Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
					$0
					$0
					$0
		Exemption 4			
	Sub-total				

Vendor Name/Organization	Product or Service, Purpose/Need and Basis of Cost (Provide additional support at bottom of page as needed)	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
EXAMPLE ONLY!!! ABC Corp.	Vendor for developing custom robotics to perform lens inspection, alignment, and placement (Task 4). Required for expanding CPV module mfg. capacity. Cost is from competitive quotes.	$32,900	$86,500		$119,400
					$0
					$0
					$0
					$0
					$0
					$0
					$0
		$0	$0	$0	$0

FFRDC Name/Organization	Purpose	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
					$0
					$0
					$0
		$0	$0	$0	$0

Total Contractual		Exemption 4			

AdditionalExplanations/Comments (as necessary)

f. Contractual

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total

f. Contractual

g. Construction

PLEASE READ!!!

Construction, for the purpose of budgeting, is defined as all types of work done on a particular building, including erecting, altering, or remodeling. Construction conducted by the award recipient is entered on this page. Any construction work that is performed by a vendor or subrecipient to the award recipient should be entered under f. Contractual.

List all proposed construction below, providing a basis of cost such as engineering estimates, prior construction, etc., and briefly justify its need as it applies to the Statement of Project Objectives.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Overall description of construction actiivities:

Example Only!!! - Build wind turbine platform

General Description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Three days of excavation for platform site EXAMPLE ONLY!!!	$28,000	Engineering estimate	Site must be prepared for construction of platform.
Budget Period 1 Total	$0		
Budget Period 2			
Budget Period 2 Total	$0		

General Description	Cost	Basis of Cost	Justification of need
Budget Period 3			
Budget Period 3 Total	$0		
PROJECT TOTAL	$0		

Additional Explanations/Comments (as necessary)

h. Other Direct Costs

PLEASE READ!!!

Other direct costs are direct cost items required for the project which do not fit clearly into other categories, and are not included in the indirect pool for which the indirect rate is being applied to this project. Examples are meeting costs, postage, couriers or express mail, telephone/fax costs, printing costs, etc.

Basis of cost are items such as vendor quotes, prior purchases of similar or like items, published price list, etc.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

General description	Cost	Basis of Cost	Justification of need
Budget Period 1			
EXAMPLE ONLY!!! Grad student tuition	$16,000	Established UCD costs	Support of graduate students working on project
Budget Period 1 Total	$0		
Budget Period 2			
Budget Period 2 Total	$0		
Budget Period 3			
Budget Period 3 Total	$0		
PROJECT TOTAL	**$0**		

Additional Explanations/Comments (as necessary)

i. Indirect Costs

	Budget Period 1	Budget Period 2	Budget Period 3	Total
Rate applied:	Exemption 4			
Total indirect costs requested:				

A federally approved indirect rate agreement, or rate proposed supported and agreed upon by DOE for estimating purposes is required if reimbursement of fringe benfits is requested. Please check (X) one of the options below and provide the requested information if it has not already been provided as requested, or has changed. Calculate the indirect rate dollars and enter the total in the Section B., line 6.j. (Indirect Charges) of form SF 424A.

X **There is a federally approved indirect rate agreement. A copy is provided with this application and will be provided electronically to the Contracting Officer for this project.**
(When this option is selected, a presentation of the budget that demonstrates the application of the approved rate, to arrive at the proposed indirect charges proposed should also be provided.)

____ **There is no current, federally-approved indirect rate agreement.**
(When this option is checked, the entity preparing this form shall submit an indirect cost rate proposal in the format provided at the following website, or in a format that provides the same level of information and which supports the rate(s) being proposed for use in estimating the project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal.)

Additional Explanations/Comments (as necessary)

Cost Share

PLEASE READ!!!

A detailed presentation of the cash or cash value of all cost share proposed for the project must be provided in the table below. Identify the source & amount of each item of cost share proposed by the award recipient and each sub-recipient or vendor. Letters of committment must be submitted for all third party cost share (other than award recipient).

Note that "cost-share" is not limited to cash investment. Other items that may be assigned value in a budget as incurred as part of the project budget and necessary to performance of the project, may be considered as cost share, such as: contribution of services or property; donated, purchased or existing equipment; buildings or land; donated, purchased or existing supplies; and/or unrecovered personnel, fringe benefits and indirect costs, etc. For each cost share contribution identified as other than cash, identify the item and describe how the value of the cost share contribution was calculated.

