M.5.4.4	Validate capital cost
M.5.4.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.5.4.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.5.4.7	Validate feed flexibility in integrated system
JB.2008	Achieve a modeled cost target of $0.11 per pound of sugars (equivalent to $2.09 per gallon of cellulosic ethanol) through the formulation of improved enzyme mixtures and pretreatments.
JB.2009	Demonstrate alternative pretreatment technologies integrated with enzymatic hydrolysis at lab scale that have the potential of contributing ot the $1.31 per gallon (2007$) ethanol selling price target in 2012.
M.5.5	Demonstrate and validate woody crop fractionation to produce mixed, dilute biomass sugars
M.5.5.1	Validate cellulase enzyme cost
M.5.5.2	Validate pretreatment technology cost
M.5.5.3	Demonstrate ability to economically satisfy internal heat and power demands
M.5.5.4	Valicate capital cost
M.5.5.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.5.5.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.5.5.7	Validate feed flexibility in integrated system
MB.15	Validate integrated switchgrass-to-ethanol pilot operation
M.5.6	Demonstrate and validate ethanol from 5 biomass sugars
M.5.6.1	Validate ethanol production
M.5.6.2	Validate ethanol separation/recovery
M.5.6.3	Validate integrated production of product(s)from sugars at pilot scale
M.5.6.4	Validate integrated production of product(s)from sugars at demonstration scale
M.5.7	Demonstrate and validate products from 5 biomass sugars
M.5.7.1	Validate chemical building blocks production
M.5.7.2	Validate high value chemical production
M.5.7.3	Validate product separation
M.5.7.4	Validate integrated production of product(s)from sugars at pilot scale
M.5.7.5	Validate integrated production of product(s)from sugars at demonstration scale
M.5.8	Demonstrate and validate high value chemical and material products from lignin intermediates
M.5.8.1	Demonstrate high value chemical/material production from lignin
M.5.8.2	Validate product separation
M.5.8.3	Validate integrated production of product(s)from lignin at pilot scale
M.5.8.4	Validate integrated production of product(s)from lignin at demonstration scale
M.5.9	Demonstrate and validate fuel products from lignin intermediates
M.5.9.1	Demonstrate direct fuel production from lignin
M.5.9.2	Validate fuel product separation
M.5.9.3	Validate integrated production of fuel(s)from lignin at pilot scale
M.5.9.4	Validate integrated production of fuels(s)from lignin at demonstration scale
M.5.10	Demonstrate and validate combined heat and power from lignin intermediates/residues
M.5.10.1	Demonstrate combined heat and power production from lignin

M.5.10.2	Validate integrated production of heat and power from lignin at pilot scale
M.5.10.3	Validate integrated production of heat and power from lignin at demonstration scale
M.5.11	Demonstrate and validate lignin gasification to produce syngas
M.5.11.1	Validate feeder system performance
M.5.11.2	Validate gasification performance
M.5.11.3	Validate gas cleanup performance
M.5.11.4	Validate capital costs - ROI hurdle rate versus cost magnitude hurdle amount
M.5.11.5	Validate integrated gasification and gas cleanup at pilot scale
M.5.11.6	Validate integrated gasification and gas cleanup at demonstration scale
M.5.12	Demonstrate and validate biomass gasification to produce syngas
M.5.12.1	Validate feeder systems to reliably feed solid biomass to high pressure (30 bar) systems
M.5.12.2	Validate gasification performance
M.5.12.3	Validate gas cleanup performance
M.5.12.4	Validate capital costs
M.5.12.5	Validate integrated gasification and gas cleanup at pilot scale
M.5.12.6	Validate integrated gasification and gas cleanupat demonstration scale
M.5.12.7	Validate feed flexibility in integrated system
JT.2007	Demonstrate conversion of 50% of non-methane (C2+ higher) hydrocarbons that result in a syngas cost of $7.15/MBtu in 2007.
JT.2010	Validate and demonstrate technology for the cost-effective cleanup of biomass synthesis gas leading to a modeled syngas cost of $5.40/Mbtu in 2010.
M.5.13	Demonstrate and validate ethanol from mixed alcohols using lignin or biomass derived syngas
M.5.13.1	Demonstrate ethanol production from mixed alcohols
M.5.13.2	Validate ethanol separation
M.5.13.3	Validate integrated production of ethanol from syngas at pilot scale
M.5.13.4	Validate integrated production of ethanol from syngas at demonstration scale
MT.20	Validate integrated switchgrass/hybrid poplar-to-ethanol (via gasification) pilot operation.
M.5.14	Demonstrate and validate hydrogen production from lignin or biomass derived syngas
M.5.14.1	Demonstrate optimized hydrogen production from syngas
M.5.14.2	Validate hydrogen separation/recovery
M.5.14.3	Validate integrated production of hydrogen from syngas at pilot scale
M.5.14.4	Validate integrated production of hydrogen from syngas at demonstration scale
M.5.15	Demonstrate and validate combined heat and power production from lignin or biomass derived syngas
M.5.15.1	Demonstrate combined heat and power production from syngas
M.5.15.2	Validate integrated production of heat and power from syngas at pilot scale
M.5.15.3	Validate integrated production of heat and power from syngas at demonstration scale
M.5.16	Demonstrate and validate non-ethanol fuels from lignin or biomass derived syngas
M.5.16.1	Demonstrate non-ethanol fuel production from lignin or biomass-derived syngas
M.5.16.2	Validate non-ethanol fuel separation
M.5.16.3	Validate integrated production of non-ethanol fuels from syngas at pilot scale
M.5.16.4	Validate integrated production of non-ethanol fuels from syngas at demonstration scale

M.5.17	Demonstrate and validate product(s) from lignin or biomass derived syngas
M.5.17.1	Demonstrate high value chemical/material production (C3-C5 alcohols) from syngas
M.5.17.2	Validate product(s) separation
M.5.17.3	Validate integrated production of product(s) from syngas at pilot scale
M.5.17.4	Validate integrated production of product(s) from syngas at demonstration scale
M.5.18	Demonstrate and validate non-ethanol fuels from 5 biomass sugars that are econonomically viable
M.5.18.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.5.18.2	Optimize non-ethanol fuel separation
M.5.18.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.5.18.4	Optimize integrated production of non-ethanol fuel from sugars at demonstration scale
M.5.19	Demonstrate and validate biomass pyrolysis to produce pyrolysis oil intermediate
M.5.19.1	Validate feeder systems to reliably feed solid biomass to pyrolysis reactor high pressure (30 bar) systems
M.5.19.2	Validate pyrolysis performance
M.5.19.3	Validate pyrolysis oil cleanup performance
M.5.19.4	Validate capital costs - ROI hurdle rate versus cost magnitude hurdle amount
M.5.19.5	Validate integrated pyrolysis and pyrolysis oil cleanup at pilot scale
M.5.19.6	Validate integrated pyrolysis and pyrolysis oil cleanup at demonstration scale
M.5.19.7	Validate feed flexibility in integrated system
M.5.20	Demonstrate and validate fuels from pyrolysis oil intermediate
M.5.20.1	Demonstrate fuel production from pyrolysis oil intermediate
M.5.20.2	Validate fuel separation
M.5.20.3	Validate integrated production of fuels from pyrolysis oil at pilot scale
M.5.20.4	Validate integrated production of fuels from pyrolysis oil at demonstration scale
M.5.21	Demonstrate and validate high value chemical and material products from pyrolysis oil intermediates
M.5.21.1	Demonstrate high value chemical/material production from pyrolysis oil
M.5.21.2	Validate product separation
M.5.21.3	Validate integrated production of product(s)from pyrolysis oil at pilot scale
M.5.21.4	Validate integrated production of product(s)from pyrolysis oil at demonstration scale
6. Forest Resources Processing	
Milestone #	**Milestone Title**
M.6	***Complete systems level demonstration and validation of technologies to improve pulp and paper mill facilities and/or produce additional products (fuels, chemicals and /or power) from wood feedstock in a pulp and paper mill environment***
JF.2010	Complete a core R&D engineering design that can receive multiple feedstock resources and preprocess them into cellulosic feedstock for an average of $35 per ton delivered to biorefineries.
JF.2011	In conjunction with USDA, land grant universities, and private sector, incorporate yield and othe data from field trials. Complete and validate dry and woody feedstocks at $35 per ton in line with 2012 goal.
JF.2012	Feedstocks (wet, dry, and woody) in support of $1.07 per gallon cost target will be validated on a regional basis.
M.6.1	Demonstrate and validate integrated logging residue and forest thinnings collection and logistics
M.6.1.1	Demonstrate sustainable logging practices
M.6.1.2	Demonstrate logging residue collection

