

REPORT NO. 00-10734/01

FIRST QUARTERLY REPORT FOR THE CONCEPTUAL DESIGN ASSESSMENT FOR THE CO-FIRING OF BIOREFINERY SUPPLIED LIGNIN PROJECT

PROJECT NO. 00-10734
MASADA D.O.E. LIGNIN STUDY

MASADA RESOURCE GROUP, LLC
BIRMINGHAM, AL

DATE: JULY 27, 2000

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1. TITLE PAGE

Report Title: First Quarterly Report for the Conceptual Design Assessment for the Co-Firing of Bio-Refinery Supplied Lignin Project.

Type of Report: Quarterly Report, Second Quarter of 2000

Reporting Period Start Date: June 23, 2000

Reporting Period End Date: July 1, 2000

Principal Author(s) Ted Berglund, Jeffrey T. Ranney, Carol L. Babb

DOE Award #: DE-FC26-99FT40670--01

Date Report Was Issued: July 2000

Name of Submitting Organization: Masada Resource Group, LLC &
Harris Group, Inc.

Address of Submitting Organization:

Masada Resource Group, LLC.
2170 Highland Ave., Suite 200
Birmingham, AL 35205

Harris Group, Inc.
Suite 800
1000 Denny Way
Seattle, WA 98109-5338

2. 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.

3. ABSTRACT

After several months of planning and contract negotiations a coordination meeting was held on June 23 for this project at the TVA facility in Muscle Shoals AL. Representatives of Masada, Harris Group, Inc., and the Tennessee Valley Authority attended the meeting. A preliminary timeline/schedule for the project was distributed and is being finalized based on participant comments.

4. INTRODUCTION

The development of renewable domestic fuel sources is a desirable goal with positive economic and environmental impacts. Masada Resource Group (MRG) has developed a proprietary process for the conversion of Municipal Solid Waste (MSW) and Sewage Sludge (SS) into ethanol (CES OxyNol™ Process). One of the byproducts of this process is a solid lignin product. MRG has developed a method for using this MSW derived lignin as a solid fuel for steam generation. In this joint research project a conceptual design will be developed which joins a CES OxyNol™ facility with a Tennessee Valley Authority (TVA) coal fired power plant (The TVA-Colbert facility).

MRG is working with Harris Group, Inc. (HGI), TVA and the National Energy Technology Laboratory (NETL) to develop a conceptual design for the co-firing of bio-refinery derived lignin fuel in a coal fired steam boiler. This project will research the de-watering and fuel properties of the CES OxyNol™ derived fuel. The project will evaluate the technological feasibility and cost/benefit analysis of co-locating a CES OxyNol™ facility with the TVA-Colbert facility with the bio-refinery supplying boiler fuel to the Colbert facility and the Colbert facility providing the process steam needed for the CES OxyNol™ process. The co-location has the benefits of providing a low cost renewable fuel source that can be co-fired with coal. Co-location also reduces the capital and operating costs of the CES OxyNol™ process and provides environmental gains by reducing the impact of coal combustion and by providing an environmentally acceptable method for the disposal of solid waste.

5. EXPERIMENTAL

Experimental plans are currently being developed by TVA and HGI to complete this study. TVA has considerable experience in the acid hydrolysis process and their experimental experience will be applied to the lignin production. The lignin de-watering and conditioning will be studied in conjunction with de-watering equipment vendors and with the input of NETL.

6. RESULTS AND DISCUSSION

On June 23 the operational phase of this project was officially started during a meeting at the TVA facility in Muscle Shoals AL. Representatives of Masada, Harris Group, Inc., and the Tennessee Valley Authority attended the meeting. A preliminary timeline/schedule for project was distributed and is being finalized based on participant comments. Please find attached as Appendix 1 a copy of the meeting minutes, contact list, tentative schedule and an issues list for this project.

Next steps include:

- 1) Develop facility design criteria to allow mass balance calculations
- 2) Provide TVA-Colbert with steam demand and solid fuel supply based on mass balance and preliminary fuel analysis of MSW derived fuel
- 3) Arrange for a meeting with NETL to discuss project scope and coordinate testing
- 4) Develop preliminary site information at Colbert
- 5) Provide small Lignin sample from previous bench scale testing to TVA-Colbert
- 6) Create process flow and experimental scope and protocol for the hydrolysis pilot testing at TVA
- 7) Arrange for RDF and SS receipt at TVA

TVA completed preliminary reporting. These reports include the Hazardous Substance Plan and the Environmental Questionnaire. Copies of these previously submitted reports are attached in Appendix 2.

7. CONCLUSION

The Conceptual Design Assessment for the Co-Firing of Bio-Refinery Supplied Lignin Project was successfully kicked off on July 23, 2000 during a meeting at the TVA-PPI facility in Muscle Shoals AL. An initial timeline for the study was distributed, issues of concern were identified and a priority actions list was developed. Next steps include meeting with NETL to discuss de-watering and lignin fuel testing, the development of the mass balance model and ethanol facility design criteria, providing TVA-Colbert with preliminary lignin fuel analysis and the procurement of representative feed materials for the pilot and bench scale testing of the hydrolysis process.

8. LIST OF ACRONYMS AND ABBREVIATIONS

DOE	Department of Energy
HGI	Harris Group, Inc.
MRG	Masada Resource Group, LLC
MSW	Municipal Solid Waste
NETL	National Energy Technology Laboratory (Also FETC, Federal Energy Technology Center)
SS	Sewage Sludge
TVA	Tennessee Valley Authority
WWT	Waste Water Treatment

9. APPENDICES

1. Kick off Meeting Summary, Contact List, Issues List, Timeline/Schedule.
2. Hazardous Substance Plan and Environmental Questionnaire

JTR/afw

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9.3 Kick Off Meeting Summary

MINUTES OF MEETING NO. 00-10734/1

PROJECT NO. 00-10734
COFIRING OF BIOREFINERY SUPPLIED LIGNIN

MASADA RESOURCE GROUP
BIRMINGHAM, AL

Meeting Date: June 23, 2000

Location: TVA Laboratory
Muscle Shoals, Alabama

Purpose: Kick off Meeting for the DOE/Masada project: Conceptual Design Assessment for the Co-Firing of Bio-Refinery Supplied Lignin.