Funds from other Federal sources MAY NOT be counted as cost share. **This prohibition includes FFRDC sub-recipients. Non-Federal sources include private, state or local Government, or any source not originally derived from Federal funds. Documentation of cost sharing commitments must be provided, if not already provided with the original application and they have not changed since its submission.**

Fee or profit will not be paid to the award recipients or subrecipients of financial assistance awards. Additionally, foregone fee or profit by the applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined in accordance with the applicable cost principles prescribed in 10 CFR 600.127, 10 CFR 600.222 or 10 CFR 600.317. Also see 10 CFR 600.318 relative to profit or fee.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
ABC Company **EXAMPLE ONLY!!!**	Cash	Project partner ABC Company will provide 40 PV modules for product development at 50% off the of the retail price of $680	$13,600			**$13,600**
						$0
						$0
						$0
						$0
						$0
						$0

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
						$0
						$0
						$0
						$0
		Totals	$0	$0	$0	$0

Total Project Cost: $Exemption 4

Cost Share Percent of Award: Exemption **%**

Additional Explanations/Comments (as necessary)

Applicant Name: **Membrane Technology and Research, Inc.** Award Number: **YEAR ONE**

Budget Information - Non Construction Programs

OMB Approval No. 0348-0044

Section A - Budget Summary

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. DE - FOA - 0000096	81.087			$148,854	Exemption 4	
2.						
3.						
4.						
5. Totals		$0	$0	$148,854		

Section B - Budget Categories

6. Object Class Categories	Grant Program, Function or Activity				Total (5)
	(1) 81.087	(2)	(3)	(4)	
a. Personnel	Exemption 4				
b. Fringe Benefits					
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual					
g. Construction					
h. Other					
i. Total Direct Charges (sum of 6a-6h)					
j. Indirect Charges					
k. **Totals** (sum of 6i-6j)					
7. Program Income	$0				$0

Section C - Non-Federal Resources

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) **Totals**
8. DE - FOA - 0000096	$37,214	Exemption 4		
9.				
10.				
11.				
12. **Total** (sum of lines 8 - 11)	$37,214			

Section D - Forecasted Cash Needs

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th quarter
13. Federal	$148,854	$37,214	$37,213	$37,214	$37,213
14. Non-Federal	Exemption 4				
15. **Total** (sum of lines 13 and 14)					

Section E - Budget Estimates of Federal Funds Needed for Balance of the Project

	Future Funding Periods (Years)			
(a) Grant Program	(b) First	(c) Second	(d) Third	(e) Fourth
16. DE - FOA - 0000096	$615,304	$114,382	$113,508	$0
17.				
18.				
19.				
20. **Total** (sum of lines 16-19)	$615,304	$114,382	$113,508	$0

Section F - Other Budget Information

21. Direct Charges	22. Indirect Charges
	Provisional rate, Exempt % of direct labor (6a. Personnel), includes all allowable indirect costs.

23. Remarks

LINE B.6.a. PERSONNEL.

YEAR ONE/PHASE I:	Estimated	Rate/hour	Estimated
Exemption 4			

YEAR TWO/PHASE II:	Estimated	Rate/hour	Estimated
Exemption 4			

YEAR THREE/PHASE III:	Estimated	Rate/hour	Estimated
Exemption 4			

BUDGET EXPLANATION, PAGE 2 OF 3

YEAR FOUR/PHASE III:	Estimated	Rate/hour	Estimated
Exemption 4			

[NOTES: HOURLY RATES USED ARE BASED ON ACTUAL CURRENT SALARIES FOR INDIVIDUALS (OR AVERAGES OF GROUPS OF INDIVIDUALS) ADJUSTED TO MEET EXPECTED PROJECT START DATE (OCTOBER 2009). SUBSEQUENT YEAR ESTIMATES ARE THE RESULT OF APPLYING AN ESCALATION FACTOR OF 4% TO FIRST-YEAR RATES. FRINGE BENEFITS ARE INCLUDED IN LABOR OVERHEAD, J.)]

LINE B.6.c. TRAVEL.

	Year 1/	Year 2/	Year 3/	Year 4/	Subtotal,
Exemption 4					

[NOTE: AIR FARES ARE BASED ON CURRENT QUOTES FOR UNRESTRICTED ECONOMY FARE FROM SAN FRANCISCO AIRPORT. GROUND TRANSPORTATION INCLUDES COMPACT RENTAL CAR AND TRANSPORTATION TO AND FROM AIRPORT. PER DIEM AMOUNTS ARE BASED ON CONUS RATES IN EFFECT 1 JANUARY 2009.]

LINE B.6.d. EQUIPMENT.

	Year 1/	Year 2/	Year 3/	Year 4/	Subtotal,
Exemption 4					

[NOTE: EQUIPMENT COSTS ARE ENGINEER'S ESTIMATES, BASED ON PREVIOUS EXPERIENCE AND/OR VENDOR QUOTES.]

LINE B.6.e. SUPPLIES.

