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GREAT LAKES REGIONAL BIOMASS ENERGY PROGRAM

Quarterly Report

December 1, 1988 - February 28, 1989

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Council of Great Lakes Governors
Chicago, Illinois 60604

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DISCLAIMER

EXECUTIVE SUMMARY

This is the second quarterly report of the sixth year of operation of the Great Lakes Regional Biomass Energy Program. The program was initiated in 1983 with a grant to the Council of Great Lakes Governors from the Biofuels and Municipal Waste Technology Division of the U.S. Department of Energy. Stressing near-term biomass feedstock production techniques and conversion processes, the objective of the program is to increase the use of biomass energy by the public and private sectors in the seven state Great Lakes region. States that are in the Great Lakes region include: Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio and Wisconsin.

The Great Lakes Regional Biomass Energy Program is divided into three separate operational programs. The first is the State Grant Program, which provides resources to the seven state energy offices in the region to increase their capabilities in biomass energy. State-specific activities and interagency programs are emphasized in the State Grant Program. The second, the Subcontractor Program, involves the letting of subcontracts to private organizations to address regional biomass issues and needs. The third is the In-House Technology Transfer Program in which Council staff develop biomass energy publications and reports.

The impact of biomass energy on the environment was an important issue throughout the region this quarter. Pacific Environmental Services began the first phase of its subcontract to perform an evaluation of stack emissions and ash composition at a small scale boiler that is fueled exclusively with d-RDF. The state of Minnesota awarded a contract to undertake an analysis of emissions test results from eight waste-to-energy facilities, while Wisconsin worked on "Guidelines for Good Wood Combustion" as part of the state's new air emissions regulations. Iowa's Waste Management Planning for Local Governments seminar stressed environmental implications of landfilling and waste-to-energy projects.

The primary thrust of the program continued to be technology transfer and technical assistance. Wisconsin produced a four page "Annual Biomass Special" insert to the Wisconsin Energy News and Illinois and Iowa published biomass energy article in three state energy periodicals. Michigan distributed a package to acquaint forestry professionals with wood energy assistance services available in the state. Production of the regional MSW-to-energy case studies booklet resumed. The regional office and each state provided technical assistance to industrial, commercial, and institutional facilities considering biomass energy conversion.

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December 1, 1988 - February 28, 1989

1. INTRODUCTION

The Great Lakes Regional Biomass Energy Program was initiated in September of 1983 with a grant from the Biofuels and Municipal Waste Technology Division of the U.S. Department of Energy. The program is intended to provide resources to public and private organizations in the Great Lakes region (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio and Wisconsin) to increase the utilization and production of biomass fuels. Overall, the goals of the program include:

1. improving the capabilities and effectiveness of biomass energy programs in the state energy offices;
2. assessing the availability of biomass resources of energy in light of other competing needs and uses;
3. encouraging private sector investments in biomass energy technologies;
4. transferring to the private sector the results of biomass research and development;
5. eliminating or reducing barriers to private sector use of biomass fuels and technologies; and,
6. preventing or substantially mitigating adverse environmental impacts of biomass energy use.

As the grantee, the Council of Great Lakes Governors is responsible for designing and implementing the program structure to meet the above-stated objectives. Maximizing broad-based regional initiatives was also an important element in the development of the Great Lakes Regional Biomass Energy Program. To fulfill these goals, the Council recruited a 40-member Technical Advisory Committee to prioritize the biomass needs of the region and to recommend programs to address those needs. The members of the Technical Advisory Committee are biomass professionals from federal agencies, state agencies, universities, private industry, not-for-profit organizations and trade organizations located throughout the seven-state region. Through this diverse advisory committee, it is anticipated that the most important biomass issues for the Great Lakes region will be identified.

A seven-member Steering Council was appointed by the governors of the Great Lakes states. The role of this body is to act on recommendations of the Technical Advisory Committee, provide advisement on specific program activities and set basic program guidelines.