Attendees:	<u>TVA-PPI</u>	<u>TVA-Power</u>	<u>Harris Group Inc.</u>
	Jacqueline Broder	Mark Hill	Carol Babb
	Russ Lambert	Chuck Ward	Jeff Ranney
	Joyce Chatman	Susan Elder	
	Jonathon Patterson	Denton Eady	<u>Masada Resource</u>
		Ronnie McNutt	Larry Russo

1. Introductions (led by J. Broder)
2. Summary of Masada MSW to Ethanol Project in Middletown New York. (L. Russo)
 - Review impetus for this project
 - Overview of status of Middletown project/EPC lead
 - Present future Masada plans for BioRefinery technology
3. Organizational review, organization chart, primary contacts, contact information (attached)
 - Harris Group Inc. as project engineering, design and management for Masada Resource Group.
 - Primary Contacts: C. Babb, J. Ranney
 - TVA Public Power Institute-BioEnergy pilot and bench facilities
 - Primary Contact: J. Broder (also primary TVA contact)
 - TVA Fossil Power
 - Primary Contact: M. Hill
4. Objectives: To determine if it is technically and economically feasible to co-locate a bio-refinery with a TVA power plant and have the power plant provide steam to the bio-refinery and the bio-refinery to provide lignin as boiler fuel.
5. TVA Financial Charge Summary
 - J. Chatman summarized TVA charge summary (will provide necessary information to HGI for DOE required reporting)
6. Task review
7. Review schedule/timeline
 - TVA-power would prefer to see only one task line with a deliverable final report under Task 2.

- TVA-power also requested that their timeline be extended to provide scheduling flexibility.
- Other Timeline issues and changes discussed.
- Updated Timeline in attached.

8. Brainstorm issues/concerns: See attached issues list

9. Action list: See attached action list

10. Adjourn

Minutes Prepared by:

HARRIS GROUP INC.

Jeff Ranney
Process Specialist

JTR/afw
10734MOM001

File No.: 10734-0401
Issue Date: July 5, 2000

cc: Attendees
File

9.2 Contact List

TVA-PPI

Jacqueline Broder	jgbroder@tva.gov	(256) 386-2688	(256) 386-2526	Reservation Rd, PPI 1A, Muscle Shoals, AL 35662
Joyce Chatman	jachatman@tva.gov	(256) 386-3250	(256) 386-3526	or
Russ Lambert	rolambert@tva.gov	(256) 386-2688	(256) 386-3076	P.O. Box 1010, Muscle Shoals, AL 35662-1010
Jonathan Patterson	jlpatrickson@tva.gov	(256) 386-2688	(256) 386-2277	

TVA - POWER

Denton Eady	jdeady@tva.gov	(423) 751-6619	(423) 751-3014	
Susan Elder	sselder@tva.gov	(423) 751-7094	(423) 751-3995	1101 Market ST, LP2G-C, Chattanooga, TN 37402
Mark Hill	mkhill2@tva.gov	(423) 751-7545	(423) 751-7488	1101 Market ST, LP5D, Chattanooga, TN 37402
Chuck Ward	cpward@tva.gov	(423) 751-7094	(423) 751-3620	1101 Market ST, LP2G-C, Chattanooga, TN 37402
Ronnie McNutt	rkmcnutt@tva.gov	(256) 389-7002	(256) 389-7201	900 Steam Plant Rd, COL 1A-TSA, Tuscumbia, AL 35674

DOE- NETL

Sean Plasynski	sean.plasynski@netl.doe.gov	(412) 386-4867		
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ISSUES / CONCERNS PENDING LIST