	Year 1/	Year 2/	Year 3/	Year 4/	Subtotal,
Exemption 4					

[NOTE: MATERIAL AND SUPPLIES COSTS ARE ENGINEER'S ESTIMATES, BASED ON PREVIOUS EXPERIENCE AND/OR VENDOR QUOTES.]

LINE B.6.h. OTHER:

	Year 1/	Year 2/	Year 3/	Year 4/	Subtotal,
Exemption 4					

LINE B.6.j. INDIRECT COSTS.

An indirect cost rate of Exemption % (as overhead applied to direct labor, net of fringe benefits) is requested for the duration of the project. This single rate includes all allowable indirect costs, including fringe benefits, G&A and B&P/IR&D. MTR's most recently DCAA-audited indirect cost rate (2005) was Exemption 4 % (audited by Ms. Elizabeth Sanchez, Western Region, Peninsula Branch, 650-917-5005); claimed rates for subsequent years 2006 and 2007 are Exemption 4 %, respectively. A provisional billing rate agreement for Exemption % is currently in effect with DCAA (Reference: 4281/820.5/09-V-0031).

COST SHARE.

The proposed cost share of $Exemption 4 of the total cost of the subcontract, will come from internal funds, primarily to support labor and overhead costs.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RESEARCH AND DEVELOPMENT
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY
CINCINNATI, OHIO 45268

April 23, 2009

Craig R. Smith, M.D.
Executive Vice President, Chief Operating Officer
Algenol Biofuels, Inc.

Dr. Wood,

The purpose of this letter is to indicate our interest in supporting the project "**Demonstration of Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol From Algae**" submitted as a proposal to the U.S. Department of Energy under Funding Opportunity DE-PS36-09GO99038 - Demonstration of Integrated Biorefinery Operations. As you know, the U.S. Environmental Protection Agency's National Risk Management Research Laboratory (USEPA-NRMRL) has an active in-house research program in the conversion of biomass to alcohol-based biofuels with an emphasis on the efficient recovery of the alcohols from dilute bioreactor media and the dehydration of the alcohols to meet product specifications. We believe our background in efficient alcohol-water separation systems will help the Algenol-led team successfully develop their algae-based ethanol production platform.

Our separations research group has a long history of supporting biofuels projects, including collaborating with industrial partners on projects funded by the U.S. Department of Agriculture, U.S. Army, and the U.S. Department of Energy. We are currently collaborating through a cooperative research and development agreement (CRADA) with a membrane separation company and member of your project team, Membrane Technology and Research, Inc. (MTR), to develop highly efficient membrane-based and hybrid distillation-membrane processes for recovery of biofuel alcohols from dilute fermentation broths. During the proposed project, we will provide technical support and facilities to the Algenol-led team that will enable: the identification and implementation of efficient separation processes; the evaluation of such separation processes in our facilities or other project locations; access to our extensive know-how related to design and performance of membrane-based and other innovative separation processes; and the identification of scale-up and life cycle issues related to the algae-based process.

In order to assist your efforts, we are prepared to obligate two members of our separations group, Dr. Leland Vane and Mr. Franklin Alvarez, to the project on a part-time basis. Our efforts will be provided as no-cost contributions to the project. This participation will take the form of developing and analyzing process concepts, performing process simulations and system modeling, evaluating process integration options, establishing experimental designs, and carrying out performance verification tests of separation options. We have bench- and pilot-scale membrane separation units which will be made available for performance verification tests.

We look forward to the opportunity to partner with Algenol and the other collaborators on this project.

Sincerely,

Douglas Young

Douglas Young, Ph.D.
Chief, Clean Processes Branch
Sustainable Technology Division

The Dow Chemical Company
Midland, Michigan 48674

June 16, 2009

Dr. Craig R. Smith
Chief Operating Officer
Algenol Biofuels Inc.
28100 Bonita Grande Drive, Suite 200
Bonita Springs, Florida 34135

Dear Dr. Smith:

The Dow Chemical Company (Dow), with annual sales of $58 billion and 46,000 employees worldwide, is a diversified chemical company that combines the power of science and technology with the "Human Element" to constantly improve what is essential to human progress. Dow delivers a broad range of products and services to customers in around 160 countries, connecting chemistry and innovation with the principles of sustainability to help provide everything from fresh water, food and pharmaceuticals to paints, packaging and personal care products.

Dow confirms its proposal to cooperate with Algenol Biofuels, Inc. (Algenol), by
Exemption 4

per year. Dow would be pleased for the opportunity to be able to work closely with Algenol, Principle Investigator, as described in the proposal entitled "Demonstration of Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol from Algae" submitted to the US Department of Energy in response to the Funding Opportunity Announcement DE-FOA-0000096.