M.6.1.3	Demonstrate forest thinnings collection
M.6.1.4	Demonstrate logging residue and forest thinnings transportation
M.6.1.5	Demonstrate quality and quantity of logging residue and forest thinnings available
M.6.1.6	Demonstrate logging residue and forest thinnings preprocessing benefits
M.6.1.7	Validate integrated logging residue and forest thinnings logistics in prototype equipment
M.6.1.8	Validate integrated logging residue and forest thinnings logistics at demonstration scale
M.6.2	Demonstrate and validate integrated fuel treatment biomass collection and logistics
M.6.2.1	Demonstrate fuel treatment biomass collection
M.6.2.2	Demonstrate fuel treatment biomass storage
M.6.2.3	Demonstrate fuel treatment biomass transportation
M.6.2.4	Demonstrate fuel treatment biomass quality and quantity of available
M.6.2.5	Demonstrate fuel treatment biomass preprocessing benefits
M.6.2.6	Validate integrated fuel treatment biomass logistics in prototype equipment
M.6.2.7	Validate integrated fuel treatment biomass logistics at demonstration scale
M.6.3	Demonstrate and validate forest resources fractionation to produce mixed, dilute biomass sugars
M.6.3.1	Validate cellulase enzyme cost
M.6.3.2	Validate pretreatment technology cost
M.6.3.3	Demonstrate ability to economically satisfy internal heat and power demands
M.6.3.4	Validate capital cost
M.6.3.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.6.3.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.6.3.7	Validate feed flexibility in integrated system
M.6.4	Demonstrate and validate ethanol from 5 biomass sugars
M.6.4.1	Validate fermentation of all 5 sugars to produce ethanol
M.6.4.2	Optimize ethanol separation
M.6.4.3	Optimize integrated production of ethanol from sugars at pilot scale
M.6.4.4	Optimize integrated production of ethanol from sugars at demonstration scale
M.6.5	Demonstrate and validate non-ethanol fuels from 5 biomass sugars
M.6.5.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.6.5.2	Optimize fuel separation
M.6.5.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.6.5.4	Optimize integrated production of non-ethanol fuels from sugars at demonstration scale
M.6.6	Demonstrate and validate chemical building blocks, chemicals or materials from 5 biomass sugars
M.6.6.1	Optimize chemical building blocks production
M.6.6.2	Optimize high value chemical production
M.6.6.3	Optimize product separation
M.6.6.4	Optimize integrated production of product(s) from sugars at pilot scale
M.6.6.5	Optimize integrated production of product(s) from sugars at demonstration scale
M.6.7	Demonstrate and validate fuel products from lignin intermediates
M.6.7.1	Demonstrate direct fuel production from lignin

M.6.7.2	Validate fuel product separation
M.6.7.3	Validate integrated production of fuel(s) from lignin at pilot scale
M.6.7.4	Validate integrated production of fuels(s) from lignin at demonstration scale
M.6.8	Demonstrate and validate high value chemical and material products from lignin intermediates
M.6.8.1	Demonstrate high value chemical/material production from lignin
M.6.8.2	Validate product separation
M.6.8.3	Validate integrated production of product(s) from lignin at pilot scale
M.6.8.4	Validate integrated production of product(s) from lignin at demonstration scale
M.6.9	Demonstrate and validate combined heat and power from lignin intermediates/residues
M 6.9.1	Demonstrate combined heat and power production from lignin
M 6.9.2	Validate integrated production of heat and power from lignin at pilot scale
M 6.9.3	Validate integrated production of heat and power from lignin at demonstration scale
M 6.10	Demonstrate and validate lignin gasification to produce syngas
M 6.10.1	Validate feeder system performance
M 6.10.2	Validate gasification performance
M 6.10.3	Validate gas cleanup performance
M 6.10.4	Validate capital cost
M 6.10.5	Validate integrated gasification and gas cleanup at pilot scale
M 6.10.6	Validate integrated gasification and gas cleanup at demonstration scale
M 6.11	Demonstrate and validate cost-effective biomass gasification of wood, forest residues and other process residues and synthesis gas cleanup in a forest resources mill environment
M 6.11.1	Develop cost effective gasification designs for syngas production at appropriate scale
M 6.11.2	Validate feeder system performance to reliably feed solids to high pressure (30 bar) systems)
M 6.11.3	Validate gasification performance
M 6.11.4	Validate cost-effective gas cleanup performance
M 6.11.5	Validate integrated biomass gasification and syngas cleanup process at pilot scale
M 6.11.6	Validate integrated biomass gasification and syngas cleanup process in a forest resources mill environment
	Validate feed flexibility in integrated system
JT.2007	Demonstrate conversion of 50% of non-methane (C2+ higher) hydrocarbons that result in a syngas cost of $7.15/MBtu in 2007.
JT.2009	Validate technology capable of economically converting biomass residues, pulping liquors or waste fats and greases to synthesis gas or bio-oils that are suitable for fuels and chemicals produciton. The target is a modeled cost of $5.81/Mbtu in 2009.
JT.2010	Validate and demonstrate technology for the cost-effective cleanup of biomass synthesis gas leading to a modeled syngas cost of $5.40/Mbtu in 2010.
M 6.12	Demonstrate and validate production of ethanol from syngas in a forest resources mill environment
M 6.12.1	Produce mixed alcohols from syngas
M 6.12.2	Recover ethanol fuel product
M 6.12.3	Validate integrated process at pilot scale
M 6.12.4	Validate new process in a forest resources mill environment
M 6.13	Demonstrate and validate production of non-ethanol fuels from syngas in a forest resources mill environment
M 6.13.1	Produce non-ethanol fuel from biomass syngas

