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1.3. Staffing Plan

Following is the detailed staffing plan, including names and affiliations for the Solazyme Integrated Biorefinery (SzIBR) project.

Name	Affiliation	Responsible for
Period 1: Preliminary Activities		
David Brinkmann	Solazyme, Inc.	
Nick Lurty	Solazyme, Inc.	
Peter Licari	Solazyme, Inc.	
Tyler Painter	Solazyme, Inc.	
Matthew Frome	Solazyme, Inc.	
Orlando Romero	Solazyme, Inc.	
Todd Potas	National Resource Group, LLC	
Jeff Haney	Cherokee	
Greg Spancake	Cherokee	REDACTED EXEMPTION 4
Bob Wooley	Abengoa	
John Cuzens	Blue Fire	
Period 2: Construction and Operation		
David Brinkmann	Solazyme, Inc.	
Nick Lurty	Solazyme, Inc.	
Felipe Arana	Solazyme, Inc.	
Steve Decker	Solazyme, Inc.	
Matthew Frome	Solazyme, Inc.	
Peter Licari	Solazyme, Inc.	
Tony Day	Solazyme, Inc.	
Tyler Painter	Solazyme, Inc.	
Jeff Haney	Cherokee	
Greg Spancake	Cherokee	
Bob Wooley	Abengoa	
John Cuzens	Blue Fire	
Glen Meier	REG	
Andrea Bozzano	UOP	

Table PMP 1.3 — Staffing Plan

Period 3 Staffing Plan – Extended Operation

As per Period 2 operation only

1.4. Communication Plan

The communication plan will implement a hub and spoke model with the Solazyme manager privy to all material communication regarding the project as shown in Figure PMP-1.4. Special attention will be accorded to facilitating the critical communication channel between Solazyme and Cherokee.

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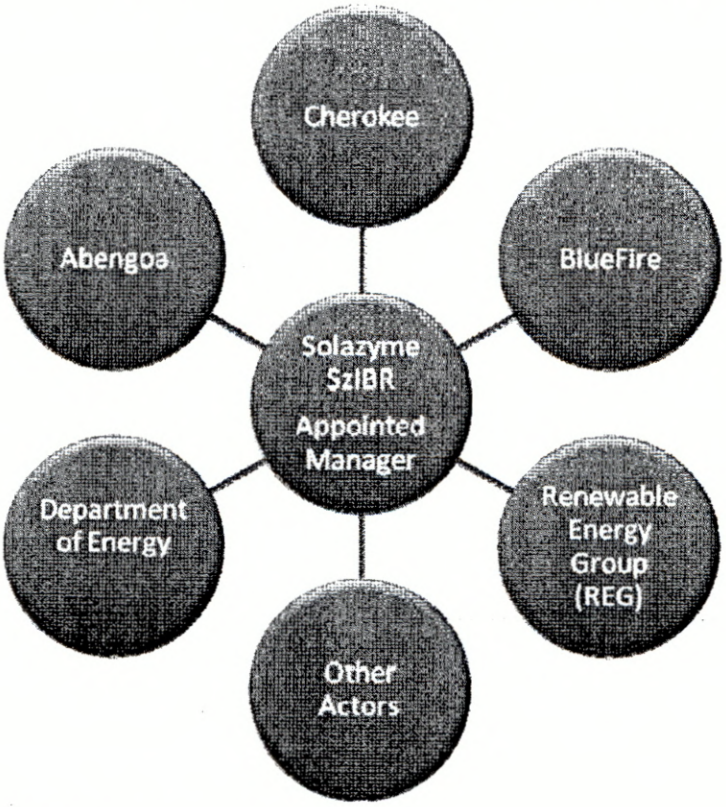

Figure PMP 1.4 – Hub and spoke communication model

Tables PMP 1.4a and PMP 1.4b represent the communication plan matrix for the Solazyme Integrated Biorefinery (SzIBR) project.

The matrix defines the project team, communication types, communication frequency and the information to be communicated. The construction team comprises a subset of the project team, as noted in the table below, as well as the Construction Management Agent. Meetings will be face-to-face, web-cast, and voice conference calls. Documents will be placed on central repository server and distributed by email.