This project complements Dow's efforts in Sustainable Chemistry as stated in our publicly announced 2015 goals and is supported by our Polyethylene and Hydrocarbon and Energy Businesses. Steven Gluck, one of Dow's top experts in analytical chemistry, water treatment and algae technology, will lead the Dow effort.

Dow has dedicated significant resources in research for both alternative energy and minimizing the carbon footprint of manufacturing. Recent announcements include: a projected commercial launch of Building Integrated Photovoltaics for the home (The development of this technology is supported in part by a cooperative agreement with the US Department of Energy Solar America Initiative), an agreement with Alstom to build a pilot facility in West Virginia to capture CO_2 from a coal fired power plant, a joint project with NREL to focus on improving mixed alcohol catalysts for producing ethanol and AIRSTONE™ Systems for Wind Energy. Dow currently is expanding the products

made from renewable resources including RENUVA™ renewable resource technology polyols and the first integrated sugarcane derived ethanol to polyethylene world scale commodity production facility. In addition, Dow has proposed a comprehensive national energy security plan that stresses greater conservation, more use of domestic energy sources, development of natural gas and nuclear power and accelerated development of alternative energy with a reduction in greenhouse gases.

Dow proposes to support this program by providing research, engineering and related
Exemption 4

Dow's participation in this collaboration would be, of course, pursuant to finalization and execution of relevant written contracts or subcontracts governing such collaboration that are acceptable to Dow. The finalization and execution of any such contracts and subcontracts shall be at Dow's sole discretion, and is subject to approval by requisite management or executive leadership.

We look forward to the opportunity to further advance our collaboration with Algenol.

Sincerely,

William F. Banholzer
Executive Vice President and Chief Technology Officer

MTR Membrane Technology & Research

May 5, 2009

Algenol Biofuels Inc.
Craig R. Smith, M.D.
Executive Vice President, Chief Operating Officer
28100 Bonita Grande Drive, Suite 200
Bonita Springs FL 34135

Re: Commitment Letter: "Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol From Algae"

Dear Dr. Smith,

The purpose of this letter is to confirm our support for and participation in the project **"Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol From Algae,"** which will be submitted as a proposal to the US Department of Energy under Funding Opportunity DE-PS36-09GO99038.

As you know, MTR has an ongoing development program in the area of membrane permeation applied to the separation of ethanol/water mixtures. The technology we are developing, called BioSep™, has the promise of reducing the energy required for the ethanol/water separation by a factor of two compared to conventional distillation. This energy savings could be a significant factor in reducing the carbon footprint of ethanol produced by the Algenol process. We believe our background will help the Algenol-led team to successfully complete the project.

REDACTED
EXEMPTION 4

We look forward to working with you and the distinguished team that Algenol has assembled to successfully complete the goals of this project and prepare the technology for commercialization.

Sincerely,

Richard W. Baker, Ph.D.
Principal Scientist
Membrane Technology and Research, Inc.

1360 Willow Road, Menlo Park, CA 94025, USA Phone: (650)328-2228 http://www.mtrinc.com

PMC-EF2a
(2/04/02)

S. DEPARTMENT OF ENERGY
EE PROJECT MANAGEMENT CEN
NEPA DETERMINATION

RECIPIENT: Algenol Biofuels Inc. **STATE:** FL

PROJECT TITLE : Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol from Hybrid Algae

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000096	DE-EE0002867	GFO-10-287	0

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

Rational for determination:

DOE is proposing to provide federal funding to Algenol for an Integrated Biorefinery pilot-scale project. The NEPA determination applies to Budget Period 1 (BP1) only. Additional NEPA review is required prior to beginning any Budget Period 2 activities.

During BP I of this Integrated Biorefinery pilot-scale project, Algenol's principle activities will include:

- appointing the joint project team;
- R&D related to organism development;
- R&D related to developing the flexible film photobioreactor;
- preliminary process engineering;
- architect search, site selection, construction planning, employee recruiting, and SOP development;
- NEPA review for budget period 2 activities;
- regulatory submissions and approval;
- a Phase I stage gate review.

CX A9 applies to all administrative tasks. CX B3.6 applies to the R&D activities.

All necessary regulatory approvals have been obtained by Algenol to complete the transgenic R&D activities.

NEPA PROVISION

DOE has made a conditional NEPA determination for this award, and funding for certain tasks under this award is contingent upon the final NEPA determination.

Insert the following language in the award:

You are restricted from taking any action using federal funds, which would have an adverse affect on the environment or limit the choice of reasonable alternatives prior to DOE/NNSA providing either a NEPA clearance or a final NEPA decision regarding the project.

