but may consider supplying sawdust in the future.

02/28/01

**APPENDIX E. POTENTIAL SAWDUST SAWMILLS – PHONE SURVEY
SHORT LIST BY DISTANCE (TEXT)**

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Robinson Lumber Company 814-355-9583
 776 Lucas Road
 Bellefonte, PA 16823

Contact: Richard N. Robinson

Directions: 10 miles — Take Route 150N between Milesburg and Howard (1 mile north of Curtin village). Turn right at Puff Cigarette Store to lane between house and barn.

Tons sawdust available/week: 20 tons

Sawdust cost: \$15.00/ delivered

Transportation cost: See above.

What s done with sawdust?: Sawdust is sold to particle board plant and to farmers for bedding.

Note: They make pallets. They have one walking floor trailer and a 30 ton silo. They would prefer to deliver the wood.

Thomas Timberlands Enterprises 814-359-2890
 Box 5075, Route 26
 Pleasant Gap, PA 16823

Contact: BJ and Richard Thomas

Directions: 10 miles — Take Route 26N to Texaco/Carwash/Gas Station - turn right and take fourth left on gravel road.

Tons sawdust available/week: 40 tons (45-95 generated)(also up to 800 tons/week of chips — avg. 300 tons/week)

Sawdust cost: Sawdust - \$10.50 delivered. Chips - \$13.33 delivered.

Transportation cost: See above.

What s done with sawdust?: Two loads of sawdust per week (46 tons) is committed to a sewer authority to blend with sludge.

Note: They have one walking bed. They have one 70 ton silo. A load of sawdust weighs 23 tons. A load of chips weighs 24 tons.

717-667-9373

Note: They have no trucks. The broker is Paul Kaufman (717-667-6317). He buys sawdust and chips for Oaks Forestry, Temple Inland, Clarion, PA.

814-349-1210

Note: They have two box trailers but no walking floor vans.

717-483-6700

Note: He has no trucks and has one year contracts with the trucker that he would be willing to end.

717-667-6317

Note: He has 7 walking floor vans. He currently sells 250 tons/week of sawdust. He is not willing to reduce the supply to his current customers. He would be willing to consider selling us additional sawdust if it should come available. We will leave him on the list as a possible future supplier.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Kish Lumber 717-667-6157
 157 Sawmill Road
 Belleville, Pa 17004

Contact: Dave Byler

Directions: 26 miles — Take Route 322E to Route 655S. Go 3 miles and turn right onto Barrville Road. Go 2 miles to sawmill road and follow signs to mill (on hill).

Tons sawdust available/week: Tentatively 25 tons (out of 75 tons). He also generates 120 tons of chips but he gets \$30/ton.

Sawdust cost: \$2.15/ton FOB mill

Transportation cost: NA

What's done with sawdust?: Most of the sawdust goes to Paul Kaufman (Kaufman's Mulch). The rest goes to farmers.

Note: He has no trucks and no silo. The sawdust is stored in a shed on concrete. Kish Lumber is listed under L. E. Peachey in the phone book.

C L Price Sawmill and Planning 814-349-4431 and 814-349-5505
 319 W Alley St,
 Aaronsburg, PA 16820

Contact: C L Price, Dennis and Fred

Directions: 30 miles — Take Route 45 to Millheim. Turn right at red light then go 3 miles to County store on the right. Turn left and go 1.5 miles then turn right across the bridge to the mill.

Tons sawdust available/week: 40 tons

Sawdust cost: \$4.00/ton FOB mill

Transportation cost: Sawdust and woodhog ground slabs \$15.00 delivered (slabs ground to 1.5 x 1/4 to 1/2).

What's done with sawdust?: About 30 tons of sawdust per week is sold to farmers. The rest is sold to Jesse Thomas from Thomas Timberlands then to the PSU waste treatment plant.

Note: They have one tri-axle and one dump truck. They have no walking floor vans. The sawdust is stored in a covered bin.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

*American Hickory Corp
 Lewistown, PA 17044

717-543-6070

Contact: Mark Colwell

Directions: 31 miles — Take Route 322E to the Burnham exit. Go through Burnham (3 lights) and turn left onto 522 N or E. Go 6 miles to Vira. Go through Vira 3 miles to mill on right side of road.