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Management / Project Team	Name	Email Address
Project Manager	David Brinkmann	
Project Team	Nick Lurty (construction team)	
	Matthew Frome	
	Steve Decker	
	Orlando Romero	
	Felipe Arana (construction team)	REDACTED EXEMPTION 4
	Peter Licari	
	Tony Day	
	Jeff Haney (construction team)	
	Greg Spancake (construction team)	
	Bob Wooley	
	John Cuzens	
	Glen Meier (Period 2 only)	REDACTED EXEMPTION 6
	Andrea Bozzano (Period 2 only)	
	Todd Potas (Period 1 only)	
Management	Jonathan Wolfson	
	Harrison Dillon	
	Tyler Painter	
	Genet Garamendi	
	Jurgen Dominik	

Table PMP 1.4a – Project Team

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1.5. Procurement Plan

1.5.1. Task Overview

Solazyme will follow the "owners approval purchasing cycle" for all procurements related to the project. The Procurement Manager will work directly with the Project Manager to validate the estimates, and to adapt the procurement schedule to the master schedule, establishing procurement budgets for each phase of the project, and allocating the necessary resources to meet the procurement targets.

1.5.2. Owner Approval Purchasing Cycle

This purchasing process is applied when the owner delegates the procurement efforts to the contractor, but the owner retains control over every aspect, to be able to respond to external auditors for every expenditure. Following this procedure demands more time than the Typical Purchasing Cycle, so provisions must be made in the master schedule to minimize the impact on the project completion date.

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1.5.3. The phases of the procurement effort will be identified as follows:

- Conceptual Phase. (Completed)
- Planning Phase. (Completed)
    - Prepare pre-qualification vendor list
    - Prepare pre-qualification documents
- Equipment Procurement Phase. (In Progress)
    - Prepare equipment and material requisitions
    - Pre-qualify vendors
    - Prepare request for bid
    - Obtain bids
    - Technical evaluation of bids
    - Commercial evaluation of bids
- Construction Procurement Phase.

1.5.4. Equipment Procurement Phase – (In Progress)

This is the most demanding phase of the procurement effort, because it is expected to start immediately after the project is funded and almost in parallel to the detailed design effort of specifying and sizing equipment.

Using some of the procurement information generated during the planning phase and incorporating the approved by the "owner" equipment specifications, the procurement department has issued requests for bids to obtain "firm prices", and "firm deliveries".

To carry on this procurement task it was necessary to assemble requests for bid that included as a minimum the following information:

a) Documents (cover letter, non-disclosure agreement)
b) Scope of the work (scope of supply)
c) Equipment, material or systems specifications
d) Quantities (material take off)
e) Delivery requirement (best route, time and location)
f) Commercial terms and conditions
g) Tax or no Tax (depending on exemptions)

Immediately after the receipt of the bids, the procurement department initiated the tabulation effort to compare the bids and to facilitate the technical and commercial evaluations.

The format included a list of the specifications that were submitted with the request for bid, to allow a fast and accurate technical evaluation.

To perform the commercial evaluation, the format included at a minimum involves the following items:

a) Price
b) Time of delivery (ideally what was requested)
c) Freight to the site (pre-paid and add)
d) Terms and conditions (ideally what was requested)
e) Tax or no tax (depending on exemptions)
f) Required down payment
g) Time to deliver shop drawings.

At the conclusion of the evaluation cycle, the procurement department submitted recommendations based on the rating of each bidder with sufficient background information to support the rating process.

NOTE: *Orders have not been placed yet. Current status is Bids Received.*

Upon receiving the proper authorization to proceed (at the beginning of Period 2) the equipment orders will be placed and the procurement department will assign an expediter to follow up with the vendors to make sure that the shop drawings are released to the design group ASAP (per vendor's commitment), then expedite the marked up or approved drawings from the design group back to the vendor. This cycle may have to be repeated as many times as necessary to assure that the equipment is fabricated correctly.

Once the design group releases the vendor drawings for fabrication, arrangements will be made to schedule visits to the fabrication shop by qualified inspectors.