M 6.13.2	Recover fuel product
M 6.13.3	Validate integrated process at pilot scale
M 6.13.4	Validate new process in a forest resources mill environment
M 6.14	Demonstrate and validate hydrogen production from lignin or biomass derived syngas forest resources mill environment
M 6.14.1	Demonstrate optimized hydrogen production from syngas
M 6.14.2	Validate hydrogen separation/recovery
M 6.14.3	Validate integrated production of hydrogen from syngas at pilot scale
M 6.14.4	Validate integrated production of hydrogen from syngas at demonstration scale
M 6.15	Demonstrate and validate product(s) from lignin or biomass derived syngas forest resources mill environment
M 6.15.1	Demonstrate high value chemical/material productionfrom syngas
M 6.15.2	Validate product(s) separation
M 6.15.3	Validate integrated production of product(s) from syngas at pilot scale
M 6.15.4	Validate integrated production of product(s) from syngas at demonstration scale
M 6.16	Demonstrate and validate syngas utilization for combined heat and power in a forest resources mill environment
M 6.16.1	Verify fuel gas quality to levels necessary for CHP or clean cold gas consuming equipment
M 6.16.2	Validate CHP from syngas and/or direct use of sygas in process equipment
M 6.16.3	Validate integrated process at pilot scale
M 6.16.4	Validate new process in a forest resources mill environment
M 6.17	Demonstrate and validate bio-oil production to a stable intermediate forest resources mill environment
M 6.17.1	Validate bio-oil production
M 6.17.2	Validate bio-oil inermediate recovery
M 6.17.3	Validate integrated process for producing bio-oil at pilot scale
M 6.17.4	Demonstrate and validate new process in a forest resources mill environment
M 6.17.5	Validate feed flexibility in integrated system
M 6.18.	Achieve cost-effective conversion bio-oil intermediate into product(s) in a forest resources mill environment
M 6.18.1	Validate production of products from bio-oil
M 6.18.2	Validate bio-oil product(s) recovery
M 6.18.3	Validate integrated process for producing bio-oil product at pilot scale
M 6.18.4	Validate integrated process in a forest resources mill environment
M 6.19.	Achieve cost-effective conversion bio-oil intermediate into product(s) in a forest resources mill environment
M 6.19.1	Validate production of products from bio-oil
M 6.19.2	Validate bio-oil product(s) recovery
M 6.19.3	Validate integrated process for producing bio-oil product at pilot scale
M 6.19.4	Validate integrated process in a forest resources mill environment
M 6.20	Demonstrate and validate cost-effective extraction of C5 and C6 sugars from hemicellulose upstream of the pulp digestor in a pulp mill without negatively impacting paper quality
M 6.20.1	Meet yield target for C5 and C6 sugars without negatively impacting paper quality
M 6.20.2	Meet sugar upgrading requirements
M 6.20.3	Meet targets for recovery of other intermediates
M 6.20.4	Validate integrated sugar extraction process at pilot scale

M 6.20.5	Validate sugar extraction process in pulp and paper mill
M 6.21	Demonstrate and validate reliable and economic gasification of spent pulping liquor, recycle liquor causticization, chemical recovery and gas cleanup in a pulp mill
M 6.21.1	Validate reliable and economic performance of gasification of spent pulping liquor
M 6.21.2	Validate cost effective causticization and return Na based pulping chemicals
M 6.21.3	Validate advantages of co-gasification of spent pulping liquors and other forms of biomass (woody, recycle paper streams, and bio-oil)
M 6.21.4	Validate process chemical recovery from spent pulping liquor syngas
M 6.21.5	Validategas cleanup technologies on spent pulping liquor syngas
M 6.21.6	Validate integrated black liquor gasification, causticization, chemical recovery and gas cleanup process at pilot scale
M 6.21.7	Validate integrated black liquor gasification, causticization, chemical recovery and gas cleanup process in pulp and paper mill
JB.2011	Demonstrate the conversion of synthesis gas or bio-oils, derived from biomass pulping liquors or waste fats and greases to chemicals or transportation fuels. The target modeled cost is $5.25/Mbtu in 2011.
7. Waste Processing Pathway	
Milestone #	**Milestone Title**
M.7	***Complete systems level demonstration and validation of technologies to process waste biomass streams to produce fuels, chemicals and /or power.***
M.7.1	Demonstrate and validate fractionation of carbohydrate rich waste streams to produce mixed, dilute biomass sugars
M.7.1.1	Validate cellulase enzyme cost
M.7.1.2	Validate pretreatment technology cost
M.7.1.3	Demonstrate ability to economically satisfy internal heat and power demands
M.7.1.4	Validate capital cost
M.7.1.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.7.1.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.7.1.7	Validate feed flexibility in integrated system
M.7.2	Demonstrate and validate ethanol from 5 biomass sugars
M.7.2.1	Validate fermentation of all 5 sugars to produce ethanol
M.7.2.2	Optimize ethanol separation
M.7.2.3	Optimize integrated production of ethanol from sugars at pilot scale
M.7.2.4	Optimize integrated production of ethanol from sugars at demonstration scale
M.7.3	Demonstrate and validate non-ethanol fuels from 5 biomass sugars
M.7.3.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.7.3.2	Optimize non-ethanol fuel separation
M.7.3.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.7.3.4	Optimize integrated production of non-ethanol fuel from sugars at demonstration scale
M.7.4	Demonstrate and validate chemical building blocks, chemicals or materials from 5 biomass sugars
M.7.4.1	Optimize chemical building blocks production
M.7.4.2	Optimize high value chemical production
M.7.4.3	Optimize product separation
M.7.4.4	Optimize integrated production of product(s)from sugars at pilot scale
M.7.4.5	Optimize integrated production of product(s)from sugars at demonstration scale

M.7.6	Demonstrate and validate high value chemical and material products from lignin intermediates
M.7.6.1	Demonstrate high value chemical/material production from lignin
M.7.6.2	Validate product separation
M.7.6.3	Validate integrated production of product(s)from lignin at pilot scale
M.7.6.4	Validate integrated production of product(s)from lignin at demonstration scale
M.7.5	Demonstrate and validate fuel products from lignin intermediates
M.7.5.1	Demonstrate direct fuel production from lignin
M.7.5.2	Validate fuel product separation
M.7.5.3	Validate integrated production of fuel(s)from lignin at pilot scale
M.7.5.4	Validate integrated production of fuels(s)from lignin at demonstration scale
M.7.7	Demonstrate and validate combined heat and power from lignin intermediates/residues
M.7.7.1	Demonstrate combined heat and power production from lignin
M.7.7.2	Validate integrated production of heat and power from lignin at pilot scale
M.7.7.3	Validate integrated production of heat and power from lignin at demonstration scale
M.7.8	Demonstrate and validate lignin gasification to produce syngas
M.7.8.1	Validate feeder system performance
M.7.8.2	Validate gasification performance
M.7.8.3	Validate gas cleanup performance
M.7.8.4	Validate capital costs
M.7.8.5	Validate integrated gasification and gas cleanup at pilot scale
M.7.8.6	Validate integrated gasification and gas cleanupat demonstration scale
M.7.9	Demonstrate and validate waste biomass gasification to produce syngas
M.7.9.1	Validate feeder systems to reliably feed solid biomass to high pressure (30 bar) systems
M.7.9.2	Validate gasification performance
M.7.9.3	Validate gas cleanup performance
M.7.9.4	Validate capital costs
M.7.9.5	Validate integrated gasification and gas cleanup at pilot scale
M.7.9.6	Validate integrated gasification and gas cleanupat demonstration scale
M.7.9.7	Validate feed flexibility in integrated system
JT.2009	Validate technology capable of economically converting biomass residues, pulping liquors or waste fats and greases to synthesis gas or bio-oils that are suitable for fuels and chemicals produciton. The target is a modeled cost of $5.81/Mbtu in 2009.
M.7.10	Demonstrate and validate ethanol from mixed alcohols using lignin or waste biomass derived syngas
M.7.10.1	Demonstrate ethanol production from mixed alcohols
M.7.10.2	Validate ethanol separation
M.7.10.3	Validate integrated production of ethanol from syngas at pilot scale
M.7.10.4	Validate integrated production of ethanol from syngas at demonstration scale
JB.2011	Demonstrate the conversion of synthesis gas or bio-oils, derived from biomass pulping liquors or waste fats and greases to chemicals or transportation fuels. The target modeled cost is $5.25/Mbtu in 2011.
M.7.11	Demonstrate and validate non-ethanol fuels from lignin or waste biomass derived syngas
M.7.11.1	Demonstrate non-ethanol fuel production from lignin or biomass-derived syngas