A Project Director was hired by the Council of Great Lakes Governors to coordinate the activities of the Technical Advisory Committee and the Steering Council. Additionally, the Project Director is responsible for the day-to-day activities of the regional program, as well as implementing program mandates.

The Great Lakes Regional Biomass Energy Program is divided into three separate operational programs. The first is the State Grant Program, which provides resources to the seven state energy offices in the region to increase their capabilities in biomass energy. State-specific activities and interagency programs are emphasized in the State Grant Program. The second, the Subcontractor Program, involves the letting of subcontracts to private organizations to address regional biomass needs as identified by the Technical Advisory Committee. The third is the In-House Technology Transfer Program in which Council staff develop biomass energy publications and reports.

2. RESEARCH HIGHLIGHTS

The Iowa Department of Natural Resources sponsored a one-day seminar entitled "Waste Management Planning for Local Governments" which was attended by 250 people.

The Michigan Public Service Commission produced a package for forestry professionals which provides information on wood energy assistance services.

Cal Recovery Systems, under a contract with the Minnesota Department of Public Service, completed the first phase of the "Analysis of Tests Performed on Stack Emissions from Waste-to-Energy Facilities."

The Wisconsin Division of State Energy published a four-page "Annual Biomass Special" insert to the Wisconsin Energy News.

Pacific Environmental Services identified Dordt College in Sioux Center, Iowa, as the test site for a d-RDF emissions study.

3. MANAGEMENT HIGHLIGHTS

The Council of Great Lakes Governors hired Frederic Kuzel as Project Director of the Great Lakes Regional Biomass Energy Program.

4. TECHNICAL PROGRESS

4.1 STATE GRANT PROGRAM SUMMARIES

4.1.1 Illinois State Grant Program

Agency: Illinois Department of Energy and Natural Resources

Project Manager: Mr. Terry Miller

Objective: The objective of the project is to combine biomass research, development and information activities into a program that will accelerate the commercialization of biomass technologies and fuels in the state of Illinois.

Approach: The program will focus on informing the public about the conversion of wood, forest product waste, crop residues and municipal wastes to energy. Illinois intends to: (1) write six newsletter articles pertaining to biomass; (2) make three presentations to general-interest groups, college classes or secondary educators; (3) produce annual updated edition of Current Alternative Energy Research in Illinois, (4) conduct waste-to-energy workshops; (5) offer at least one tour of waste-to-energy facility and one tour of an ethanol facility; (6) establish a speakers and consultants bureau; (7) update the biomass energy fact sheets; and (8) conduct a marketing survey and assessment of wood wastes in Illinois.

Status: These activities have been completed:

- wrote two articles which were published in "Illinois Resources";
- hosted a press conference regarding the Vienna Correctional ethanol production facility;
- completed the revision of Current Alternative Energy Research in Illinois.

Future Efforts: These activities will be completed in the near future:

- printing and distributing a brochure describing the Biomass Speakers and Consultants Bureau;
- listing potential users for each wood waste source identified in the Wood Waste Marketing Survey;

- setting up a workshop/tour of the DuPage County anaerobic digestor project;

- working with other GLRBEP states to conduct a joint Waste-to-Energy Workshop/Conference in Chicago.

4.1.2 Iowa State Grant Program

Agency: Iowa Department of Natural Resources

Project Manager: Ms. Katherine Sibold

Objective: The objective of the project is to increase the use of biomass in Iowa by providing energy users with information on the utilization of wood, agricultural products and municipal solid waste (MSW) as energy resources.

Approach: The focus of the program is the transfer of information gained through numerous biomass demonstration projects and other sources. In addition, the state will continue to sponsor biomass-related task forces and to coordinate interagency efforts relating to biomass. Iowa plans to: (1) publish eight articles on biomass technologies in the Energy Bulletin or the Conservationist; (2) continue to update a state biomass directory; (3) participate in the formulation of a ten-year comprehensive energy plan for Iowa; (4) publish information about oil overcharge funded biomass programs; (5) conduct a solid waste workshop; (6) develop and implement a marketing plan for the recently completed solid waste alternatives video; and (7) conduct a workshop for science teachers.