Tons sawdust available/week: 0 tons

Sawdust cost: \$ 2.00/ton FOB mill

Transportation cost: NA

What s done with sawdust?: They have a contractor pick up all sawdust, shavings and chips. They generate 100 tons of sawdust per week. They may be willing to talk about changing contracts at some future time.

Note: Talked with Bob Niven.

CHJ Lumber
 Box 187
 Allport, PA 16821

814-345-5271

Contact: Clark Hubler

Directions: 31 miles — Take Route 80W to Snowshoe, then Route 144N to Moshannon. Turn right at blinker light, turn left at next stop sign and take Route 879W to Karthaus. Just out of Karthaus with gas station on left, turn right on first dirt road. Keep to right, sawmill is at the end of the road (before Meeker s Mill).

Tons sawdust available/week: 30 tons

Sawdust cost: \$2.00/ton FOB mill

Transportation cost: NA

What s done with sawdust?: The sawdust is generally sold to farmers in the area.

Note: They have no trucks but have access to a trucking firm. The sawdust is stored outside uncovered.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Urbanik Lumber 814-387-4098
 Box 195
 Clarence, PA 16829

Contact: Sam Urbanik

Directions: 33 miles — Take Route 80W to Snowshoe, then Route 144N to Moshannon blinker light. Turn right and go 2 miles to tee. Turn right onto first road on left.

Tons sawdust available/week: 25 tons sawdust and 75 tons slabs

Sawdust cost: \$ 10.00/ton delivered (both)

Transportation cost: See above.

What is done with sawdust?: Sawdust is sold to farmers.

Note: They contract out their shipping. In their area, he believes that most of the mills have twice as much slabs as sawdust and they typically burn it just to get rid of it.

Phillip's Wood Products 570-726-3515
 RD 2, Box 279
 Mill Hall, PA 17751

Contact: Carl and Tina Phillips

Directions: 37 miles — Take Route 150N to Laurel Run Road (2mi before Mill Hall on left). Turn left On Laurel Run Road and go 3 miles to stop sign. Go straight through sign - 3/4 mile on left.

Tons sawdust available/week: 60 tons

Sawdust cost: \$ 3.00/ton FOB mill (\$0.75/cubic yard)

Transportation cost: NA

What is done with sawdust?: The sawdust is currently bought by farmers in the area.

Note: No delivery vehicle at present but would consider getting one.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Walker Lumber and Supply Co. 814-857-7642
 Route 322 Bigler
 Bigler, PA 16825

Contact: Mark Shaw

Directions: 37 miles — Take 322W to Bigler. Mill is on left side of road.

Tons sawdust available/week: 45 tons

Sawdust cost: \$16/ton delivered.

Transportation cost: See above.

What s done with sawdust?: They burn their own sawdust but could set aside about two truckloads/week.

Note: The sawdust is kept under roof. They have one 18-wheeler dump trailer. They are owned by Hardwoods of Michigan (their only mill in the area).

J E Culbertson Co, Inc. 814-643-4519
 P.O. Box A
 Mill Creek, PA 17060

Contact: Pat Rux

Directions: 40 miles — Take Route 45S or W to Water Street. Turn left onto Route 22E. The mill is on 2E near Mill Creek.

Tons sawdust available/week: 25 tons

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: The sawdust is given to farmers. They also burn their sawdust in winter so there would be none available in wintertime.

Note: They have a small dump truck and a standard box trailer. They manufacture pallets from green wood. The sawdust is blown into a 30 ton silo.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Grubco
 RD1, Box 57A
 Hesston, PA 16647

814-658-3291

Contact: Mike Grub

Directions: 40 miles — Take Route 26S. Go 8 miles beyond Huntingdon turn right on racetrack road to stop sign turn right then shortly make a left on sawmill road.

Tons sawdust available/week: 50 tons

Sawdust cost: \$7.00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: Sawdust is sold to farmers

Note: He has a tractor trailer. But he can contract out for a walking floor. His operation is year round. He stores the dust indoors. He has a front-end loader. The price of his chips is \$28/ton (high quality for carbonless paper.