M.7.11.2	Validate non-ethanol fuel separation
M.7.11.3	Validate integrated production of non-ethanol fuels from syngas at pilot scale
M.7.11.4	Validate integrated production of non-ethanol fuels from syngas at demonstration scale
M.7.12	Demonstrate and validate hydrogen production from lignin or waste biomass derived syngas
M.7.12.1	Demonstrate optimized hydrogen production from syngas
M.7.12.2	Validate hydrogen separation/recovery
M.7.12.3	Validate integrated production of hydrogen from syngas at pilot scale
M.7.12.4	Validate integrated production of hydrogen from syngas at demonstration scale
M.7.13	Demonstrate and validate product(s) from lignin or waste biomass derived syngas
M.7.13.1	Demonstrate high value chemical/material production from syngas
M.7.13.2	Validate product(s) separation
M.7.13.3	Validate integrated production of product(s) from syngas at pilot scale
M.7.13.4	Validate integrated production of product(s) from syngas at demonstration scale
M.7.14	Demonstrate and validate combined heat and power production from lignin or waste biomass derived syngas
M.7.14.1	Demonstrate combined heat and power production from syngas
M.7.14.2	Validate integrated production of heat and power from syngas at pilot scale
M.7.14.3	Validate integrated production of heat and power from syngas at demonstration scale
M.7.15	Demonstrate and validate waste biomass pyrolysis to produce pyrolysis oil intermediate
M.7.15.1	Validate feeder systems to reliably feed solid biomass to pyrolysis reactor high pressure (30 bar) systems
M.7.15.2	Validate pyrolysis performance
M.7.15.3	Validate pyrolysis oil cleanup performance
M.7.15.4	Validate capital costs
M.7.15.5	Validate integrated pyrolysis and pyrolysis oil cleanup at pilot scale
M.7.15.6	Validate integrated pyrolysis and pyrolysis oil cleanup at demonstration scale
M.7.15.7	Validate feed flexibility in integrated system
M.7.16	Demonstrate and validate fuels from pyrolysis oil intermediate
M.7.16.1	Demonstrate fuel production from pyrolysis oil intermediate
M.7.16.2	Validate fuel separation
M.7.16.3	Validate integrated production of fuels from pyrolysis oil at pilot scale
M.7.16.4	Validate integrated production of fuels from pyrolysis oil at demonstration scale
M.7.17	Demonstrate and validate high value chemical and material products from pyrolysis oil intermediates
M.7.17.1	Demonstrate high value chemical/material production from pyrolysis oil
M.7.17.2	Validate product separation
M.7.17.3	Validate integrated production of product(s)from pyrolysis oil at pilot scale
M.7.17.4	Validate integrated production of product(s)from pyrolysis oil at demonstration scale

APPENDIX

To

SPECIAL TERMS AND CONDITIONS, PROVISION 34

REQUIREMENTS FOR CONTINGENCY FUNDS FOR INTEGRATED BIOREFINERY PROJECTS

TO DE-EE0002877 – Solazyme, Inc. Biorefinery Project

I. Background

Recipients of awards selected under Funding Opportunity Announcement DE-FOA-0000096 are required to provide an initial amount of Contingency funds equal to not less than 25 percent of the Total Project Cost (TPC), subject to the requirements and clarifications provided in this Appendix. TPC includes the approved combined Federal and Recipient cost share funding amounts to accomplish the approved scope in the Statement of Project Objectives that are allowable, reasonable and allocable to the project in accordance with 10 Code of Federal Regulations (CFR) 600.317.

II. Definition

For the purposes of this award, **Contingency** is defined as follows:

A provision in the project management plan to mitigate cost and /or schedule risk (Project Management Body of Knowledge, Third Edition).

III. Requirements

A. Purpose

The Recipient may expend Contingency funds solely for the purpose of mitigating risks to the cost and/or schedule associated with the project performance baseline and consistent with the Risk Mitigation or Management Plan (RMP) and Risk Register. Schedule risks ultimately would be reflected as cost overruns. It is expected that those risks will either be: a) performance baseline schedule and/or cost risks that are identified in the RMP and Risk Register (known risks or opportunities); or, b) to mitigate unknown performance baseline risks or uncertainties that become incorporated into the RMP and Risk Register as they are discovered.

B. Framework and Criteria

1. The framework that governs the use of Contingency funds on the project authorized under this award relies on the Recipient to manage and control project performance baseline risks, opportunities and uncertainties utilizing the most recent, change-controlled performance baseline, Risk RMP and Risk Register. As risks are successfully mitigated throughout the duration of the project, the need for contingency is anticipated to decline. At the point when the performance test has been completed, the number and magnitude of risks and the available project and Contingency funds will need to be evaluated prior to DOE's Critical Decision 4 – Approval of Operations.

2. The initial 25 percent minimum Contingency is calculated based on the TPC (DOE share + Recipient cost share) in dollars. The award is divided into two budget periods – Budget Periods 1 and 2 (BP1 and BP2). BP1 primarily involves relatively low risk activities associated with design work, permitting, environmental baseline data gathering and analysis, financial close, and other activities that should not require significant contingency to be managed effectively. Therefore, for the purposes of this award, the 25% minimum Contingency requirement will be calculated based on the estimated TPC balance that begins with Budget Period 2 (BP2 - construction and operations). The Recipient will need to provide evidence (consistent with evidence standards identified in C. below) of meeting the required 25% minimum Contingency prior to DOE authorizing Critical Decision 3 – Approve Start of Construction. For example, if the BP2 estimate for construction and operations equals a TPC of $100 million, with $50 million DOE funds and $50 million Recipient cost share funds, a minimum of $25 million in initial Contingency funds would be required at the start of BP2. Any increase in the TPC resulting from cost and/or schedule overruns incurred during BP1 will be added to the BP2 TPC before calculating the initial 25% Contingency minimum.

3. Contingency Funds must be: a) liquid, b) immediately available, and c) unrestricted funds that are dedicated to the project.

4. Expenditures of Contingency funds is in addition to the TPC, and cannot count towards cost share. Similarly, expenditures of Contingency cannot result in reimbursement by DOE above the share approved for the project.

5. Contingency is **NOT** to be included in the project budget estimate.

6. The use of Contingency funds cannot be considered allowable costs under the award unless and until Recipient has actually expended such funds to address cost and/or schedule overruns to the performance baseline.

7. Estimated or projected program income CANNOT count towards contingency up front. However, the Recipient may use program income to reimburse actual expenditures of Contingency funds upon approval by the DOE Contracting Officer.