PROJECT NO. 00-10734
MASADA DOE LIGNIN STUDY

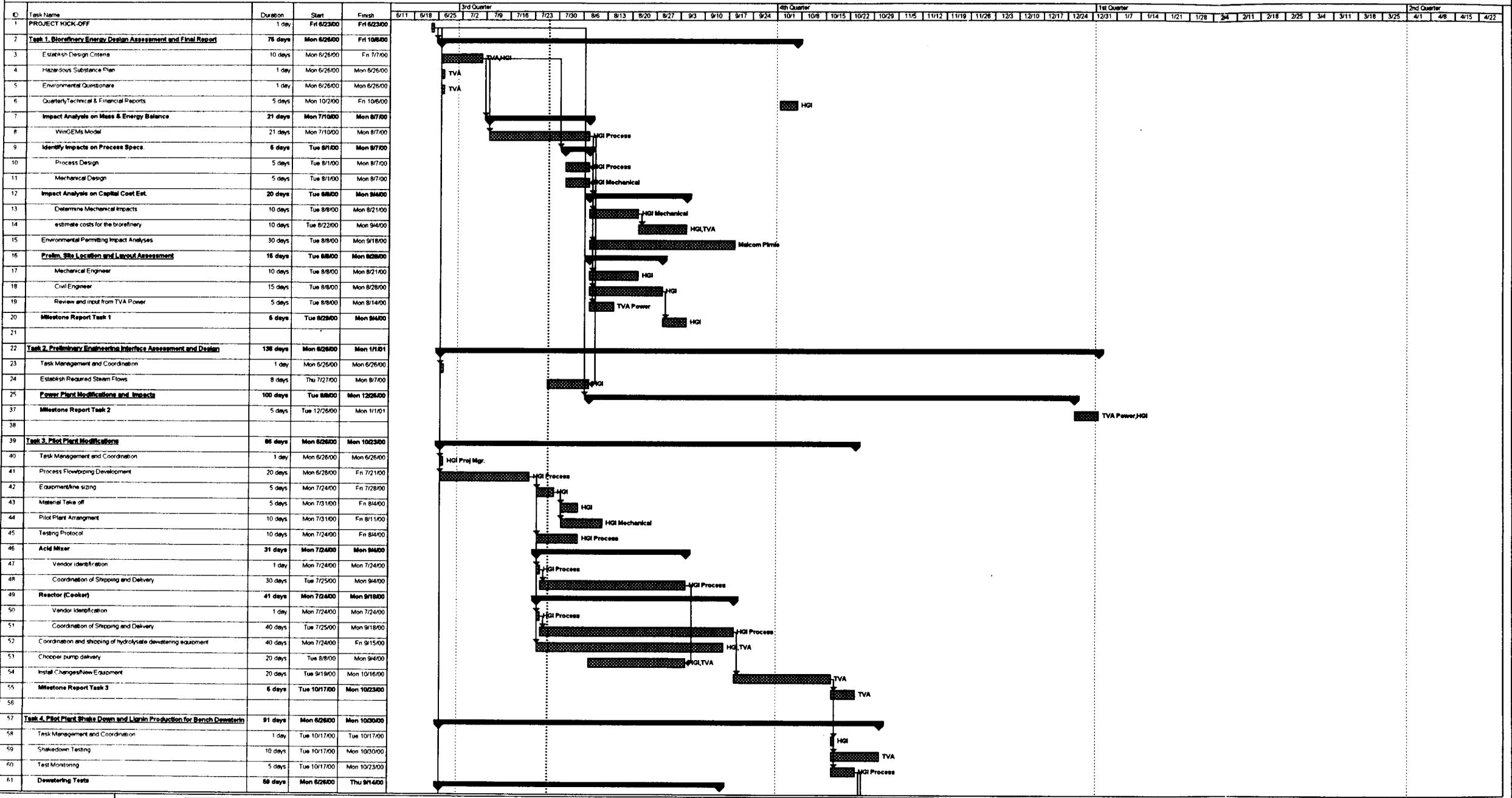
MASADA RESOURCE GROUP
BIRMINGHAM, AL

DATE: JUNE 23, 2000

<u>Item</u>	<u>Issue/Concern</u>	<u>Action/Resolution</u>
1	What is the size of the bio-refinery and design criteria for TVA power?	Bio-refinery will be sized on 275000 TPY of gross MSW to the tipping floor. Design criteria will be based on this size.
2	Is location of site co-located with Colbert power plant?	Yes.
3	Will Masada cover cost of rental equipment used in pilot testing?	Yes.
4	Is the purchase of a cook tank/reactor by Masada feasible?	Yes.
5	Add sewage sludge processing to project scope: <ul style="list-style-type: none"> • Cook/acidify @ TVA • De-water at vendor or rent equipment 	Larry Russo is investigating options with Alfa Laval.
6	Investigate the availability of chopper pump	
7	Understand the scope of the FETC/NETL De-watering Test (low pH is a concern, pH = 2)	
8	Meeting with FETC/NETL to confirm scope and schedule & de-watering test.	HGI will arrange (Carol Babb).
9	Where do we get "dry" rdf?	HGI/Masada to contact RRT. Chicago looks like possible location.
10	What WWT plant will we get sludge from and in what form?	
11	Give TVA power approximate amount of lignin for commercial facility.	Will be issued with design criteria and mass balance results.
12	Issue lignin/ash analyses to TVA power.	HGI coordinating summary of existing analysis (Jeff Ranney).
13	TVA power to evaluate pulverizer's ability to handle lignin.	
14	Evaluate adding a polishing system to condensate return. Provide steam requirements and process conditions.	Awaiting Design Criteria/Steam Demand.
15	What is the impact of loss of steam on the Masada facility?	Unacceptable. Need to have continuous supply but load can be variable to reduce during peak power demand.
16	Work out scope of test burn with NETL/TVA power.	TVA, HGI and Masada to work with NETL.
17	Environmental impact of burning lignin in Colbert boilers? Colbert has no scrubbers. What is impact of SO ₂ /NO _x ?	
18	What is impact of adding lignin on coal feed mix ratios? What is the impact on maximizing PRB vs free lower BTU-higher sulfur lignin?	
19	Storage of lignin to accommodate batch loading of coal?	
20	Investigate alternative uses of lignin during power plant outages?	

File No: 00-10734.0106

9.4 Timeline/Schedule



Project: Project1
Date: Thu 7/27/00

Task: [Pattern] Progress: [Pattern] Summary: [Pattern] Rolled Up Task: [Pattern] Rolled Up Milestone: [Pattern] External Tasks: [Pattern] Project Summary: [Pattern]

MASADA DOE CO-FIRING STUDY
REV 0
Thu 7/27/00

Page 1

9.5 Hazardous Substance Plan and Environmental Questionnaire

Masada Resource Group/DOE Contract: *Conceptual Design Assessment for the Cofiring of Bio-Refinery Supplied Lignin*

HAZARDOUS SUBSTANCE PLAN

TWO HAZARDOUS SUBSTANCES WILL BE USED DURING THE PERFORMANCE OF THIS CONTRACT. THESE ARE SULFURIC ACID AND LIME. INFORMATION ABOUT EACH OF THESE CHEMICALS IS PROVIDED.

Sulfuric Acid

EPA Hazardous Waste Number: UN 1830

EPA Hazard Code: 66975

DOT: 014

Freight Class: 60

Sulfuric acid (93% technical grade) will be purchased in two 55-gallon drums (650 pounds/drum) for a total of 110 gallons. It will be purchased from and delivered by:

Harcros Chemicals, Inc.

300 Pepi Drive

Muscle Shoals, AL 35661

There will be liquid and solid products resulting from the processing. The liquid will contain about 20% acid and the product sugars for fermentation to ethanol. The acid will be neutralized with lime, and the gypsum removed by filtration.

The solids will be washed to recover sugars and acids. This wash water will be added to the liquid above. If the solids have a pH of less than 2, they will be washed again with a dilute lime slurry. The solids will then be evaluated for co-firing with coal for electrical generation. There will be no hazardous by-products that will require treatment or disposal.

Lime (Hydrated)

EPA Hazardous Waste Number: UN 1910

EPA Hazard Code: 99999

DOT: 099

Freight Class: 50

Hydrated lime will be purchased in 50-pound bags and stored inside the pilot plant. About 1 ton of lime will be used. It will be purchased from and delivered by:

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300 Pepi Drive

Muscle Shoals, AL 35661

The lime will be used in the process to neutralize the sulfuric acid and will result in gypsum by-product. There will be no hazardous by-products that will require treatment or disposal.