The expediter or the procurement manager depending on the seriousness of the deficiency will handle negative inspection reports on quality or potential delays.

There are some systems being procured as "pre-assembled" skids that will require testing at the factory prior to shipment. The Project Manager will assign a team of engineers and purchasing personnel to witness the test at the factory.

The expediter will continue to work with the vendors to assure that they are proceeding with fabrication, and that nothing that the vendor expects to get from the "owner's" team could be used as an excuse to delay the delivery of the equipment.

During the negotiating of the purchase order, it is customary to define how the equipment or goods will be delivered. However, there are situations when the expediter must act to avoid shipping delays due to labor strikes, weather, cost, or government refusal to allow "oversized" items in the highways that were originally consider the best route to the site.

At the construction site the expediter or the vendor, at the time of arrival of equipment, will notify the site receiving coordinator. Arrangements will be made to coordinate the necessary labor and equipment (crane, fork truck) to unload the equipment, and immediately install it or place it in the warehouse or storage yard.

All the procurement activities are monitored (at least weekly) to keep the project team informed and to identify potential problems or delays by the procurement group, the vendor, or the design group.

As a minimum reporting for the procurement activities the following reports will be compiled:

- The purchase order report (POR)
- The material status report (MSR)
- The master equipment and vendor drawing report (ME &VDR)

1.5.5. Construction Procurement Phase

This is the second most demanding phase of the procurement effort, because as the last phase in the procurement, it tends to catch items that were accidentally omitted from the previous phases.

Following the path established during the prior procurement phases, the procurement department will work with attorneys, accountants, the owners' representative, the Project Manager, and construction manager on establishing the "contracting strategy".

This phase will start after the environmental permits are approved, the design group issues construction bid packages, and the "owner" has hired a contractor or subcontractors.

While subcontractors are given the responsibility to include materials as part of their scope of supply, there are situations when materials and services must be contracted as they were not included in the scope of supply. The construction site procurement team will perform these activities.

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The site accountant will be responsible for preparing the contracts for services, and construction work, and to coordinate with attorneys to insure that the documents will provide the proper legal protection to the "owner".

As the progress of the contracts is monitored, there is a need for the site procurement team to be knowledgeable on the interpretation of the contracts, to prevent overcharges due to high earned value estimates.

Progress payments approvals will be generated by the site procurement team, based on the equipment deliveries, and services performed.

It is imperative to require "lien releases" for services rendered, prior to each progress payment, and particularly important prior to the release of retainages.

Once the project is built and commissioned, it will be necessary to obtaining "certificates of operation" from the local authorities and "certificates of acceptance" from the plant user.

1.6. Construction Management Plan

Solazyme proposes to "construct" the SzIBR on the site of team member Cherokee Pharmaceuticals' existing commercial facility in Riverside, PA. The Cherokee plant manufactures numerous active pharmaceutical ingredients, biopesticides, and nutraceuticals

An experienced project engineering design and construction firm will be contracted to act as the Construction Management agent for the design, engineering, construction and commissioning of the SzIBR. Firms which will be considered for this role include the following:

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1.6.1. Approach

A design – bid – build project delivery system will be employed to bring this project to completion, whereas pre-qualified contractors / vendors will be solicited to provide the various elements necessary to construct the facility on a "fast track" basis as design documents become available from the engineering service provider. This process will be overseen by the Construction Management agent in consultation with both Jeff Haney at Cherokee and David Brinkmann, the Project Manager. No major decisions will be made, or expenditures incurred, without sign-off by David Brinkmann.

Pre-construction phase activities EX 4

- Review preliminary design documents to develop a baseline understanding of the project status.
- Review project design criteria and establish Quality Assurance protocol.
- Review Process Flow Diagrams (PFD's) and Process and Instrumentation Diagrams (P&ID's), if available, to gain an understanding the process.