Spigelmyer Lumber
 2316 Hawstone Rd,
 Lewistown, PA 17044

717-248-6555

Contact: Toby Spigelmyer

Directions: 40 miles — Rte. 322E to Lewistown. Then Rte. 333E to mill on right.

Tons sawdust available/week: 45 tons

Sawdust cost: \$4.00/ton FOB mill

Transportation cost: Approximately \$6.50/ton to State College (\$10.50 delivered)

What s done with sawdust?: Sold to be burned in dry kilns at Cherry Hill Hardwoods (they use about 100 tons/week). The extra sawdust generated by Spigelmeyer Lumber goes to farm bedding or pellet mills. Energex Pellet Mill in Port Royal, PA currently uses 100 tons of sawdust/week and is expanding to 500 tons per week soon.

Note: They contract out transportation with walking floor vans.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Robbins Lumber Co 814-236-3384
RR 1,
Olanta, PA 16863

Contact: Lynn Robbins

Directions: 42 miles — Take Route 322W to Clearfield, then Route 879S or W to Curwensville and Route 453S to mill on right side of the road.

Tons sawdust available/week: 40 tons

Sawdust cost: \$3.50/ton FOB mill

Transportation cost: \$15.00/ton

What s done with sawdust?: Sawdust is given to neighbors. They also sell to Heaton who sells to State College for blending with treated sewage.

Note: Has open top trailers. He told me some mills blend their sawdust with their chips when selling to people that use chips. they would get a larger price for their chips if they could separate the products.

*Garner Lumber Co 814-658-3700
PO 462
James Creek, PA 16657

Contact: J. Robert Garner

Directions: 44 miles — Take Route 26S and go to Marklesburg. Turn right onto a mountain road (at Scott Sporting Goods). The mill is one mile up the road.

Tons sawdust available/week: None available at this time. Would be willing to look into the situation and pricing if the project goes forward. They currently generate 80 tons of sawdust per week.

Sawdust cost: No quote at this time.

Transportation cost: See above.

What s done with sawdust?: Most of his sawdust goes to Alexandria Wood Products. Any excess is sold to farmers in the area.

Note: The mill number is 814-658-3401. They have one open top trailer. The walking floor vans are provided by Alexandria Wood Products. They drop them off and pick them up.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Kitko Wood Products 814-672-3606
 Route 53 Box 3
 Glen Hope, PA 16645

Contact: Ken and Robert

Directions: 44 miles — Take Route 322W to Phillipsburg then Route 53S to mill on left side of the road.

Tons sawdust available/week: 20 tons (March thru October)(generates 80 tons/week).

Sawdust cost: \$12:00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: They burn most of their sawdust in their boiler system but not all of it. Some sawdust is sold to Allegheny Particle Board along with their chips.

Note: No sawdust is available in winter months (used in boilers and kilns). They don t have walking floor vans. Sawdust is stored in a concrete bin with a roof. It is loaded with a front end loader.

J W Kitko and Sons 814-672-3590
 Route 53 Rose St
 Glen Hope, PA 16645

Contact: Chuck Kitko

Directions: 44 miles — Take Route 322W to Phillipsburg then Route 53S to mill on left side of the road.

Tons sawdust available/week: 20 tons (March thru October)(generates 50 tons/week).

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: \$6.50 delivered

What s done with sawdust: None available in winter months (used in boilers and kilns).
 Note: They don t have walking floor vans or open top trailers.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Smith Bros. Sawmill
 Highway 522 S.
 RR1 Box 168
 Mount Union, PA 17066

814-542-8320

Contact: Bernard Smith

Directions: 44 miles —Take Route 26 to Huntingdon. Take Route 22E to Mount Union. Then take Route 522S. The mill is 1 1/2 miles down the road on the right hand side (about 1/2 mile beyond Fluid Containment.

Tons sawdust available/week: 40 tons

Sawdust cost: \$ 0/ton FOB mill

Transportation cost: NA

What is done with sawdust?: They give the sawdust to farmers in the area.

Note: They have no trucks.

Gray's Pallets
 Mifflintown, PA 17059

717-436-8585

Contact: Jill Swartz

Directions: 45 miles — Take Route 322E to the Port Royal exit. Turn right off the exit ramp. Go 1/4 mile to a 4-way red blinker light. Turn left and go 2 miles. Turn right onto Wagner Road. Go 1.5 miles. Mill is on the right side of the road.