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ENVIRONMENTAL QUESTIONNAIRE

I. BACKGROUND

The Department of Energy's (DOE) National Environmental Policy Act (NEPA) Implementing Procedures (10 CFR 1021) require careful consideration of the potential environmental consequences of all proposed actions during the early planning stages. DOE must determine at the earliest possible time whether such actions require either an Environmental Assessment or an Environmental Impact Statement, or whether they qualify for Categorical Exclusion. To comply with these requirements, an Environmental Questionnaire must be completed for each proposed action to provide DOE with the information necessary to determine the appropriate level of NEPA review.

II. INSTRUCTIONS

Separate copies of this Environmental Questionnaire should be completed by the principal offeror and each proposed subcontractor. In addition, if the proposed project includes activities at different locations, an independent questionnaire should be prepared for each location. Supporting information can be provided as attachments.

In completing this questionnaire, the proposer is requested to provide specific quantities regarding air emissions, wastewater discharges, solid wastes, etc., to facilitate the necessary review. In addition, the proposer should identify the exact location of the project and specifically describe the activities that would occur at that location.

To expedite completion of this questionnaire, diskette copies in WordPerfect 6.1 are available upon request. Questions regarding the type of information requested or the approach to preparing responses should be referred to Lloyd Lorenzi, U.S. Department of Energy, Federal Energy Technology Center, by phone (412) 386-6159, fax (412) 386-4604, or E-mail (lorenzi@fetc.doe.gov).

III. QUESTIONNAIRE

A. PROJECT SUMMARY

1. Solicitation Number: _____
2. Proposer & all Proposed Subcontractors: Masada Resource Group and Tennessee Valley Authority
3. Principal Investigator: Daryl E. Harms
Telephone Number: 205-558-7900
4. Project Title: Conceptual Design Assessment for the Cofiring of Bio-Refinery
Supplied Lignin
5. Duration: 10/01/99 - 7/31/00
6. Location (city, township, county, state): Birmingham, AL
Muscle Shoals, AL, Colbert County
7. Indicate the type or scale of project:

<ol style="list-style-type: none"> a. <input type="checkbox"/> Computer Modeling c. <input type="checkbox"/> Paper Study e. <input type="checkbox"/> Laboratory (Batch) Research g. <input checked="" type="checkbox"/> Pilot- or Proof-of-Concept-Scale Research i. <input type="checkbox"/> Full-scale Demonstration 	<ol style="list-style-type: none"> b. <input type="checkbox"/> Library/Literature Search d. <input type="checkbox"/> Workshop/Conference f. <input type="checkbox"/> Bench-scale Research h. <input type="checkbox"/> Pilot Plant Construction/Operation j. <input type="checkbox"/> Other (please describe):
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If either item a, b, c, or d was selected for Question A.7, proceed to Section IV (CERTIFICATION BY PROPOSER); submittal of the intervening parts of this questionnaire is not required.

However, if either item e, f, g, h, i or j was selected, continue with Question A.8.

8. Indicate the size of the proposed project and the primary material processed (e.g., 200 tph of coal).

tph (of _____) _____ MM Btu/hr
 scfm (of _____) _____ MW electric thermal
 acfm (of _____) Other: Two 80# RDF batches/day

9a. Summarize the proposed work. List all activities or tasks planned at the location covered by this Environmental Questionnaire. Treated sewage sludge will be conditioned with sulfuric acid and heat and filtered. The resulting filtrate will be added to a mixture of Refuse-Derived Fuel (RDF) and sulfuric acid. This mixture will then be heated for 2 hours to hydrolyze the RDF to sugars. After filtration, the filtrate will be stored for future testing. The sewage sludge solids and the hydrolysis lignin residue will be washed and then shipped to a NETL site for cofiring tests with coal.

9b. Characterize the work site at this location (check all that apply).
 Existing Building (indoors) Developed site Undeveloped site

10. List all other locations where work would be performed. (Note: Submit a separate Environmental Questionnaire for each location.)
Cofiring of the lignin residue and sewage sludge solids will be conducted in Pennsylvania at the NETL site.

11. Describe the objectives of the proposed project.
The objective of the project is to produce conditioned sewage sludge solids and hydrolysis lignin residue for evaluating the feasibility of cofiring these solids with coal for application at a coal-fired fossil plant.

12. Identify the planned number of tests, the frequency of testing (e.g., tests per week), and the duration of tests by type (e.g., laboratory tests, pilot unit runs, etc.).
One ton of dried RDF will be processed in 80-pound batches at two batches per day. An estimated 25 days of operation will be required. Operations will be conducted five days a week.

13. Identify all materials that would be used and produced by the project (materials can be grouped by category) and estimate their total quantities over the entire duration of the proposed project.

Materials Used (total quantity)		Materials Produced (total quantity)	
<input type="checkbox"/>	coal ()	<input type="checkbox"/>	wastewater ()
<input type="checkbox"/>	natural gas ()	<input checked="" type="checkbox"/>	air emissions (~0)
<input type="checkbox"/>	oil ()	<input type="checkbox"/>	solid waste ()
<input checked="" type="checkbox"/>	electricity ()	<input type="checkbox"/>	hazardous waste ()
<input checked="" type="checkbox"/>	water (500 gal)	<input type="checkbox"/>	salable by-products -- list and note quantity
<input type="checkbox"/>	air ()		
<input type="checkbox"/>	organic solvents ()		
<input checked="" type="checkbox"/>	others -- list and note quantity: RDF—1 dry t Sulfuric Acid—0.85 t Sewage Sludge—1.5 dry t	<input checked="" type="checkbox"/>	others -- list and note quantity: Hydrolyzate—500 gal Lignin Residue—0.75 dry t Sewage Sludge Solids—1.0 dry t
<input type="checkbox"/>	None	<input type="checkbox"/>	None

B. PROPOSED PROJECT AND ITS ALTERNATIVES

1. List all alternative approaches considered to achieve the objectives described in A.11 and discuss the anticipated environmental effects of each. (Place the selected approach at the top of the list.)
 - a. Produce pilot quantity of bio-refinery lignin and sludge and cofire in a test boiler.
 - b. Produce demo quantity of lignin and sludge and cofire in full-scale TVA fossil plant (Would produce more hydrolyzate than needed in future and would require disposal.)
 - c. Mass burn MSW (results in emissions and hazardous ash)
2. Identify the environmental consequences of not implementing this project (e.g., emission increase).