Prohibited actions include:

This NEPA determination applies to Budget Period 1 only. Budget Period 1 includes administrative tasks and some research and development activities. This NEPA determination does NOTapply to any Budget Period 2 activites. Additional NEPA review is required prior to beginning any Budget Period 2 activities.

This restriction does not preclude you from:

Budget Period 1.

If you move forward with activities that are not authorized for federal funding by the DOE Contracting Officer in advance of the final NEPA decision, you are doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

None Given.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Kristin Kerwin Date: 3/29/2010
NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____
Field Office Manager

EF2

U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER

NEPA REVIEW AND RECOMMENDATIONS
(To Be Completed By DOE Project Officer)

PART I. PROJECT INFORMATION

Project Title: Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol from Hybrid Algae **State:** FL

Recipient: Algenol Biofuels Inc.

Funding Opportunity Announcement Number	Procurement Instrument Number	CID Number
DE-FOA-0000096	DE-EE0002867	0

1. Is this an ongoing project? Yes: ☐ No: ☑ If no, skip to part II.

Original NEPA Determination Category Original NEPA Control Number

2. Has there been a change in the original scope, environmental conditions, and/or determination? Yes: ☐ No: ☑
If yes, please describe the nature of the change.

PART II. RECOMMENDED CATEGORY OF EVIRONMENTAL REVIEW

Please provide answers to the following questions and indicate your recommended category of environmental review. If you need assistance, please contact Steve Blazek (Contact information listed below)

1. Please describe the intended use of DOE and cost share funding associated with this award.
During phase I of this Integrated Biorefinery pilot-scale project, Algenol's principle activities will include appointing the joint project team (A.1), R&D related to organism development (A.2), R&D related to developing the flexible film photobioreactor (A.3), preliminary process engineering (A.4), architect search, site selection, construction planning, employee recruiting, and SOP development (A.5), NEPA review (A.6), regulatory submissions and approval (A.7), and a phase I gate review (A.8).
(A.1) Appointing the project management team at Algenol and Dow will have no environmental impact at all; this is a strictly an administrative task.
(A.2) The R&D activities relating to organism development will take place at the Algenol Baltimore, MD facility and at the Algenol Palm Beach, Florida facility; a single R&D questionnaire has been submitted for these facilities. Specifically, these activities will include: further characterization of the cyanobacterial strains that are producing the highest rates of enthanogenesis, demonstration that the selected strain can grow in salt water at various scales (500L and 4500L), determination of optimum nutritional requirements at scale, and maintaining ethanol productivity and culture longevity. All of the work related to these activities will be conducted at the Algenol facilities that have standard operating procedures in place for this type of work.
(A.3) The RD activities related to developing the flexible film photobioreactor will take place at Dow and Algenol facilities. Dow and Algenol will work together to improve performance characteristics of the flexible film bioreactor material and the bioreactor end caps. Most of this research will focus on developing the manufacturing specifications for the film, coatings, and the blow mold for the end caps, as well as specific manufacturing techniques for certain elements of the photobioreactor and the plastic to be used to make the end caps. This work will also include design specifications for the mixing and power systems, as well as the specifications for the plastic to be used to make any other parts needed for the photobioreactor.
(A.4) The process engineering activities that will be performed during phase I of this project will take place at Georgia Tech, NREL, and Algenol. The activities will include development of preliminary specifications for the various upstream and downstream systems and Standard Operating Procedures (SOPs). Upstream processes are processes used to treat and supply water, CO2, nutrients and electricity to the photobioreactor to make ethanol. This work will include, for example, testing of several new materials to be used as piping for the photobioreactor systems. In addition, this work will include the development of the SOPs for the delivery and distribution of this water to all photobioreactor systems. During phase I Georgia Tech will be working on R&D related to the CO2 and oxygen-selective membrane-based separation processes and NREL will be performing an analysis of bench-scale growth of four cyanobacterial strains using simulated flue gas.
Downstream processes are all processes that take place after the ethanol-containing medium, condensate or vapor is removed from the photobioreactor for further enrichment of the ethanol concentration. Downstream processes include photobioreactor condensate pumping and storage and Vapor Compression Steam Stripping (VCSS) unit for ethanol purification. Work during phase I includes delivering preliminary design criteria and manufacturing technicques for construction of both the vapor compression unit and the steam stripper. In addition, R&D will be continued to design a central dehydration plant that will be used produce 10 to 100 million gal/y of dry ethanol.
(A.5) Architect search, site selection, construction planning, employee recruiting, and SOP development will all take place during phase I. As these are all administrative and desk-related tasks, they will have no adverse environmental impact.
(A.6)The NEPA review process is also an administrative task and should have no environmental impact.
(A.7) The regulatory submissions task is also an administrative task and should have no environmental impact. See question #2 for relevant information regarding the applicable phase I regulatory submissions.
(A.8 and A.9) The life-cycle analysis phase I update and the stage gate review are also administrative tasks and should have no environmental impact.