C. Acceptable Evidence of Sufficient Contingency Funds

1. Recipient must provide evidence of Contingency funds that are dedicated to the project and sufficient to meet the 25 percent minimum, which must be documented and reported on a monthly basis consistent with the reporting requirements for this award.

2. Below is a list of the types of evidence the Contracting Officer may consider. Although this list is not all-inclusive, it represents some of the types of documents the Contracting Officer may consider as evidence of adequate Contingency. DOE will review evidence of adequate Contingency provided by the Recipient on a case-by-case basis to determine its acceptability. This evidence may include, but not is not limited to, one or a combination of the following:

   (i) Bank statement of availability of funds

   (ii) Letter of credit

(iii) Evidence of sufficient cash funds (e.g., a letter from the bank or investors certifying to the specific amounts and availability of cash contributions)

(iv) EPC Performance Guarantees

(v) Evidence of funds in an escrowed account dedicated to the project

(vi) Performance bond(s) – Terms and conditions must be approved by the Contracting Officer

3. Self-certification of the availability of Contingency funds is generally **NOT** acceptable evidence. In order for self-certification to be considered acceptable by the Contracting Officer, the following minimum requirements must be met:

   a. An executive officer from the Recipient (typically, the Chief Financial Officer) who has control of the disbursement of Contingency funds must:

      i. Certify to no less than the minimum required initial specific amount, types and availability of Contingency funds;

      ii. Report on the expenditure of those funds monthly to the Contracting Officer; and

      iii. Recertify to the specific amount, type and availability of Contingency funds each month.

   b. Any Contingency funds expended to address risks and/or opportunities in the performance baseline must be transparent and documented through the most recent approved baseline change control procedure; and

   c. The documentation of expenditures of Contingency funds must be transparent such that an independent auditor would be able to easily track the use of such funds through the financial accounting system to the project code of accounts and to the performance baseline cost overruns.

D. Control and Management of Contingency Funds

1. Cost overruns that result in changes to the performance baseline must go through baseline change control. Cost overruns involving the use of Contingency must be documented through the most recent, approved baseline change control procedure. Those cost or schedule overruns that exceed the DOE-approved change control threshold must be approved by DOE. **Exception**: In the situation where an event occurs that compromises safety or threatens human health or the environment, the Recipient is expected to expend the appropriate amount of resources and/or Contingency necessary to manage the event and the project to a safe configuration. Changes to the performance baseline and any cost overruns resulting from the event shall be addressed after the Recipient has achieved a safe project configuration.

2. Any month in which the amount of Contingency becomes insufficient to meet the required minimum, it must be reported to the Contracting Officer within five (5) calendar days of discovery.

3. Incorporation of Contingency within the basis of estimates for each activity shall not be allowed. Activity estimates should be consistent with standard Recipient project estimating methods (e.g., activity-based cost estimating, parametric cost estimating, etc.), but shall avoid the embedding and layering of contingency throughout the Work Breakdown Structure (WBS).

4. At the completion of performance test (as described in the performance baseline), DOE will conduct the Critical Decision 4 (CD-4) – Approval of Operations review. This review will also be the point at which DOE will determine the amount of Contingency the Recipient will be required to have available during the operations phase. The criteria for this determination will be as follows:

   a. Pilot plants – The amount of the Contingency typically required will be based on a minimum of 10 percent of the initial capital cost (BP2 TPC). Using this as a base, the amount of Contingency will be adjusted taking into account risk mitigation trends through the end of the performance test. For example, if the estimate to complete (ETC) and remaining risks through the end of the performance test reflect successful risk mitigation and cost effective project performance management, DOE would factor that into its decision on what percentage contingency will be required for the operations phase. DOE will withhold a percentage of its funds to assure that the operations phase is completed in accordance with the performance baseline and that DOE receives operations data in the form required.

   b. Demonstration plants – The required amount of Contingency typically will be based on a minimum of 10 percent of the initial capital cost (BP2 TPC). Using this as a base, the amount of Contingency will be adjusted using risk mitigation trends through completion of the performance test. For example, if the ETC and risks remaining through the end of the performance test reflect successful risk mitigation and cost effective project performance management, DOE could factor that into its decision on what percentage contingency will be required for the operations phase. Furthermore, if the cost of the core technology exceeds 10 percent of the initial capital cost (BP2 TPC), DOE will factor this into the percentage of DOE funds to be withheld to assure that the operations phase is completed in accordance with the performance baseline.

Contingency

A. Contingency Requirement. A minimum amount of Contingency is required for awards selected under Funding Opportunity Announcement DE-FOA-0000096. "Contingency" is defined in the Appendix as: "a provision in the Project Management Plan to mitigate cost and/or schedule risk." Contingency funds must be (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the Project for the purpose of mitigating project performance baseline risk. Contingency funds may come from a variety of sources, as approved by the Contracting Officer on a case-by-case basis in accordance with the Appendix to these Terms and Conditions.

B. Minimum Amount of Contingency. Initial Contingency funds shall be not less than 25 percent of the Total Project Cost that begins with Budget Period 2, as more specifically described in Section B(2) of the Appendix to these Terms and Conditions.

C. Contingency Not Counted Toward Cost Share or DOE Reimbursement. Contingency is in addition to the Total Project Cost and cannot count toward cost share or result in reimbursement by DOE above the share approved in the award.

D. Appendix. All of the terms and conditions set forth in this provision shall be further subject to the requirements and clarifications of the Appendix.

PMC 120.1
(12/09)

U.S. DEPARTMENT OF ENERGY
GOLDEN FIELD OFFICE

FINANCIAL ASSISTANCE COMBINED COST/TECHNICAL EVALUATION AND NEGOTIATION MEMORANDUM

SECTION I - GENERAL INFORMATION

This technical evaluation/negotiation memorandum will be prepared jointly by the assigned DOE/Golden OCPM AND OAFA personnel, to document the specific action being evaluated and supported. Each office is responsible for certain sections of this document. The assigned OCPM and OAFA personnel responsible for the action will both sign this document upon its completion, demonstrating their agreement on its contents.

Project Officer to complete:

1. Recipient: Solazyme, Inc.

2. Grant/Cooperative Agreement No.: DE-EE0002877 Modification No. 001
   Requisition No:
   Project Title: Solazyme Integrated Biorefinery (SzIBR): Diesel Fuels from Heterotrophic Algae

3. Type of Action: ☒ New Award ☐ Renewal ☐ Continuation ☐ Revision

   Description of this Action: (NOTE: Indicate what is addressed by this Action only):

   The purpose of this action is to lift the conditions on the to be used in Budget Period 1 of the award for Solazyme, Inc. for the project entitled "Solazyme Integrated Biorefinery (SzIBR): Diesel Fuels from Heterotrophic Algae." It also approves the scope and budget for Budget Period 1.

4. Award type, as determined at Procurement Strategy Meeting (for new awards): ☐ Grant ☒ Cooperative Agreement

   If Cooperative Agreement, provide the specifics of the Substantial Involvement. (Note: This language will be used in the Substantial Involvement provision of the award.):

   Include standard language.