Tons sawdust available/week: 150 tons (also has 20 tpy chips and 40 tpy slabs)

Sawdust cost: \$ 0/ton FOB mill (dust, chips and slabs)

Transportation cost: NA

What is done with sawdust?: They give the sawdust to RB Trucking who resells the dust to farms and horse farms. They also give the chips and slabs to others. There are no contracts for this.

Note: They have no trucks. They are looking into purchasing two tractor trailers (possibly walking floors) in the future to both ship pallets and transport chips. They would still contract out the trucking.

Details of Selected Sawmills for PSU
Phone Survey Short List by distance - Text

Treen Box and Pallet Corp
Mifflintown, PA 18966

717-535-5800

Contact: Vernon Troyer

Directions: 45 miles —Take Route 322E to Port Royal. At stop sign off the ramp turn right. At 4-way blinker light, turn left and go 3.5 miles to Center village. Turn left at the two story farm house with maroon trim. Go 1/4 mile under 322 bridge. The mill is on the right.

Tons sawdust available/week: 100 tons

Sawdust cost: \$4.50/ton FOB mill

Transportation cost: NA

What s done with sawdust?: The dust is sold to farmers in the area.

Note: They don't have trucks. They do have a large silo.

Called main office in Ben Salem, PA (Phila.)(215-639-5100) and talked with Keith Geiges. He told me they have two mills in PA: Ken Geromi is the mgr. at Williamsport (570-584-4512) and John Walton is mgr. of the mill in Mifflintown (717-535-5800). I talked with Mary Walton at the Mifflintown mill.

*Helsel Lumber Mill, Inc.
3446 Johnstown Road
Duncansville, PA 16635

814-696-0869

Contact: Joel Jackson

Directions: 47 miles — Take Route I-99 to Roaring Spring exit. Turn right at end of ramp (old 220S). Turn right at blinking yellow light (Route 164W). Go 7 miles, the mill is on the left.

Tons sawdust available/week: None available at this time.

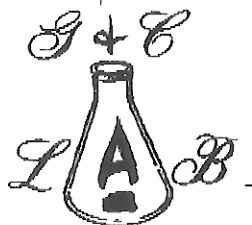
Sawdust cost: \$ 4.00/ton FOB mill

Transportation cost: No quote at this time.

What s done with sawdust?: In the winter, they use all their sawdust for heat and to operate 7 kilns. In the summer (March through October) they sell to the farmers.

Note: They are willing to discuss the situation with us as we get closer to having a project. They may have an interest in the future.

APPENDIX F. COAL AND LIMESTONE ANALYSIS

**G and C Coal Analysis Lab., Inc.**

R.D. 1, Box 324

Summerville, PA 15864

814-849-2559

FAX Number: (814)-849-8878

Date: _____

TO: _____

Penn State

RE: _____

The Residual Moisture was
used in the calculation not the
total - please call if you have
any questions!

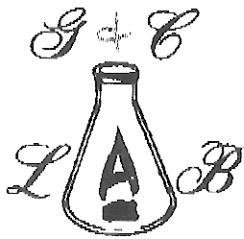
Thank You

ATTN: _____

Bruce Miller

Number of Pages Including Cover Page: _____

4



G and C COAL ANALYSIS LAB., INC.

R.D. 1, BOX 324
SUMMERVILLE, PA 15864
(814) 849-2559
FAX: (814) 849-8878

RECEIVED FROM:

Penn State University
Attn: Bruce Miller
C214 Coal Utilization Lab
University Park, PA 16802

LAB NO. 430592

SAMPLED 01-22-01

RECEIVED 01-26-01

REPORTED 02-01-01

SAMPLE MARKED:

Reliant Bradford Train
PAP-58

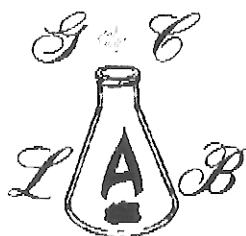
ANALYSIS REPORT

	AS RECEIVED	DRY BASIS
% Moisture... (Residual Moisture).....	0.39	
% Ash.....	14.64	14.70
% Sulfur.....	2.26	2.27
B.T.U.....	13,067	13,118
B.T.U. (Moisture-Ash Free).....	15,379	
% Volatile Matter.....	24.07	24.16
% Fixed Carbon.....	60.90	61.14
Fusing Temperature.....	ID: 2518	ST: 2566
	HT: 2601	FT: 2632
1.73 Lbs. Sul./mil. BTU		
11.20 Lbs. Ash /mil. BTU		

THE ABOVE ANALYTICAL RESULTS WERE
OBTAINED FOLLOWING ASTM PROCEDURES.