Status: These activities have been completed:

- published five articles in the Energy Bulletin and one article in the Conservationist;

- distributed 10 copies of the Biomass Energy Facilities Directory;

- sponsored a daylong Waste Management Planning for Local Governments seminar in Ames attended by 250 people;

- implemented a plan to promote and market the solid waste alternative videotape. The video was used by 36 additional groups;

- held meetings of the Wood-to-Energy, Waste-to-Energy, and Agricultural Residue-to-Energy Task Forces;

- made a presentation on biomass technologies at the DHS/DOC Facilities Engineers Meeting.

Future Efforts: These activities will be completed in the near future:

- preparing the narrative and statistical work for the Comprehensive Energy Plan.

4.1.3 Michigan State Grant Program

Agency: Michigan Public Service Commission

Project Manager: Mr. Mac McClelland

Objective: The objective of the program is to increase the environmentally sound use of wood, waste, and other biomass for energy in Michigan through an integrated strategy consisting of technical assistance,consensus building and research.

Approach: The Michigan program will provide technical assistance to 10 industrial/commercial/institutional facilities interested in converting to wood fuel. In addition, the Michigan program will provide assistance to state facility decision makers regarding wood energy conversions and participate in the Resource Recovery Development Program and the Michigan Energy Program for Agriculture and Forestry. The state will also act as an information clearinghouse, including establishing BIONET, an electronic bulletin board and mail system for biomass organizations throughout the U.S. and Canada.

Status: These activities have been completed:

- negotiated agreements for 14 grantees in four different components of the Resource Recovery Development Program;

- developed a package for forestry professionals to provide wood energy assistance services, and distributed it to 60 Soil Conservation Service staff and 30 DNR field staff.

Future Efforts: These activities will be completed in the near future:

- developing recommendations for the Wood Energy Technology Transfer component of the Resource Recovery Development Program;

- developing a marketing program for wood energy assistance services;

- implementing the BIONET system and providing training materials.

4.1.4 Minnesota State Grant Program

Agency: Minnesota Department of Public Service

Project Manager: Mr. Narvel Soudahl

Objective: To provide technical assistance to local governments considering waste-to-energy or wood fuel projects.

Approach: Three projects will be undertaken:

A publication will be prepared detailing sources and potential supplies of wood residues available for energy use at this time. It will replace the outdated 1980 report. This publication will be used by DPS-Division of Energy, DNR-Forestry, and other agencies to promote and advance the use of fiber fuels in Minnesota, through technical assistance and conversion analyses. Accurate information identifying available wood energy sources is critical to any fiber fuel conversion analysis.

A second publication will detail the volumes, species, geographic distribution, and trends of wood used for residential fuelwood. This report will be used by the state agencies that are concerned about energy, forest industries, and forest land managers. Primary benefits will be in planning and avoiding competing uses for wood.

Finally, a review of stack emissions test results at eight sites that incinerate Municipal Solid Waste for the purpose of steam and/or electricity production will be performed. Data will be collected on facility design, fuel type, ash composition, and air emissions. From this survey, four facilities will be selected for in-depth analysis to determine the relationship between plant characteristics and pollutant emissions.

Status: These activities have been completed:

- initiated data collection for the Forest Biomass Assessment, Manufacturing Bi-Products, and Urban Wood Waste segments of the "1989 Minnesota Wood Residue Survey";

- awarded a contract for the study "Analysis of Tests Performed on Stack Emissions from Waste-to-Energy Facilities" to Cal Recovery Systems. Emission test results from eight sites were compiled and reviewed. Four locations were selected for further in-depth analysis.