Cofiring biorefinery lignin with coal may reduce harmful coal emissions. Processing RDF keeps MSW out of landfills, decreasing landfill requirements and associated methane and leachate problems. Processing of sewage sludge reduces the amount that is land applied. Mass burning of MSW can result in harmful emissions and hazardous ash.

C. PROJECT LOCATION

1. Provide a brief description of the project location (physical location, surrounding area, adjacent structures).

The processing of the RDF and sludge will be conducted on the TVA reservation in Colbert County in Muscle Shoals, AL. Surrounding buildings house fertilizer production pilot plants, maintenance facilities, fabrication shop, and test and maintenance buildings.
2. Attach a site plan or topographic map of the area that would be affected by the project and highlight (or otherwise identify) the specific location where the project would be performed.

Surrounding area will not be affected.

D. ENVIRONMENTAL IMPACTS

This section is designed to obtain information for objectively assessing the environmental impacts of a proposed project. NEPA procedures require evaluations of all possible effects (including: land use, energy requirements, natural or depletable resource use, historic and cultural resources, and pollutants) from proposed projects on the environment. Answer the following questions as completely as possible. Also, for "yes" or "no" questions, answer "yes" if there would be any effect, or if there may be an effect. (Failure to answer the questions completely could produce delays in project awards.)

1. Land Use

- a. Identify the location of the proposed project (i.e., city, county, state).

The biomass plant is part of the TVA Environmental Research Center which is located in Muscle Shoals of Colbert County in Alabama.
- b. Identify the total size of the facility and the portion would be used for the proposed project.

The TVA Research facilities are located on 625 acres. The Biomass plant is a two-story building about 60'x80'.
- c. Characterize present land use where the proposed project would be located.

<input type="checkbox"/> Urban	<input type="checkbox"/> Industrial
<input type="checkbox"/> Commercial	<input type="checkbox"/> Agricultural
<input type="checkbox"/> Suburban	<input type="checkbox"/> Rural
<input type="checkbox"/> Residential	<input checked="" type="checkbox"/> Research Facility
<input type="checkbox"/> Forest	<input type="checkbox"/> University Campus
<input type="checkbox"/> Other:	

d. Describe how land use would be affected by planned construction activities.

No construction would be anticipated for this project.

e. Describe how land use would be affected by operational activities associated with the proposed project.

No effect.

f. Describe any plans to reclaim and/or revegetate areas that would be affected by the proposed project.

No land areas would be affected None

g. Would changes resulting from the proposed project affect future uses of the site or surrounding areas?

No Yes (describe)

h. Would the proposed project affect any unique or unusual landforms (e.g., cliffs, waterfalls, etc.)?

No Yes (describe)

i. Would the proposed project affect existing or future recreational opportunities in the area?

No Yes (describe)

j. Would the proposed project be located in or near a national park or wilderness area?

No Yes (describe)

If the project would involve only laboratory or bench-scale research and be conducted within an existing building, proceed to Part D.8 (Atmospheric Conditions/Air Quality). If the project would be larger than bench-scale, continue with Part D.2.

2. Construction Activities and/or Operation

a. Describe the topography at the project site, including any significant landforms, etc.

Several structures and man-made ponds are part of the industrial complex. The biomass plant is located on level land.

b. Identify any transmission lines and/or pipelines that traverse the proposed site and clearly mark them on the site plan or topographic map.

None

c. Would the proposed project require the construction of settling ponds?

No Yes (describe, identify location, and estimate surface area disturbed)

c. Would the proposed project affect any existing body of water?

No Yes (describe)

d. Would the proposed project be located in or impact a floodplain?

No Yes (describe)

e. Would the proposed project be located on (or near) or impact wetlands?

No Yes (describe)

f. Would the proposed project be likely to cause erosion?

No Yes (describe)

g. Would any wetlands be impacted by the discharge of wastewater from project activities?

No Yes (describe)

h. Would any construction activities planned under the proposed project result in stream diversion?

No planned construction No Yes (describe)

3. Geological/Soil Conditions

a. Describe any instability (e.g., subsidence) in the topography near the proposed project.

The area is stable and is karst topography developed in the Tuscumbia limestone and Fort Payne chert.

b. Is there faulting in the vicinity of the proposed project area?

No Yes (describe)

c. Describe the soil in the vicinity of the proposed project in terms of productivity, presence of unique species, and susceptibility to erosion.

Silty sandy clay with various amounts of rock fragments. The area is covered in grass or limestone rock and is not susceptible to erosion.

c. Would any construction activities planned under the proposed project result in subsidence or changes in soil permeability/filtration?

No planned construction No Yes (describe)

4. Vegetation and Wildlife Resources

a. Describe the indigenous flora and fauna in the vicinity of the proposed project.

Flora includes fescue, wild flowers and brush. Fauna in a 1980 study showed sightings of 22 species of birds, 3 species of mammals, 4 reptiles, and one amphibian.

b. Identify any state- or Federal-listed endangered or threatened species in the vicinity of the proposed project.

None

c. Would any threatened or endangered species or their habitat be affected by the proposed project?

No Yes (describe)

d. Describe any impacts that construction would have on sensitive or unique habitats.

No planned construction No habitats None (discuss) Impact (describe)

e. Would any species or subspecies, not indigenous to the area, be introduced as a result of the project (e.g., introducing a new bacterial strain, as in microbial desulfurization projects)?

No Yes (describe)

f. Would any migratory corridors be impacted or disrupted by the proposed project?

No Yes (describe)

g. What regulatory authority maintains cognizance over indigenous wildlife species?

Alabama Department of Conservation and Natural Resources

5. Socioeconomic and Infrastructure Conditions

a. What is the population in the vicinity of the proposed project and in communities near the project site?

One-mile radius—about 1500 people; two-mile radius—about 10,000 people.

b. Describe employment and labor mix in the vicinity of the proposed project.

Research and industrial

c. Would changes (increases/decreases) in regional labor requirements be created by the proposed project?

No Yes (describe)

d. Would the proposed project alter present traffic patterns?

No Yes (describe)

e. Would the proposed project require new transportation access (roads, rail, etc.)?

No Yes (describe)

f. Would the proposed project create an increase in local energy usage?

No Yes (describe)

Minor increase during pilot plant operation due to operation of equipment and electric boiler to provide steam heating.

g. Would the proposed project increase local energy efficiency?