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- Review mechanical equipment layout concept to determine the required building size and configuration.
- Review the process equipment list and specifications for content and pricing status.
- Review Work Breakdown Structure (WBS) for completeness.
- Review preliminary overall project schedule and spend plan.
- Provide preliminary risk analysis to identify risk associated with preliminary design documents and recommend plan for mitigation.
- Conduct "value engineering" session to identify areas of potential cost savings.
- Expand overall project schedule and identify the critical path.
- Expand WBS to be inclusive of all aspects needed to support construction and establish a Schedule of Values (SOV) as a base line for tracking Earned Value.
- Define project team responsibilities.
- Implement project controls.
- Develop project communication protocol and establish team meeting schedule.
- Issue Non-Disclosure agreements to selected vendors and contractors.
- Issue pre-qualification packets to selected contractors.
- Reach agreement of construction contract format for contract administration (AIA, EJCDC)

Procurement phase activities

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- Procure specified equipment. Procurement will be on the owner's paper to assure that all guarantees and warrantees are passed through to the owner.
- Compare equipment quotations to WBS schedule of values.
- Monitor and report on equipment procurement status on a bi-weekly basis.
- Develop construction bid packages.
- Qualify construction bids and secure contracts.
- Monitor and report on construction procurement status on a bi-weekly basis.

Construction phase activities

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- Provide construction safety management in compliance with OSHA 29 CFR 1910 and any site-specific safety requirements.
- Provide on-site document control and distribution.
- Provide on-site receiving and receiving reports.
- Manage construction contracts.
- Monitor critical path construction schedule and provide bi-weekly updates.
- Monitor WBS schedule of values and report on earned value on a bi-weekly basis.

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- Check out and start up phase activities:
  - Motor rotational checks.
  - Instrumentation checks.
  - System installation qualification checks.
  - System operational qualification checks.
  - Water runs.
  - Validate entire integrated process.

Construction Management Plan staffing requirements:

- Construction Manager
- Construction Superintendent
- Safety Manager
- Document control/ receiving clerk
- Purchasing Agent
- Project Accountant

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2. Detailed Schedule

See Figure PMP 2.1 – 2.3 for the detailed project schedule for the Solazyme Integrated Biorefinery (SzIBR) project. The detailed project schedule is shown in two sections for clarity.

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Figure PMP 2.1 – Detailed project schedule – part 1

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3. Key Project Decision Points and Stage Gates

Table PMP – 3.0 depicts the key project decision points incorporating the stage gate review approach that will be utilized for the Solazyme Integrated Biorefinery (SzIBR) project. The stage gate review will be coordinated via the communication plan outlined in PMP section 1.4 and in conjunction with the detailed list of key project decision points.

Stage gate review will involve the project and management teams. It will take into consideration all gating factors to determine if progress to the next stage is technically and economically justified. The CEO in consultation with the CTO and the Project Manager will make the final decision.

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4. Project Milestones

Table PMP – 4.0 depicts the detailed project milestones through Periods 1, 2 and 3 for the Solazyme Integrated Biorefinery (SzIBR) project. The milestone review will be coordinated via the communication plan outlined in PMP section 1.4.

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5. Detailed Resource Loaded Schedule

See Table PMP 5.0 for the detailed resource loaded schedule for the Solazyme Integrated Biorefinery (SzIBR) project.

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6. Detailed Spend Plan

See Tables PMP 6.0a- 6.0b for the detailed spend for the Solazyme Integrated Biorefinery (SzIBR) project.

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Figure PMP 6.4 – Cumulative Cost Graph

7. Risk Management Plan

7.1. Risk Management Strategy

Following is the risk management methodology that will be followed for the Solazyme Integrated Biorefinery (SzIBR) project.

This risk management process has been adapted to be scalable to ensure that the level, type, and visibility of risk management are commensurate with both the risk and the importance of this project.

A. Preliminary Risk Identification – Risks are identified in Table PMP-7.0, listing significant risk factors. Risks will continue to be identified as additional parts of the project management plan are implemented (i.e. project monitoring, project controlling, procurement plan and construction management plan). Additional risks will be identified up to and during Period 1.

B. Risk Impact Assessment – For each risk identified, the risk will be assessed in terms of likelihood of occurrence and its effect on project objectives if the event occurs. This information will be used to prioritize the risk and develop a mitigation strategy.