Future Efforts: These activities will be completed in the near future:

- completing the Operational Impact Analysis phase of the "Waste to Energy Study";
- completing data collection for the "Wood Residue Survey";
- initiating staff work and selecting a consultant for the "Residential Fuelwood Study."

4.1.5 Ohio State Grant Program

Agency: Public Utilities Commission of Ohio

Project Manager: Mr. Claude Eggleton

Objective: To encourage biomass energy use in Ohio by informing the public about the opportunities available to use Ohio biomass resources wisely and economically.

Approach: The PUCO will create biomass energy resource maps which will be available on electronic media. The maps can be used to match areas rich in biomass resource supply with the location of boilers needing replacement. A boiler survey will also be undertaken to complement the mapping project. Using this data, Ohio can make recommendations to replace boilers with ones that utilize nearby biomass products as fuel. In order to better reach the general public, a number of public libraries have been designated as biomass learning resource centers. Additional libraries will be added to the system, and all will continue to receive biomass energy publications. Ohio will also publish a waste-to-energy pamphlet for city and county officials, undertake a series of written/video recorded case studies of businesses using wood burning boiler systems, and prepare other literature as part of its public outreach program.

Status: These activities have been completed:

- mailed the Decision Maker's Guide to Waste-to-Energy Projects pamphlet to city and county officials throughout the state;

- printed 30,000 copies of the boiler survey form;
- made initial site visits to one business and one college which were chosen as subjects for written/video recorded case studies on the use of wood burning furnaces.

Future Efforts: These activities will be completed in the near future:

- mailing the boiler survey forms;
- finalizing the Biomass Energy Resource maps;
- carrying out the case studies program.

4.1.6 Wisconsin State Grant Program

Agency: Wisconsin Division of State Energy and Intergovernmental Relations

Project Manager: Mr. Dan Moran

Objective: The objectives of this program are to provide information and technical assistance to institutions and industries interested in converting to wood fuel or other biomass fuels.

Approach: The program will encourage public and private sector investments in wood energy. The Division will continue to offer free economic analyses to parties interested in utilizing wood for energy, and has expanded the service to include analyses of cogeneration. A mailing detailing the service will be made, with particular reference as to how the prefeasibility study might be a first step toward applying for a Business Energy Fund award, or a waste-to-energy grant. Continuing assistance will also be given to the eight companies currently in various states of planning or installing wood burning system.

A significant portion of the wood energy assistance effort will consist of compiling and disseminating current market information on wood fuel suppliers, wood fuel users, and wood energy system vendors and engineers. Specifically, the information collected during the recent biomass facilities directory update process will be used as a basis for continued data gathering efforts including a follow-up survey of waste wood generators and users to produce an inventory of unused wood waste and a listing of wood burning facilities in need of additional fuel, and a follow-up survey and updated inventory of equipment vendors, contractors, and consultants.

The program also intends to provide information and assistance on biomass fuels other than wood. Those biomass technologies will be investigated and analyzed to determine their potential for application in Wisconsin. Data and information gathered will be synthesized for technical and nontechnical audiences and presented in fact sheets and Wisconsin Energy News articles.

Status: These activities have been completed:

- provided technical assistance to two locations regarding wood waste-to-energy projects;
- provided input to DNR on "Guidelines for Good Wood Combustion" publication;
- continued to manage three Waste-to-Energy Program contacts;
- published the "Annual Biomass Special" as a four page insert to the Wisconsin Energy News.

Future Efforts: These activities will be completed in the near future:

- publishing results of the waste wood survey;
- producing small directory of Wisconsin biomass energy facilities.
- developing program guidelines for the wood waste-to-energy segment of the "Stripper 4" Oil Overcharge Plan.

4.2 SUBCONTRACTOR PROGRAM SUMMARIES

4.2.1 d-RDF Emissions

Project Manager: Mr. John Chehaske

Objective: The purpose of this project is to assist regional air quality regulatory agencies determine the permitting processes required for densified waste fuels. To accomplish that end, this project will develop an accurate and complete emissions profile for pelletized waste fuels produced in the Great Lakes region and burned in small commercial/industrial burners and utility boilers.