No Yes (describe)

h. Would the proposed project significantly impact local fuel or energy supply?

No Yes (describe)

i. Would any new transmission lines be required?

No Yes (describe location, voltage, and length of line)

6. Historical/Cultural Resources

a. Describe any historical or cultural places in the vicinity of the proposed project; note any sites included on the National Register of Historic Places.

None The following historical cultural places are located in the project area:
Some buildings associated with the former nitrate production plant are not to be disturbed per agreement with State Historic Preservation Officer.

b. Are there any known archeological sites in the vicinity of the proposed project?

No Yes (describe)

Not in overall plant area where the biomass facility is located.

c. Would construction or operational activities planned under the proposed project disturb any historical or cultural sites?

No planned construction No historic sites No impact (discuss) Yes (describe)

d. Has the State Historic Preservation Office been contacted with regard to this project?

No Yes (describe)

Facility to be used is an existing facility that was previously reviewed.

7. Visual Resources

a. Describe any scenic vistas or aesthetic landscaping in the vicinity of the proposed project?

None The following visual resources exist in the project area:

b. Would the proposed project interfere with visual resources (e.g., eliminate scenic views) or alter the present landscape?

No Yes (describe)

c. Would any facilities constructed under the proposed project contrast with the present landscape?

No construction planned No Yes (describe)

For all proposed projects involving laboratory, bench-scale, or larger research and development activities, respond to the following questions.

8. Atmospheric Conditions/Air Quality

a. Describe the local climate.

Moderate climate, fairly high humidity, temperature range 20-100°F.

b. Identify air quality conditions in the immediate vicinity of the proposed project with regard to attainment of National Ambient Air Quality Standards. (This information should be available from the county environmental agency.)

	<u>Attainment</u>	<u>Non-Attainment</u>
O ₃	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SO _x	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PM ₁₀	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CO	<input checked="" type="checkbox"/>	<input type="checkbox"/>
NO ₂	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Lead	<input checked="" type="checkbox"/>	<input type="checkbox"/>

c. Would the proposed project be in compliance with the National Emissions Standards for Hazardous Air Pollutants?

No (explain) Yes

d. Would the proposed project be classified as either a New Source or a major modification to an existing source?

No Yes (describe)

e. Would the proposed project be in compliance with the New Source Performance Standards?

Not applicable No (explain) Yes

f. Would the proposed project be subject to prevention of significant deterioration review?

Not applicable No (explain) Yes (describe)

g. What authority regulates air quality in the project area (identify Federal, state, and local authorities)?

State

h. Identify the contact person, address, and telephone number for each authority.

Gerald Griffies, Alabama Department of Environmental Management, P.O. Box 301463, Montgomery, AL 36130-1463
(334) 271-7861

i. When were these authorities contacted regarding the proposed project (if necessary)? Include results of discussions

Not contacted

Previous approval obtained for operation of the biomass pilot plant.

j. How does each regulator (authority) define a major source (e.g., greater than 100 ton/year thermal input of 250 MM Btu/hr)?

100 tons/yr

k. Would any types of emission control or particulate collection devices be used?

No Yes (describe, including collection efficiencies)

l. If no control devices are used, how would emissions be vented?

Fugitive emissions only--negligible

m. What types of air emissions, including fugitive emissions, would be anticipated from the proposed project, and what

None

	(Maximum per year)	(Total for project)
<input type="checkbox"/> SO _x	_____	_____
<input type="checkbox"/> NO _x	_____	_____
<input type="checkbox"/> PM ₁₀	_____	_____
<input type="checkbox"/> CO	_____	_____
<input type="checkbox"/> Lead	_____	_____
<input type="checkbox"/> H ₂ S	_____	_____
<input type="checkbox"/> organic solvent vapors or other volatile organic compounds -- list		
<input type="checkbox"/> hazardous air pollutants -- list		
<input checked="" type="checkbox"/> other - list : steam and negligible fugitive sulfuric acid		

would be the total quantity and maximum annual rate of emissions over the duration of the project?

n. Would the proposed project reduce the amount of air emissions in the area?

No Yes (describe)

o. Identify Federal, state, and local air quality regulations that govern emissions in the project area.

NA

9. Hydrologic Conditions/Water Quality

a. What is the closest body of water to the proposed project area and what is its distance from the project site? Indicate on the site plan, if provided

Central drainage ditch—1150 ft. inactive plant ash settling pond—1200 ft

b. What sources would supply potable and process water for the proposed project? Identify quantities consumed and uses. Identify the names of municipal or other water systems that would be used.

500 gal of process water from onsite water treatment plant.

c. Quantify the total amount of wastewater that would be generated by the proposed project.

<input checked="" type="checkbox"/>	None	(gallons)
<input type="checkbox"/>	non-contact cooling water	(gallons)
<input type="checkbox"/>	process water	(gallons)
<input type="checkbox"/>	sanitary and/or grey water	(gallons)
<input type="checkbox"/>	other -- describe	(gallons)

d. What would be the components of each type of wastewater (e.g., coal fines)?

Liquid stream is the product sugar stream, solid stream is product or cofiring with coal.

e. Identify the local treatment facility that would receive wastewater from the proposed project.

No discharges to local treatment facility.

If needed, discharges are sent to Sheffield POTW

f. Describe how wastewater would be collected and treated.

NA

g. What Federal, state, and local authorities regulate water quality in the proposed project area?

Alabama Department of Environmental Management

h. Identify the contact person, address, and telephone number for each authority.

Mike McCary, P.O. Box 301463, Montgomery, AL 36130-1463, (334) 271-7700

i. When were these authorities contacted regarding the proposed project (if necessary)? Include results of discussions.

Not contacted

j. Would any run-off or leachates be produced from storage piles or waste disposal sites?

No Yes (describe sources, nature of flow, and collection techniques)

k. Identify Federal, state, and local regulations that govern water effluents/water quality in the project area.

NA

l. Where would wastewater effluents from the proposed project be discharged?

NA

m. Would the proposed project be permitted to discharge effluents into an existing body of water?

No Yes (describe water use and effluent impact)

n. Would a new or modified National Pollutant Discharge Elimination System (NPDES) permit be required?