5. New/Revised Project Period for this Award: From: 01/29/2010 To: 03/31/2013
   New/Revised Budget Period 1 for this Award: From: 01/12/2010 To: 03/31/2010
   New/Revised Budget Period 2 for this Award: From: To:

6. Compliance Assessment (skip if new award):
   a. Deliverables
      The Recipient is current in submitting required reports: ☐ Yes ☐ No
      If no, identify the delinquent report(s), indicate what action(s) have been taken to remedy the situation, and identify what further action(s) are necessary, if any:

   b. Financial
      The Recipient is current in meeting the cost share requirement: ☐ Yes ☐ No
      If no, indicate what action(s) have been taken to remedy the situation and validate why this new action should proceed:

REDACTED
EXEMPTION 5
(Deliberative Process)

Comment [CL1]:

Comment [CL2]: 1/29 based on conditional award date

1/12 based on latest Gantt from SZ

12/4 earliest possible based on signed selection statement

7. Check the applicable box for Funding Appropriation:
☒ Energy and Water ☐ Other _____

8. Check the applicable box for Statutory Authority:

☐ 109-58, Energy Policy Act 2005
☐ 110-140, Energy Independence and Security Act 2007
☒ ARRA
☐ Other: _____

Specialist to complete:

9. Per 10 CFR 600, the preferred payment method for State/Local Governments, Institutions of Higher Education, Hospitals, or Other Non-Profit Organizations is **Advance**. The preferred Payment Method for For-Profit organizations is **Reimbursement**. Please state the payment method that will be used for this award in the box below. If the preferred payment method is not planned for a new award, provide an explanation below. Also, explain below if the payment method for the award is being changed by this action. If the ACH or the "ASAP Approval Required" payment methods is required, include an explanation for the restriction.

10. Is the proposed Recipient on the debarred or suspended list? Yes ☐ No ☐
Are any of the proposed subrecipients/subcontractors on the debarred or suspended list? Yes ☐ No ☐
Is the Project Director on the debarred or suspended list? Yes ☐ No ☐
If yes for either response above, award cannot be made without obtaining a waiver. See attached waiver.
The review was conducted on the Internet on *(Date)* _____ (Include Printout in permanent STRIPES file)

11. A risk determination has been completed on the PMC Form 460.2 Yes ☐ N/A ☐

Project Officer and Specialist to complete:

12. Negotiation:

	Government Negotiator(s)		Recipient Negotiator(s)	
	Name	Organization	Name	Position
1.	Molly Hames	DOE – Contract Specialist	David Brinkmann	VP Manufacturing (PI)
2.	Christy Sterner	DOE – Project Officer	Dr. Anthony Day	VP R&D
3.	Chris Lindeman	DOE – Project Engineer	Gypsy Achong	

Comment [CL3]:

REDACTED
EXEMPTION 5
(Deliberative Process)

SECTION II – NEGOTIATION SUMMARY

Project Officer/Specialist to complete:

1. Please record any significant application or budget submissions that resulted in a revised budget in the Negotiation History Table below (including SF424A, budget justifications, e-mails, etc.):

Application/Budget Submission	Reference Document (s)	Date of Submission	Summary of Change
Original		12/29/2010	
Revision 1		1/20/2010	Updated SF-424a and PMC 123.1 to reflect Solazyme 20% cost share
Revision 2			
Revision "n"			

2. Complete Budget Table below (only include the original budget and final negotiated costs – the Percent of Total Negotiated Budget will calculate automatically)
Note: List proposed amounts by category even if there are no differences in the dollar amount.

Element of Cost	Original Budget Submission	Final Negotiated Costs	Percent of Total Negotiated Budget	Fringe Benefits and Indirects	
				Proposed Rate	Negotiated Rate
Personnel					
Fringe Benefits					
Travel					
Equipment					
Supplies					
Contractual					
Construction					
Other					
Total Direct Charges					
Indirect Charges					
TOTAL					
Program Income					
DOE Share (non-FFRDC)					
DOE Share (FFRDC)					
Total DOE Share					
Non-Federal Cost Share					

REDACTED
EXEMPTION 4

SEE ATTACHED SF 424A FOR BUDGET PERIOD BREAKDOWN

3. Total Allowable Adjustment without Concurrence from the Selection Official per the Selection Statement: ___ ____

Actual Total Adjustment based on Budget Table Above: ___ _

Is the original budget the same as the negotiated budget: ☐ Yes ☒ No

If No, please check all boxes that apply:

REDACTED
EXEMPTION 4

- ☐ Change in the Project Scope
- ☐ Changes due to Time Delays
- ☐ Math Errors in Budget
- ☐ Changes in Indirect/Fringe Costs Caused Changes in Direct Costs or Total Project Costs
- ☐ Indirect/Fringe Rates incorrectly applied
- ☒ Other (explain) Original applicatior cost share; selected on condition of achieving . Solazyme contribution to $5.4 to reach the cost share requirement and maintain the same level of DOE funding.

4. Briefly describe and explain any substantial change(s) to the original Statement of Project Objectives submitted by the recipient:

Project Officer commentary:
SOPO was not submitted in original application.

SECTION III – TECHNICAL EVALUATION SUMMARY

A. For each cost category, the Project Officer and the Specialist will complete his/her Technical Evaluation of the Negotiated Costs to confirm that they are all reasonable, allowable, and allocable. Additional comments should be added as necessary and as indicated below.

1. Personnel:

Total Negotiated Personnel Costs: REDACTED EXEMPTION 4	Not Applicable, the recipient did not propose Personnel costs: ☐

Project Officer:
The labor hours proposed in the negotiated budget are reasonable for the scope of work: ☒

The types of labor and labor mix proposed in the negotiated budget is reasonable: ☒

The proposed labor rates are reasonable: ☒

Specialist:
Please fill out the following table with the negotiated costs:

Labor Type	Budget Period 1			Budget Period 2		
	Hours	Rate	Total	Hours	Rate	Total
Total:						

REDACTED
EXEMPTION 4

Negotiated labor rates are reasonable: ☐
Labor rates are loaded rates (with fringe benefits or overhead costs): ☐ Address loaded rates in fringe benefits or indirect comments.

Please detail the basis for the reasonable determination:

2. Fringe Benefits:

Total Negotiated Fringe Benefit Costs: REDACTED EXEMPTION 4	Not Applicable, the recipient did not propose Fringe Benefit costs: ☐

For recipient budgets that include only fringe benefits and no indirect costs are proposed, the fringe benefit costs up to 35% of Direct Labor costs may be determined to be reasonable and acceptable, based on internal benchmarks of these costs. This fringe benefit costs allowance up to 35% of Direct Labor costs does not apply if fringe benefit costs are included in any indirect costs proposed for a budget. Fringe benefits costs that meet the criteria will not require a Fringe Benefit Rate proposal to be reviewed by the Cost/Price Analyst. However, supporting documentation should still be obtained for review.