Approach: This project will be performed in four phases. Phase I will include background work to document prior research, locate densified waste fuel producers and identify state regulations pertaining to small scale combustion of waste fuels. During Phase II, emissions and ash tests will be conducted on a small add-on furnace rated between 5,000 and 7,000 lbs. of steam/hour. Phase III will involve emissions and ash testing of a 15 to 25 MW power generating boiler rated at approximately 150,000 lbs. of steam/hour. In the final phase, Phase IV, the test results will be analyzed, and the information gathered will be transferred to the air quality officials in the region.

Three types of densified waste fuel produced in the Great Lakes region will be tested for emissions including two different d-RDF pellets and a wastepaper pellet. The two d-RDF fuels will represent the two different processes currently being utilized in the region to produce d-RDF, namely (1) a "Lundell" type; and (2) a "Buhler-Miag" type. One of the two d-RDF fuels will include plastics, while the other will not. The pelletized wastepaper will be from a source separation and pelletizing facility. Emission tests to be conducted will include: (1) particulates; (2) PM_{10} particulates; (3) CO; (4) CO_2; (5) NO_x; (6) SO_2; (7) HCl; (8) total hydrocarbons; (9) dioxins; (10) dibenzofurans; (11) heavy metals; and (12) PCBs. Ash will be tested for total hydrocarbons, dioxins, dibenzofurans, heavy metals, and PCBs.

Status: These activities have been completed:

- completed a literature search of prior d-RDF research, testing, and technology;
- identified five d-RDF pellet producers as potential fuel suppliers for the tests;
- selected the Dordt College boiler in Sioux Center, Iowa, as the site for emissions testing in the 5,000-7,000 lbs. steam/hour, small boiler, phase.

Future Efforts: These activities will be completed in the near future:

- compiling existing and proposed d-RDF emissions regulations from each of the Great Lakes states;
- selecting pellet producer;

- preparing a site specific test plan and QA plan;
- conducting field test on stack emissions.

4.3 IN-HOUSE TECHNOLOGY TRANSFER PROGRAM SUMMARIES

4.3.1 MSW Incineration with Energy Recovery Case Studies

Project Manager: Ms. Kathryn Lyster

Objective: Assist municipal officials in making decision regarding MSW incineration by providing them with detailed information on the issues and problems that have been encountered by cities that have already invested in incinerators with energy recovery systems.

Approach: A listing will be developed of all MSW incinerators with energy recovery in the Great Lakes region. From that list, 14 sites will be selected to do in-depth case studies. The case studies will be based on site visits to the plants which will consist of interviewing the plant personnel, touring the facility and taking photographs. Information to be collected will include: (1) size of the system; (2) amount of waste burned; (3) type of system; (4) political process which resulted in decision to invest in system; (5) financing arrangements; (6) MSW tipping fees; (7) emissions; and, (8) ash disposal. The MSW incineration case studies will be published in a booklet. The first part of the booklet will provide an overview of generic MSW incineration technology and issues, while the second part will include the actual case studies complete with quotes from municipal officials, plant schematics and photographs.

Status: These activities have been completed:

- received final comments on three case studies from site managers and made revisions accordingly;
- sent three write-ups to appropriate parties for review.

Future Efforts: These activities will be completed in the near future:

- completing write-ups on visited facilities;
- printing and distributing the completed case studies booklet.

4.3.2 Commercial-Scale Anaerobic Digestor Case Studies

Project Manager: Ms. Kathryn Lyster

Objective: Inform industries with wastewater disposal problems of the possibilities of solving their problems by investing in energy generating anaerobic digestion systems.