2. Please list any applicable **existing** documentation (i.e. programmatic EAs, technical studies, state level environmental reviews). For each, please list the type of document, and its title, document number (if applicable), and date of publication.

An APHIS determination was mad November 4, 2009 that the specified that th nobacterial strains being used in phase I of this project (Synechocystis and Synechococcus) are non-pathogenic for plants, animal and humans and are not plant pests under the Plant Protection Act, and therefore are not regulated articles under 7 CFR Part 340. A copy of AHIS' response letter has been included herewith as a supporting document.
In November 2009, the Environmental Protection Agency confirmed that, based on the containment measures adopted in Algenol's R&D activities in compliance with 40 CFR 725.234, there is no need to submit a TSCA application for the research to be conducted under those containment measures, which includes the research at the Florida facility and the planned integrated biorefinery in Freeport, TX.
On February 23, 2010 the Transgenic Aquatic Species Task force, a division of the Florida Department of Agriculture and Consumer Services, issued written authority for Algenol to use their hybrid algae for research and development purposes in order to investigate biofuel production at the Loxahatchee facility. A copy of the task force's written authorization has been uploaded as a supporting document.

3. Concerns or Issues

4. Is there enough information available to make a final NEPA determination for the entire award at this time? Yes: ☐ No: ☑
If no, please describe what additional information will be needed prior to making a final NEPA determination.

5. CX, EA, EIS Category
Appendix and Number

B3.6 Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).

PART III. CONTACT INFORMATION

DOE Project Officer: Sterner, Christy **Date:** 2/26/2010 **EERE Office:** Golden Field Office

Email: christy.sterner@go.doe.gov **Phone:** 303-275-4720 **Fax:** 303-275-4753

PMC-
EF1

(2/06/02)

U.S. DEPARTMENT OF ENERGY

EERE PROJECT MANAGEMENT CENTER

ENVIRONMENTAL CHECKLIST
(To Be Completed by Potential Recipient)

PART I: General Information **DOE Project Officer:** Christy Sterner **Date:** 1/4/2010

Project Title: Pilot-Scale Integrated Biorefinery Operations for Producing Ethanol from Hybrid Algae **ST:** FL

Organization Name: Algenol Biofuels Inc.

Solicitation Number: DE-FOA-0000096 Award No: DE-EE0002867

1. Please describe the intended use of DOE funding in your proposed project. For example, would the funding be applied to the entire project or only support a phase of the project? Describe the activity as specifically as possible, i.e. planning, feasibility study, design, data analysis, education or outreach activities, construction, capital purchase and/or equipment installation or modification. If the project involves construction, also describe the operation of the completed facility/equipment.

This EF1 addresses the tasks associated with completing Phase 1 of Algenol Biofuels' Integrated Biorefinery Project ("Phase 1"), which will include the following tasks:

REDACTED
EXEMPTION 4

REDACTED
EXEMPTION 4

2. Does any part of your project require review and/or permitting by any other federal, state, regional, local, environmental, or regulatory agency? ☑ Yes ☐ No

3. Has any review (e.g., NEPA documentation, permits, agency consultations) been completed?
☑ Yes ☐ No If yes, is a finding or report available and how can a copy be obtained?

Under the 1986 Coordinated Framework for Regulation of Biotechnology, either the U.S. Department of Agriculture (USDA) or the U.S. Environmental Protection Agency (EPA) would be responsible for regulating the use and management of our hybrid algae. Also, the state of Florida requires that our facility in Loxahatchee, FL satisfy certain permitting requirements as an aquaculture facility.

On March 3, 2009 Algenol submitted a letter and other materials to the Biotechnology Regulatory Services of the Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture, with detailed information and descriptions regarding various microorganisms and transformation and the intended use of the same. After reviewing the information, APHIS determined on November 4, 2009 that the specified strains of Cyanobacteria are non-pathogenic for plants, animal and humans and are not plant pests under the Plant Protection Act, and therefore are not regulated articles under 7 CFR Part 340. A copy of AHIS' response letter has been included herewith as a supporting document.

Algenol voluntarily contacted the Environmental Protection Agency in June 2009 to confirm the status of R&D work under the Toxic Substances Control Act (TSCA) and implementing EPA regulation for microorganisms. After reviewing detailed information provided by Algenol, the EPA confirmed in November 2009 that, based on the containment measures adopted in our R&D activities in compliance with 40 CFR 725.234, there is no need to submit a TSCA application for the research to be conducted under those containment measures, which includes the research at our Florida facility and the planned integrated biorefinery in Freeport, TX.