No Yes (describe)

o. Would the proposed project increase or decrease the surface area of an existing body of water?

No Yes (describe)

p. Would the proposed project adversely affect the quality or movement of groundwater?

No Yes (describe)

10. Solid and Hazardous Wastes

a. Describe in detail and provide the total quantity of all nonhazardous wastes that would be generated from the project. Solid wastes are defined in RCRA as any solid, liquid, semi-solid, or contained gaseous material that is discarded, has served its intended purpose, or is a manufacturing or mining by-product (40 CFR 260, Appendix I).

	<u>Quantity</u>
<input checked="" type="checkbox"/> None	
<input type="checkbox"/> municipal solid waste, i.e., paper, plastic, etc.	()
<input type="checkbox"/> coal or coal by-products	()
<input type="checkbox"/> other -- identify	()
_____	()
_____	()

b. Describe in detail and provide the total quantity of all hazardous wastes (40 CFR 261.3) that would be generated, used, or stored under this project.

None The following hazardous wastes would be generated, used, or stored:

c. How and where would solid waste disposal be accomplished?

on-site (identify and describe location) off-site (identify location and describe facility and treatment)

NA

d. How would wastes for disposal be transported?

NA

d. How many trips would be required for landfill disposal?

None Number of trips: _____

e. What volume of the landfill would the solid waste occupy?

None Volume: _____ cubic feet

g. What Federal, State, and local waste management authorities would have permit authority for the landfill?

Alabama Department of Environmental Management

h. Identify the contact person, address, and telephone number for each authority.

Gerald Hardy, same address as 9h

i. When were these authorities contacted regarding the proposed project (if necessary)? Include results of discussions.

Not contacted

j. How would hazardous or toxic products be collected and stored?

Hydrolyzate will be stored in barrels until further processed.

k. If hazardous/toxic solid wastes are subject to land disposal restrictions, how would collection, treatment, and disposal of the wastes be accomplished?

Not subject to RCRA land disposal restrictions. Subject to RCRA land disposal restrictions (explain):

l. If hazardous wastes would require off-site disposal, have arrangements been made with a certified TSD (Treatment, Storage, and Disposal) facility?

Not required Arrangements not yet made Arrangements made with a certified TSD facility (identify):

m. How would hazardous waste(s) be transported?

No hazardous wastes would be generated

n. What treatment/storage/disposal methods would be used for hazardous wastes?

No hazardous wastes would be generated Unknown Methods that would be used (describe):

11. Health/Safety Factors

a. Identify any hazardous or toxic substances that would be used in the proposed project.

None Hazardous or toxic substances that would be used (identify):

Sulfuric acid

b. What would be the likely impacts of these substances on human health and the environment?

If it came in contact with humans or the environment, it would require clean up.

c. Would there be any potential for workers to be exposed to toxic/hazardous chemicals or wastes?

No Yes (describe)

When handling the acid, protective gear will be worn. The potential for exposure is small.

d. Would there be any potential for exposure to extreme temperatures?

No Yes (describe)

Steam will be used. All steam heating is enclosed. The potential for exposure to extreme heat is small.

e. Would there be any special physical hazards associated with the project?

No Yes (describe)

f. Would personal protective equipment or clothing be required?

No Yes (describe)

Acid resistant suits, gloves, eye protection, and chemical respirator if handling acid

g. Does a worker safety program exist at the location of the proposed project?

No Yes (describe)

Safety meetings and training for plant operations

h. Would safety training be necessary for any laboratory, equipment, or processes involved with the project?

No Yes (describe)

i. Describe any increases in ambient noise levels from construction and operational activities.

None Increase in ambient noise level (describe)

j. Would project construction result in the removal of natural barriers that act as noise screens?

No construction planned No Yes (describe)

k. Identify the highest expected highest decibel level at the closest point of public access.

None

l. Identify the highest expected decibel level in the work area.

< 85 decibels

m. Would hearing protection be required for workers?

No Yes (describe)

12. Environmental Restoration and/or Waste Management

a. Would the proposed project include CERCLA removals or similar actions under RCRA or other authorities, meeting CERCLA cost/time limits?

No Yes (describe)

b. Would the proposed project include siting, construction, and operation of temporary pilot-scale waste collection and treatment facilities or pilot-scale waste stabilization and containment facilities?

No Yes (describe)

c. Would the proposed project involve improvements to environmental monitoring and control systems of an existing structure or building?

No Yes (describe)

d. Would the proposed project involve siting, construction, operation, and decommissioning of a facility for storing packaged hazardous waste for 90 days or less?

No Yes (describe)

Facility does operate a 90-day HWSF

E. REGULATORY COMPLIANCE

1. For the following laws, describe any new or modified permits, manifests, contacts, etc., that would be required for the proposed project.

a. Resource Conservation and Recovery Act (RCRA):

None Required (describe)

b. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):

None Required (describe)

c. Toxic Substance Control Act (TSCA):

None Required (describe)

d. Water Pollution Control Act (WPCA):

None Required (describe)

e. Clean Air Act (CAA):

None Required (describe)

f. Endangered Species Act (ESA):

None Required (describe)

g. Floodplains and Wetlands Regulations:

None Required (describe)

h. Fish and Wildlife Coordination Act (FWCA):

None Required (describe)

i. Farmland Protection Policy Act (FPPA):

None Required (describe)

j. National Historic Preservation Act (NHPA):

None Required (describe)

k. Coastal Zone Management Act (CZMA):

None Required (describe)

l. American Indian Religions Freedom Act (AIRFA):

None Required (describe)

m. Wild and Scenic Rivers Act (WSRA):

None Required (describe)

3. Identify any other environmental laws and regulations (Federal, state, and local) for which compliance would be necessary for this project, and describe the permits, manifests, and contacts that would be required.

F. DESCRIBE ANY ISSUES THAT WOULD GENERATE PUBLIC CONTROVERSY REGARDING THE PROPOSED PROJECT.

None

G. WOULD THE PROPOSED PROJECT PRODUCE ADDITIONAL DEVELOPMENT, OR ARE OTHER MAJOR DEVELOPMENTS PLANNED OR UNDERWAY, IN THE PROJECT AREA?