Specialist:
Does the Recipient have an approved rate agreement: ☐ Yes ☐ No

If Yes, List the Date of Rate Agreement: _____
Cite Federal Cognizant Agency: _____

If No, select one of the following:
☐ Rate proposal was reviewed by the Cost/Price Analyst and found to be reasonable, allowable, and allocable (attach Cost/Price Analyst Determination)

☐ Rate Proposal was reviewed by the Cost/Price Analyst for a previous award (attach Cost/Price Analyst Determination)
List Date of review: _____

☐ Specialist determined that rate was reasonable

☐ Other: _____

Please fill out the following table with the negotiated costs:

	Personnel	Total Cost	Fringe Rate	Cost
Example Only	*Principal Investigator*	*$100,000*	*25%*	*$25,000*
Total:				

The fringe benefit costs in the negotiated budget were appropriately applied and are reasonable: ☐

3. Travel:

Total Negotiated Travel Costs: EX 4 | Not Applicable, the recipient did not propose Travel costs: ☐

Project Officer:

The number and type of trips proposed in the negotiated budget are reasonable for the scope of work: ☒

The costs per trip proposed in the negotiated budget are reasonable: ☒

Is foreign travel included in the negotiated budget: ☐ Yes ☒ No (If yes, please fill out the following table with the negotiated costs below)

Location	Total Cost	Rationale for Foreign Travel

If the negotiated travel budget is greater than $100,000 or greater than 15% of the total negotiated budget, please explain the costs and rationale below:

Solazyme is constructing its pilot plant far outside of the vicinity of its home office. In order to ensure that the project is proceeding as expected and that the plant construction is properly supervised it is necessary for Solazyme's technical/engineering team to be able to be on site as much as possible during the development, construction, and operation of the pilot plant.

☐ Specialist concurs.

4. Equipment:

Total Negotiated Equipment Costs: EX 4 | Not Applicable, the recipient did not propose Equipment costs: ☐

Project Officer:

The type(s) of equipment proposed in the negotiated budget is/are reasonable for the scope of work: ☒

The cost of equipment proposed in the negotiated budget are reasonable: ☒

Is there any proposed equipment with a total cost exceeding $50,000: ☐ Yes ☐ No (If yes, please fill out the following table with the negotiated costs and basis of cost, i.e. historical price or vendor quote)

Equipment	Total Cost	Purpose of Equipment	Basis of Cost
	REDACTED EXEMPTION 4		

If the negotiated equipment budget is greater than $100,000 or greater than 15% of the total negotiated budget, please explain the costs and rationale below:

The equipment that Solazyme is purchasing from vendors is

The costs presented for this equipment are reasonable based on the size and type of equipment listed.

☐ Specialist concurs.

5. Supplies: REDACTED EXEMPTION 4

Total Negotiated Supplies Costs:	Not Applicable, the recipient did not propose Supplies costs: ☐

Project Officer:

The types /quantities of supplies proposed in the negotiated budget are reasonable based on the scope of work: ☒

The costs of supplies proposed in the negotiated budget are reasonable: ☒

If the negotiated supply budget is greater than $100,000 or greater than 15% of the total negotiated budget, please explain the costs and rationale below:

REDACTED EXEMPTION 4

es.

☐ Specialist concurs.

6. Contractual:

Total Negotiated Contractual Costs: REDACTED EXEMPTION 4	Not Applicable, the recipient did not propose Contractual costs: ☐

Project Officer:

The subrecipients proposed in the negotiated budget are appropriate for the scope of work: ☒

The contractual costs proposed in the negotiated budget are reasonable: ☒ Yes

Please fill out the following table with the negotiated costs:

Subrecipient/ Vendor Name	BP 1 Cost	BP 2 Cost	Total Cost	Role in Project (Identify SOPO Tasks)
REDACTED EXEMPTION 4				

Did the Recipient propose any subrecipients with total costs above $250,000? ☒ Yes ☐ No (If Yes, a separate Technical Evaluation/Negotiation Memorandum is required for each subrecipient/vendor – see below)

☐ Specialist concurs.

***For awards to corporations and nonprofits**, full reviews of their individual sub-recipients will be conducted for sub-recipient work with total costs (including cost share) greater than or equal to $250,000 or greater than or equal to 50% of the total project costs, whichever is less. **For awards to Universities, States, and Local Governments**, full reviews of their individual sub-recipients will be conducted for sub-recipient work with total costs (including cost share) greater than or equal to $500,000 or greater than or equal to 25% of the total project costs, whichever is less.*

Full reviews consist of Tech Evaluation/Negotiation Memos covering reviews of budgets, budget justifications, and scopes of work. ***For all sub-recipients costs that are below these thresholds, projects must continue to be assessed for reasonableness on the basis of the explanation (cost and brief description of work) presented by the Recipient in their application.***

7. Construction:

Total Negotiated Construction Costs: $	Not Applicable, the recipient did not propose Construction costs: ☒

Project Officer:

The type of construction proposed in the negotiated budget is appropriate for the scope of work: ☐

The construction costs proposed in the negotiated budget are reasonable: ☐

☐ Specialist concurs.

8. Other Direct Costs:

Total Negotiated Other Direct Costs: REDACTED EXEMPTION 4	Not Applicable, the recipient did not propose Other Direct costs: ☐

Project Officer:

The types of other direct costs proposed in the negotiated budget are reasonable for the scope of work: ☒

The costs proposed in the negotiated budget for other direct costs are reasonable for the scope of work: ☒

If the negotiated other direct cost budget is greater than $100,000 or greater than 15% of the total negotiated budget, please explain the costs and rationale below:

The other direct costs in this project relate to the storage and transportation of the finished algal oil to the refining partners. They are reasonable rates for the quantity and distance, and are necessary for the demonstrated integration of the pilot plant's process.

☐ Specialist concurs.

9. Indirect Charges:

Total Negotiated Indirect Costs: REDACTED EXEMPTION 4 | Not Applicable, the recipient did not propose Indirect Costs: ☐

Specialist:

Does the Recipient have an approved rate agreement: ☐ Yes ☐ No

If Yes, List the Date of Rate Agreement: _____

Cite Federal Cognizant Agency: _____

If No, select one of the following:

☐ Rate proposal was reviewed by the Cost/Price Analyst and found to be reasonable, allowable, and allocable (attach Cost/Price Analyst Determination)

☐ Rate Proposal was reviewed by the Cost/Price Analyst for a previous award (attach Cost/Price Analyst Determination)
List Date of review: _____

☐ Specialist determined that rate was reasonable

☐ Other: _____

Please fill out the following tables with the negotiated costs:

Base Item	Base Cost	Rate	Indirect Cost
Example Only: Modified Total Direct Costs	*$100,000*	*25%*	*$25,000*
Total:			

The indirect costs proposed in the negotiated budget were appropriately applied and are reasonable: ☐

10. Cost Share:

Project Officer:

Project is a: ☐ Research ☐ Development ☐ Demonstration ☒ Other: Pilot plant

The minimum recipient's cost share required for this award is:

The recipient proposed cost share for this award is: REDACTED EXEMPTION 4

Does the proposed cost share meet the minimum requirement: ☒ Yes ☐ No

If the recipient does not meet the required cost share for this award, an explanation of the reason and authority for the reduction or waiver of the cost share requirement should be included below:

Specialist:

Is the proposed cost share: ☐ Cash ☐ In-kind (detail the amount and category below for in-kind cost share, if applicable)

	Organization	Type of Cost Share (cash or in-kind)	Cost Share Amount	Basis of Value (how the recipient calculated value)
Total				

Third Party cost share commitment letters have been obtained: ☐ (Please include letters in permanent STRIPES file)

B. The following Project Officer and Specialist evaluation and negotiation commentary and recommendations address their agreement on all additional considerations for this award.

Specialist to complete

1. Please list any other special provisions agreed upon for inclusion in this award and describe the rationale for their inclusion below.

REDACTED
EXEMPTION 4

Project Officer to complete

2. If a negotiation strategy, or strategies, is/are specified in the selection statement, provide a discussion below of how this was addressed and resolved.

Solazyme was required to cost share fron o 20%. Solazym cost share

Solazyme was required to hav contingency on total project cost.