The Loxahatchee facility has been licensed by the State of Florida as an aquaculture facility for nearly two years, is operated as a zero discharge facility, and at all times has operated in compliance with Florida's Aquaculture Best Management Practices. Since establishing our Loxahatchee facility, Algenol has had on-going communication with the Florida Department of Aquaculture to ensure compliance with all relevant rules and regulations. Most recently, we submitted materials, including the favorable responses from APHIS and the EPA, in support of our application to culture, for R&D purposes, hybrid algae. On February 23, 2010 the Transgenic Aquatic Species Task force, a division of the Florida Department of Agriculture and Consumer Services, issued written authority for Algenol to use our hybrid algae for research and development purposes

in order to investigate biofuel p[illegible]uction. A copy of the task force's written [illegible]orization has been included herewith as a supporting document.

Under DOE's own NEPA implementation regulations, Algenol's activities should also be categorically excluded from additional NEPA environmental review. Based on the absence of any significant risk to health, safety or the environment, this pilot project should be treated in a manner similar to those described in Appendix B to 10 CFR Subpart D of Part 1021, including categorical exclusions applicable to site characterization, monitoring and general research, such as B3.6 "Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects"; "Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis; small-scale research and development projects; and small-scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions. Construction (or modification) will be within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible.); or B3.12 "Siting, construction (or modification), operation, and decommissioning of microbiological and biomedical diagnostic, treatment and research facilities...".

4. Is the proposed project part of a larger scope of work? ☑ Yes ☐ No If yes, please describe.

Yes, this is a three phase project that requires establishing and meeting specific gate criteria before proceeding to subsequent phases of the project. The subsequent phases of this project are:

REDACTED
EXEMPTION 4

Do you anticipate requesting additional federal funding for subsequent phases of this project?

☑ Yes ☐ No If yes, please describe.

The DOE has awarded Algenol a $25,000,000 grant for the entire project, contingent upon certain cost sharing stipulations and other terms and conditions that will be evaluated throughout the project. Phase 1 will utilize a portion of the overall $25,000,000 and, upon passing through the gate for the subsequent phases, Algenol will request the additional funds consistent with our budget and other project management documents.

5. Does the scope of your project **only** involve one or more of the following:

- ☐ Information gathering such as literature surveys, inventories, audits,
- ☐ Data analysis including computer modeling,
- ☐ Document preparation such as design, feasibility studies, analytical energy supply and demand studies, or
- ☐ Information dissemination, including document mailings, publication, distribution, training, conferences, and informational programs.

Preparer:	Phone:	Email:
Patrick Ahlm	239-498-2000	pat.ahlm@algenolbiofuels.com
Business Contact:	Phone:	Email:
Craig R. Smith, M.D.	239-498-2000	pat.ahlm@algenolbiofuels.com

PART II: Environmental Considerations

Section A Conditions or special areas are present, required, or could be affected by your project:

1. Clearing or Excavation

N/A

2. Dredge and/or Fill.

N/A

3. New or Modified Federal/State Permits And/or Requests for Exemptions

N/A

7. Non-Attainment Areas

N/A

Section B. Would your project use, disturb, or produce any chemicals or biological substances? (i.e., pesticides, industrial process, fuels, lubricants, bacteria)

10. Biological Materials.

☐ Permit Required Quantity: Permit Type:

Specific nature of use:

REDACTED
EXEMPTION 4

Section C. Would your project require or produce any radiological materials?

PMC 111.1
(01/08)

R&D Laboratory Environmental Impact Questions

In order to receive Federal financial assistance, proposed projects must be reviewed under the National Environmental Policy Act (NEPA) for potential environmental impacts. For research and development activities, the following questions must be sufficiently answered before the review can be completed. Please add as much detail as possible.

1. Please provide and describe the location of the facility or facilities where lab work will take place.

Algenol
Bea
an

REDACTED
EXEMPTION 4

2. What type of <u>safety protocols</u> are in place in the areas where work will take place? Who monitors these? Internally and externally? Are the safety protocols subject to OSHA or other standards? Please describe all safety and environmental protocols and standards related to this project.

Currently lab and facility managers at each location are responsible for implementing and ensuring compliance with safety protocols that have been implemented. Included in the company's hiring plan is an EH&S director who will be tasked with establishing more robust safety procedures as the company expands. Current lab and facility managers have implemented safety protocols in line with OSHA's Laboratory Safety Standards, requirements for preparation of Chemical Hygiene Plans, Hazard Communication Standard, Occupational

Exposure to Hazardous Chemicals in Laboratories Standard and limits on airborne contaminants such as carbon dioxide and ethanol. Safety procedures in place also conform standard operating procedures to OSHA's Process Safety Management standard in order to prevent or minimize the consequences stemming from a release of photobioreactor contents.