Approach: All commercial-scale (non-farm and non-sewage treatment) anaerobic digestors operating in the Great Lakes region will be identified. A limited number (seven) of those facilities will be selected to be featured in a case study publication. Visits to the facilities will be the basis for the write-ups on each facility. These site visits will consist of interviewing plant personnel, touring the facility and taking photographs. Information to be collected will include: (1) size of the system; (2) amount of wastewater treated; (3) type of digestor; (4) amount of gas produced; (5) manner in which gas is utilized; (6) cost and economics of system; and, (7) state and local permits. The anaerobic digestor case studies will be published in a booklet. The first part of the booklet will provide an overview of generic digestor technology and issues, while the second part will include the case study write-ups.

Status: Work on this program has been temporarily suspended.

4.3.3 Update of the Biomass Facilities Directory

Project Manager: Ms. Jill Hronek

Objective: Encourage investments in biomass energy technologies in the Great Lakes region by providing potential users with a more complete and updated directory of existing biomass facilities.

Approach: The updated directory will expand upon and improve the current listings of biomass facilities. The two sections in the current directory covering state programs and biomass research at universities will be deleted from the updated directory. The section covering generic biomass process and the section detailing specific facilities will be updated. The types of bioenergy facilities to be included in the directory would be: (1) alcohol production; (2) landfill gas production;(3) methane production from anaerobic digestion; (4) waste-to-energy incineration; and, (5) industrial/commercial/institutional wood burning. The first step in updating the directory will be to confirm the accuracy of the current listings by mail or telephone. Program staff will be responsible for collecting information on facilities in Ohio and Indiana, while state

personnel in Illinois, Iowa, Michigan, Minnesota and Wisconsin will gather data on facilities in their respective states. Each facility will be asked pertinent questions to ascertain whether there are any inaccuracies in its listings. Additional listings for the directory would be solicited from equipment manufacturers, biomass facility owners, other state agency personnel, published reports and other sources. Gathering information for the new facilities will be conducted in the same fashion as confirming the data for the current listings. Once all the data has been collected, information for each facility will be transferred to uniform data sheets to be compiled with others into a regionwide directory.

Status: These activities have been completed:

- all phases of this project have been completed. Copies are being distributed in response to requests.

5. TECHNOLOGY TRANSFER

5.1 PUBLICATIONS

Seven articles were written and published in two bimonthly editions of Biologue. The articles are listed below and attached as Appendix A:

- Five Year Retrospective: Biomass Development in the Great Lakes Region
- Biomass Facilities Directory Update Available
- Illinois Biogas Project Planned
- Solid Waste--Renewable Energy in Sioux Center and Cedar Rapids
- Biomass Demonstrations in Iowa
- Digester Succeeds in Pilot-Scale Application
- Waste Video Available

During this quarter, the Council distributed over 215 copies of the Biomass Energy Facilities: 1988 Directory of the Great Lakes Region and over 525 copies of other publications that were produced by the GLRBEP.

5.2 MEETINGS AND PRESENTATIONS

No meetings or presentations were sponsored this quarter.

6. MANAGEMENT PROGRESS

6.1 PROJECT PROCUREMENT

6.1.1 State Grant Program

No state Grant Agreements were signed this quarter.

6.1.2 Subcontractor Program

No new subcontractor procurements were made this quarter.

6.1.3 In-House Technology Transfer Program

No new in-house projects were started this quarter.

6.2 FUTURE PLANNING

No future planning was undertaken this quarter.

6.3 SITE VISITS

The Project Director made three site visits to U.S. Department of Energy sponsored meetings, to program planning meetings, or to grantee or subcontractor meetings:

Argonne National Laboratory, Energy and Environmental Systems Division, Argonne, Illinois
January 18, 1989;

Wisconsin Biomass Energy Program site visit, Madison, Wisconsin
January 27, 1989;

Regional Biomass Energy Program Review, Oak Ridge, Tennessee
February 1-2, 1989.

6.4 STAFFING

Mr. Frederic Kuzel assumed the position of Project Director on December 19, 1988.

APPENDIX A

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