Comment [CL4]:

REDACTED
EXEMPTION 5
(Deliberative process)

3. Any other comments or concerns of the Project Officer and/or Specialist for this award, and the recommended approach to mitigating them, will be explained and addressed below.

Project Officer to complete

4. Is this a Recovery Act award? ☒ Yes ☐ No

- If Yes, does the Buy American Act apply (see applicability below)? ☐ Yes ☒ No
- If Yes, does Davis Bacon Act apply (see applicability below)? ☒ Yes ☐ No

If the answer to either the Buy American Act or Davis Bacon Act questions is Yes, provide a short discussion below on: 1) the type of entity; 2) what applies; Davis Bacon, Buy American, or both; 3) whether it applies to the prime, subrecipient, or both; and 4) work to be performed that requires applicability of Buy American and/or Davis Bacon.

Solazyme, their subrecipients, contractors, vendors, and other entities involved in this project will comply with Davis Bacon Act requirements where those requirements are applicable for this project.

Buy American Applicability for Recovery Act Awards: *If the applicant's project involves construction, alteration, maintenance, or repair of a* ***public building or public work of a governmental entity*** *then the Recovery Act's Buy*

American requirements apply (to the prime and/or the Subrecipient). If not, then those requirements are inapplicable. The implementing regulations define public building and public work to mean a public building of, and a public work of, a governmental entity including the United States; the District of Columbia; commonwealths, territories, and minor outlaying islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions. The public building or public work must be located in the United States. See 2 CFR § 176.140. The implementing regulations may be found at the following link: http://edocket.access.gpo.gov/2009/pdf/E9-9073.pdf

Davis Bacon Applicability for Recovery Act Awards: *If the applicant's project involves any resultant contracts that are in excess of $2,000 for construction, alteration or repair (including painting and decorating), then the Recovery Act's Davis Bacon requirements apply. The Davis Bacon and Related Acts (DBRA) requires all contractors and subcontractors performing work on federal contracts in excess of $2,000 to pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits for corresponding classes of laborers and mechanics employed on similar projects in the area. The prevailing wage rates and fringe benefits are determined by the Secretary of Labor for inclusion in covered contracts.*

Complete this section for each subrecipient with proposed total costs of $100,000 or more. Otherwise, delete this section.

***For awards to corporations and nonprofits**, full reviews of their individual sub-recipients will be conducted for sub-recipient work with total costs (including cost share) greater than or equal to $250,000 or greater than or equal to 50% of the total project costs, whichever is less. **For awards to Universities, States, and Local Governments**, full reviews of their individual sub-recipients will be conducted for sub-recipient work with total costs (including cost share) greater than or equal to $500,000 or greater than or equal to 25% of the total project costs, whichever is less.*

*Full reviews consist of Tech Evaluation/Negotiation Memos covering reviews of budgets, budget justifications, and scopes of work. **For all sub-recipients costs that are below these thresholds, projects must continue to be assessed for reasonableness on the basis of the explanation (cost and brief description of work) presented by the Recipient in their application.***

Subrecipient: REDACTED EXEMPTION 4

SECTION II – NEGOTIATION SUMMARY

Project Officer/Specialist to complete:

1. Please record any significant application or budget submissions that resulted in a revised budget in the Negotiation History Table below (including SF424A, budget justifications, e-mails, etc.):

Application/Budget Submission	Reference Document	Date of Submission	Summary of Change
Original			
Revision 1	REDACTED EXEMPTION 4		
Revision 2			
Revision "n"			

2. Complete Budget Table below (only include the original budget and final negotiated costs – the Percent of Total Negotiated Budget will calculate automatically)
Note: List proposed amounts by category even if there are no differences in the dollar amount.

Element of Cost	Original Budget Submission	Final Negotiated Costs	Percent of Total Negotiated Budget	Fringe Benefits and Indirects	
				Proposed Rate	Negotiated Rate
Personnel					
Fringe Benefits					
Travel					
Equipment					
Supplies					
Contractual					
Construction					
Other					
Total Direct Charges					
Indirect Charges					
TOTAL					
Program Income					
DOE Share (non-FFRDC)					
DOE Share (FFRDC)					
Total DOE Share					
Non-Federal Cost Share					

REDACTED EXEMPTION 4

SEE ATTACHED SF 424A FOR BUDGET PERIOD BREAKDOWN

3. Is the original budget the same as the negotiated budget: ☒ Yes ☐ No

If No, please check all boxes that apply:

- ☐ Change in the Project Scope
- ☐ Changes due to Time Delays
- ☐ Math Errors in Budget
- ☐ Changes in Indirect/Fringe Costs Caused Changes in Direct Costs or Total Project Costs
- ☐ Indirect/Fringe Rates incorrectly applied
- ☐ Other (explain) _____

4. Briefly describe and explain any substantial change(s) to the original Statement of Project Objectives submitted by the recipient:

Project Officer commentary:
N/A

SECTION III – TECHNICAL EVALUATION SUMMARY

A. For each cost category, the Project Officer and the Specialist will complete his/her Technical Evaluation of the Negotiated Costs to confirm that they are all reasonable, allowable, and allocable. Additional comments should be added as necessary and as indicated below.

1. Personnel:

Total Negotiated Personnel Costs:	Not Applicable, the recipient did not propose Personnel costs: ☐

Project Officer:

The labor hours proposed in the negotiated budget are reasonable for the scope of work: ☒

The labor mix proposed in the negotiated budget is reasonable: ☒

Specialist:

Please fill out the following table with the negotiated costs:

Labor Type	Budget Period 1			Budget Period 2		
	Hours	Rate	Total	Hours	Rate	Total
			REDACTED EXEMPTION 4			

Negotiated labor rates are reasonable: ☐ (Please attach supporting documentation e.g. www.salary.com, if applicable)

2. Fringe Benefits:

Total Negotiated Fringe Benefit Costs:	Not Applicable, the recipient did not propose Fringe Benefit costs: ☐

Specialist:
Does the Recipient have an approved rate agreement: ☐ Yes ☐ No

If Yes, List the Date of Rate Agreement: _____
Cite Federal Cognizant Agency: _____

If No, select one of the following:
☐ Rate proposal was reviewed by the Cost/Price Analyst and found to be reasonable, allowable, and allocable (attach Cost/Price Analyst Determination)

☐ Rate Proposal was reviewed by the Cost/Price Analyst for a previous award (attach Cost/Price Analyst Determination)
List Date of review: _____

☐ Specialist determined that rate was reasonable

☐ Other: _____

Please fill out the following table with the negotiated costs:

	Personnel	Total Cost	Fringe Rate	Cost
Example Only	*Principal Investigator*	*$100,000*	*25%*	*$25,000*
Total:				

The fringe benefit costs in the negotiated budget were appropriately applied and are reasonable: ☐

3. Travel:

Total Negotiated Travel Costs: $	Not Applicable, the recipient did not propose Travel costs: ☒

Project Officer:

The number and type of trips proposed in the negotiated budget are reasonable for the scope of work: ☐

The costs per trip proposed in the negotiated budget are reasonable: ☐

Is foreign travel included in the negotiated budget: ☐ Yes ☐ No (If yes, please fill out the following table with the negotiated costs below)

Location	Total Cost	Rationale for Foreign Travel

If the negotiated travel budget is greater than $100,000 or greater than 15% of the total negotiated budget, please explain the costs and rationale below:

☐ Specialist concurs.