3. How are the gases, chemicals, heavy metals, etc., handled, stored and disposed?

There will be no heavy metals used or generated. Gases and chemicals will be handled and stored in accordance with the protocols detailed in question 1. Disposal, when necessary, is handled by a company specializing in laboratory services such as responsible disposal of sensitive materials and waste.

4. What type of safety equipment is in place for the facilities (i.e. fume hoods, alarms, scrubbers, etc...)?

During design and construction of each location was completed with the input of experienced lab managers in order to ensure all necessary safely equipment was installed. Regular EH&S reviews are conducted to examine whether additional safety equipment is necessary. Fire monitors, sprinklers, fire extinguishers, fume hoods where necessary, safety shower/eye wash stations and other standard safety equipment consistent with the safety protocols detailed in question 1 are in place at each location.

5. What permits are in place for the facility for this type of work? Please list.

Algenol has received the necessary approvals from federal agencies, as detailed in question 10 below, for use of our hybrid algae at each location. The Florida facility has been licensed as an aquaculture facility for two years by the state of Florida and recently received authorization. As well, On February 23, 2010 the Transgenic Aquatic Species Task force, a division of the Florida Department of Agriculture and Consumer Services, issued written authority for Algenol to use our hybrid algae for research and development purposes in order to investigate biofuel production.

6. What permits are needed or will be acquired for this type of work? Please list.

All necessary permits have been obtained for the work to be done at each of these locations during phase 1 of the project.

7. How is liquid effluent handled and discharged?

There is no liquid effluent at the Loxahatchee facility, which is operated as a zero discharge facility. Liquid effluent is a non-issue at the Baltimore lab.

8. How is toxic waste handled, stored, and disposed?

Toxic waste will be handled and stored in accordance with the protocols detailed in question 1. Disposal, when necessary, is handled by a company specializing in laboratory services such as responsible disposal of sensitive materials and waste.

9. Will the work being done create any air pollutants? If so please explain how these are regulated, handled, disposed, or mitigated.

There will be no air pollutants produced at the Baltimore facility.

Presently, the Loxahatchee facility does not generate ethanol or any other biofuel from algae, however, Algenol is testing the ability of various algae strains to withstand exposure to ethanol in concentrations that would be observed in commercial production. Ethanol is being added to water in the bioreactors in a ratio of 0.4 gallons of ethanol per 80 gallons of water. During the course of these experiments, some ethanol will be vented to the atmosphere periodically until the cultures are free of ethanol. Following Algenol's calculations, it was concluded that any annual VOC emissions would be far less than the amount allowed by the Generic Facility Exemption at F.A.C. Chapter 62-210.300 Section (3)(b)2 and far below any Federal or State regulations.

10. Are Genetically Modified Organisms (GMOs) being used? If so please describe how these will be transported, stored, handled and disposed? How are these classified by the USDA Animal and Plant Health Inspection Service (APHIS)?

On March 3, 2009 Algenol submitted a letter and other materials to the Biotechnology Regulatory Services of the Animal and Plant Health Inspection Service (APHIS), U.S. Department of Agriculture, with detailed information and descriptions regarding various microorganisms and transformation and the intended use of the same. After reviewing the information, APHIS determined on November 4, 2009 that the specified strains of cyanobacteria are non-pathogenic for plants, animal and humans and are not plant pests under the Plant Protection Act, and therefore are not regulated articles under 7 CFR Part 340. Algenol has also received a permit from APHIS (#09-254-101m) under 7 CFR 340 for interstate movement of our hybrid algae. The hybrid algae will be shipped as pure cultures on an agar-solidified inorganic medium contained within sealed Petri plates or as small volumes (less than 1 L) of pure cultures growing in a liquid inorganic medium within a sealed plastic, shatter-proof vessel. All biological material will be placed inside a leak-proof plastic bag inside of a Styrofoam shipping container within a cardboard box. A copy of the APHIS letter has been submitted with the EF1 as a supporting document.

Algenol voluntarily contacted the Environmental Protection Agency in June 2009 to confirm the status of R&D work under the Toxic Substances Control Act (TSCA) and implementing EPA regulation for microorganisms. After reviewing detailed information provided by Algenol, the EPA confirmed in November 2009 that, based on the containment measures adopted in our R&D activities in compliance with 40 CFR 725.234, there is no need to submit a TSCA application for the research to be conducted under those containment measures, which includes the research at our Florida facility and the planned integrated biorefinery in Freeport, TX.

11. Will prototypes be tested in a separate location, if so, please describe the location and answer questions #1-9?

No

12. Are subcontractors being used for some of the work? If so please answer Questions #1-11 for work being completed by subcontractors.

No