None Yes (describe)

H. SUMMARIZE THE SIGNIFICANT IMPACTS THAT WOULD RESULT FROM THE PROPOSED PROJECT.

None (provide supporting detail) Significant impacts (describe)

Only environmental consequence is minimal - sulfuric acid air emissions are negligible fugitive as identified above.

**FETC CATEGORICAL EXCLUSION -- APPENDIX A OR B OF SUBPART D
DOE NEPA IMPLEMENTING PROCEDURES; 10 CFR PART 1021**

Action or Project No. FY: 2000
 Title: Conceptual Design Assessment for CoFiring of BioRefinery Lignin Performance Period:
 Performing Organization: Location:

THE PROPOSED ACTION FALLS WITHIN THE FOLLOWING CLASS OF ACTIONS (CHECK ONE OR MORE):

General Administration Management

- A1 - Routine business actions
- A2 - Administrative contract amendments
- A4 - Interpretations rulings for existing regulations
- A5 - Regulatory interpretations without environmental effect
- A6 - Procedural rulemakings
- A7 - Transfer of property; use unchanged
- A8 - Award of technical support, M&O personal service contracts
- A9 - Info gathering, analysis, documentation, dissemination & training
- A10 - Reports on non-DOE legislation
- A11 - Technical advice and planning assistance
- A12 - Emergency Preparedness planning
- A13 - Procedural Orders, Notices, and Guidelines
- A14 - Approval of technical exchange arrangements
- A15 - International umbrella agreements for energy R&D

Facility Operations

- B1.2 - Training exercises and simulation
- B1.3 - Routine maintenance and custodial services
- B1.4 - Air conditioning installation for existing equipment
- B1.5 - Cooling water system improvements in existing structures
- B1.6 - Installation of runoff/spill control retention tanks & basins
- B1.7 - Communication system & data processing equipment acquisition, installation, operation, removal
- B1.8 - Screened water intake/outflow structure mods, within permits
- B1.11 - Fence installation, no adverse effect on wildlife or water flow
- B1.12 - Detonation burning of failed/damaged high explosives or propellants in designated areas, within permits
- B1.13 - Onsite pathway or short access road construction/acquisition
- B1.15 - Support building or structure, non-waste storage, const oper
- B1.16 - Removal of asbestos in accordance with regulations
- B1.17 - Removal of PCB items from aboveground structures
- B1.18 - Water supply well const/oper, from existing field, no degradation
- B1.21 - Noise abatement
- B1.22 - Building relocation to developed area/demolition/disposal
- B1.23 - Demolition disposal of buildings, equipment & structures
- B1.24 - Transfer, disposition, or acquisition of uncontaminated structures or equipment, environmental quality maintained
- B1.25 - Transfer, disposition, or acquisition of uncontaminated land for habitat preservation/wildlife management
- B1.26 - Small (< 250,000 GPD) WWT facility const/oper/decom
- B1.27 - Disconnection of utilities
- B1.28 - Placement of unused facilities in environmentally safe condition
- B1.29 - Small onsite const/demolition/waste disposal facility const/oper/decom
- B1.30 - Transfer transportation actions, quantities incidental to amounts at receiving site
- B1.31 - Relocation operation of machinery or equipment, similar use
- B1.32 - Traffic flow adjustments, existing roads

Safety and Health

- B2.1 - Modifications to enhance workplace habitability
- B2.2 - Installation improvement of building equipment instrumentation
- B2.3 - Installation of equipment for personnel safety and health
- B2.5 - Facility safety and environmental improvements, replacement or upgrade of facility components, no change in useful life

General Research

- B3.1 - Site characterization/environmental monitoring
- B3.3 - Research related to conservation of fish and wildlife
- B3.4 - Transport packaging tests for radioactive/hazardous material
- B3.6 - R&D or pilot facility construction operation/decommissioning
- B3.7 - New infill exploratory, experimental oil/gas/geothermal well construction/operation
- B3.8 - Outdoor ecological/environmental research in small area
- B3.9 - Certain CCT Demonstration activities, emissions unchanged
- B3.11 - Outdoor tests, experiments on materials and equipment components, no source, special nuclear, or byproduct materials

Conservation, Fossil, and Renewable Energy activities

- B5.1 - Actions to conserve energy, no indoor air quality degradation
- B5.2 - Modification to oil/gas/geothermal pumps and piping, no flow changes or air emission effects
- B5.3 - Modification (not expansion)/abandonment of oil storage access/brine injection/gas geothermal wells; no site closure
- B5.4 - Repair/replacement of pipeline sections within maintenance provisions of a Section 404 permit
- B5.5 - Short crude oil/gas/steam/geothermal pipeline const/oper within a single industrial complex/existing right-of-way
- B5.6 - Oil spill cleanup operations

Environmental Restoration/Waste Minimization

- B6.1 - Cleanup actions: small-scale, short-term (<\$5MM & 5 years)
- B6.2 - Siting/construction/operation of temporary pilot-scale waste collection/treatment/stabilization/containment facilities
- B6.3 - Environmental control system improvements in existing structures, recycle/release disposal within permitted facility
- B6.4 - Packaged hazardous waste storage facility const/oper/decom
- B6.5 - Const/oper/decom of onsite facility for characterizing/sorting or overpacking previously packaged waste (not high-level or spent nuclear fuel; no unpacking)
- B6.6 - Modification of facility for storing, packaging, or repacking waste (not high-level or spent nuclear fuel)
- B6.8 - Minor operational changes to minimize waste or reuse materials
- B6.9 - Small-scale, temporary measures to reduce contaminated GW migration
- B6.10 - Upgraded waste storage facility (< 50,000 ft³) for existing waste const/oper/decom

Other

- Specify category:

This Action would not (1) violate applicable ES&H requirements, (2) require siting of waste TSD or recovery facilities, (3) disturb hazardous substances (excluding naturally occurring petroleum and natural gas), thus producing uncontrolled or unpermitted releases, and (4) adversely affect environmentally sensitive resources. Furthermore, this Action (1) would not present any extraordinary circumstances such that the action might have a significant impact upon the human environment, (2) is not connected to other actions with potentially significant impacts, and (3) is not related to other actions with cumulatively significant impacts. Therefore, the proposed Action may be categorically excluded from further review.

Initiator: _____
 NEPA Compliance Officer: _____

Date: _____
 Date: _____