APPROVED BY

G&C COAL ANALYSIS LAB., INC.



G and C Coal Analysis Lab., Inc.

RD 1, Box 324
Summerville, PA 15864
814-849-2559
Fax: 814-849-8878

RECEIVED FROM:

Penn State Univ.
Attn: Bruce Miller
C214 Coal Utilization Lab
University Park, PA 16802

Lab # : 430592
Date Sampled: 01-22-01
Date Received: 01-26-01
Date Reported: 02-01-01

SAMPLE MARKED:

Reliant Bradford Train
PAP-58

ULTIMATE ANALYSIS		
	As Received	Dry Basis
% CARBON	72.47	72.75
% HYDROGEN	3.89	3.91
% NITROGEN	1.49	1.50
% OXYGEN (by difference)	4.85	4.87
% ASH	14.64	14.70
% SULFUR	2.26	2.27
% MOISTURE	0.39	

The above analytical results were obtained following ASTM procedures.

APPROVED BY

G & C COAL ANALYSIS LAB., INC.



G and C Coal Analysis Lab., Inc.

RD 1, Box 324
Summerville, PA 15864
814-849-2559

Fax: 814-849-8878

Date Received: 01-22-01

Date Reported: 02-01-01

Received From:

Penn State Univ.
Attn: Bruce Miller
C214 Coal Utilization Lab
University Park, PA 16802

Lab Number : 430592

Sample Marked: Reliant Bradford Train
PAP-58

Mineral Analysis of Ash

SiO ₂	48.20
Al ₂ O ₃	25.34
TiO ₂	1.23
Fe ₂ O ₃	18.34
CaO.....	2.28
MgO.....	0.82
Na ₂ O.....	0.25
K ₂ O.....	2.22
P ₂ O ₃	0.40
SO ₃	0.67
Und.....	0.25

The above analytical results were obtained following ASTM procedures.

APPROVED BY

G & C COAL ANALYSIS LAB., INC.

Date: 1/26/01 / 1/29/01R.D. #1 Box1682, Herndon, PA 17830
Phone: 570/758-3001 Fax: 570/758-2400**Facsimile Cover Sheet****Message For:****Name:** Bruce Miller**Company:** PSU**Fax No.:** 814.863.7432 / 814-863-8892**From:** Jim Meckley**Number of Pages Including This Cover Letter:** 3**MEMO/REMARKS:**

Bruce:

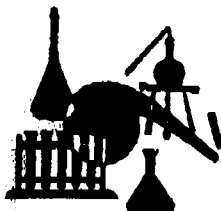
Following are two analysis reports that would give you the appropriate range of variation that could be expected from the material that we would propose to supply to your project.

Barring any unforeseen adverse change in fuel oil prices, we feel quite confident that the material can be delivered to your silos in the range of \$26.00 per ton (this price should be fine for at least two more years). If you need any additional information, please don't hesitate to contact me.

Regards,

A handwritten signature in black ink, appearing to be 'Jim Meckley', written over a large, stylized loop.

If you are not the intended receiver of this message, or if this message is unreadable, please contact 570/758-3001 immediately. Thank you.



HARRY WILSON
President

ANNETTE WITCOCKIE, B.S.
Biology - Lab Supervisor

WILSON TESTING LABORATORIES, INC.

401 West Chestnut Street

SHAMOKIN, PA. 17872

Phone 717-648-2216
Fax 717-648-6006

TOM BARWICK, B.S.
Chemistry

TIM BARWICK, B.S.
Chemistry

November 13, 1998

Client: MECKLEY'S LIMESTONE PRODUCTS INC.
Address: R. D. # 1 BOX 950
HERNDON, PA, 17830
D. MARQUETTE

CHEMICAL ANALYSIS REPORT PA D.E.R. CERTIFIED #49-303

Date collected: 10/03/98
Time received: 11/17/98
Type of sample: Limestone
Location sample collected: 75% MATERIAL BIN 6
Name of sampler: FM
Remarks: Ep Toxicity

Howe: 00:00AM
Hour: 11:00AM

Laboratory Number: 137917

Parameter	Result	Units	Comments	Date	Time	Method	Analyst
$MgCO_3$	4.2						
$CaCO_3$	82.28						
Calcium Oxide CaO	46.1	%		11/11/98	02:00PM	EPA 200.7	TLB
Magnesium Oxide MgO	2.00	%		11/11/98	02:00PM	EPA 200.7	TLB
Arsenic, Total	<0.005	MG/L	TCLP	11/12/98	09:45AM	SM #31138	TLB
Barium, Total	0.3	MG/L	TCLP	11/11/98	01:00PM	SM #31110	TLB
Cadmium, Total	<0.01	MG/L	TCLP	11/11/98	10:30AM	SM #31138	TLB
Chromium, Total	<0.04	MG/L	TCLP	11/11/98	10:50AM	SM #31138	TLB
Lead, Total	<0.1	MG/L	TCLP	11/11/98	03:30PM	SM #31118	TLB
Mercury, Total	<0.002	MG/L	TCLP	11/12/98	02:00PM	EPA 245.2	TLB
Selenium, Total	<0.005	MG/L	TCLP	11/12/98	10:15AM	SM #31138	TLB
Silver, Total	<0.05	MG/L	TCLP	11/12/98	08:00AM	SM #31118	TLB

Wilson Testing Laboratories

Harry Wilson

Harry Wilson, President
Annette Witcockie, Director
HW/sw/rb



HARRY WILSON
President

WILSON TESTING LABORATORIES, INC.

401 West Chestnut Street

SHAMOKIN, PA. 17872

Phone 717-648-2215
Fax 717-648-8808

NETTIE WITCOSKIE, B.S.
Biology - Lab Supervisor

November 13, 1998

TOM BARWICK, B.S.
Chemistry

TIM BARWICK, B.S.
Chemistry

Client: MECKLEY'S LIMESTONE PRODUCTS INC.
Address: R. D. # 1 BOX 950
HERNDON, PA, 17830
D. MARQUETTE

CHEMICAL ANALYSIS REPORT PA D.E.R. CERTIFIED #49-303

Date collected: 10/03/98 Hour: 00:00AM
Date received: 11/05/98 Hour: 11:00AM
Type of sample: Limestone
Location sample collected: 85% MATERIAL BIN 7
Name of sampler: FM
Remarks: En Toxicity

Laboratory Number: 137916

Parameter	Result	Units	Comments	Date	Time	Method	Analyst
Mg CO ₃	3.29						
CaCO ₃	85.85						
Calcium Oxide CaO	48.1	%		11/11/98	02:00PM	EPA 200.7	TLB
Magnesium Oxide MgO	1.57	%		11/11/98	02:00PM	EPA 200.7	TLB
Arsenic, Total	<0.005	MG/L	TCLP	11/12/98	09:45AM	SM #31138	TLB
Barium, Total	0.3	MG/L	TCLP	11/11/98	01:00PM	SM #31110	TLB
Cadmium, Total	<0.01	MG/L	TCLP	11/11/98	10:30AM	SM #31138	TLB
Chromium, Total	<0.04	MG/L	TCLP	11/11/98	10:50AM	SM #31138	TLB
Lead, Total	<0.1	MG/L	TCLP	11/11/98	03:30PM	SM #31118	TLB
Mercury, Total	<0.002	MG/L	TCLP	11/12/98	01:00PM	EPA 243.2	TLB
Selenium, Total	<0.005	MG/L	TCLP	11/12/98	10:15AM	SM #31138	TLB
Silver, Total	<0.05	MG/L	TCLP	11/12/98	08:00AM	SM #31118	TLB

Sincerely,
Wilson Testing Laboratories

Harry Wilson

Harry Wilson, President

HW/aw/rb