C. Risk Response Planning – Each risk will be reviewed as part of the project review meeting for risk management as outlined in PMP section 1.4 – Communication Plan. The review meetings will determine the options and actions to reduce the likelihood or consequences of impact to the project's objectives. The results of the review meeting will provide an appropriate response for planning the actions to be taken to mitigate the risks.

D. Monitor Risk:

- Systematic reviews are scheduled and outlined in section 1.4 – Communication Plan.
- These reviews will ensure:
  - All of the requirements of the Risk Management Plan are being implemented
  - Assess currently defined risks
  - Evaluate effectiveness of actions taken
  - Status of actions to be taken
  - Validate previous risk assessment (likelihood and impact)
  - Validate previous assumptions
  - State new assumptions
  - Identify new risks

E. Control Risk:

- Validate mitigation strategies and alternatives
- Take corrective action when actual events occur
- Assess impact on the project of actions taken ($$, time, resources)
- Identify new risks resulting from risk mitigation actions
- Ensure the Project Execution Plan (including the Risk Management Plan) is maintained
- Ensure change control addresses risks associated with the proposed change. Change control is addressed in great detail in section PMP section 8.3- Management of Change Plan (MOC)–Production.
- Revise Risk Response Plan

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7.2. Project Risks and Mitigation

It is anticipated that project milestones and schedules may change as new information is generated and unforeseen operational problems such as equipment delivery delays or breakdowns occur. When these occur, project risks and mitigation will be re-evaluated during regular meetings as outlined in the Communication Plan. Elements of effective risk management include the following:

- Experienced project team.
- Complete and effective design criteria.
- Clear project objectives.
- Clear and effective communications.
- Identify the nature of any uncertainties.
- Effective decision making.
- Effective risk control measures.
- Earned value management.
- Critical path scheduling.
- Management of change.

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Table PMP 7.0 – Project risk factors and mitigation strategies

NOTE: The proposed project schedule includes four months to gather NEPA documentation and obtain a CX. If an EA or EIS is required, the transition to Period 2 could be delayed without incurring any expense. The separation between Period 1 and Period 2 is a logical break point.

7.3. Preliminary Process Hazard Analysis (PHA)

Overview

The Construction Management Agent witl perform HAZOP analysis using a formally structured method of systematically investigating each piece of equipment in the SzIBR process. This information will be assembled in the most detailed of the four OSHA recommended formats, 29 CFR. 1910.119. The hazard and operability problems will be determined by a study of the Piping and Instrument Diagrams (P&ID's) and the equipment Standard Operating Procedures (SOPs). NFPA guidelines are also utilized where applicable. The analysis is assembled into the following categories:

- Deviation
- Causes
- Consequences
- Safeguards
- Hazard Category
- Recommended Changes

Project personnel with extensive operational and start-up experience will critically analyze the system design for potential problems arising in each component of the plant operation. Possible causes of failure will be identified. Important parameters that can deviate from the intended design conditions and their associated Consequences will then be identified. A Hazard Category will be assigned based on Frequency and Severity. The P&ID, SOP, and NFPA documents will be used to ensure that the proper instrumentation, alarms and interlocks are incorporated as Safeguards into the design to prevent injury, loss of life, significant equipment damage, and production downtime.

Multiple concurrent failures will also be included in the analysis and recommendations appropriate to risk management will be provided.

Cause

The causes are developed first through critical thinking analysis of what can go wrong. This is accomplished by asking the question "what if" there is a:

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Depending on the equipment, some of these may be Deviations or Consequences; however, most are Causes. Since instruments and DCS systems have been developed to include a certain level of self-diagnostic capability, the HazOp is limited to equipment. The intent is to "poke holes" in the design and look for weaknesses.

Deviation

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Pertinent parameters are selected, such as Then the effect of deviations from design conditions of each parameter is examined. A list of key words, such as is selected for use in describing each potential deviation.

Consequences

The Consequences list an event or chain of events associated with the deviation. Consequences are listed as if there were no safeguards in place. The consequence could be as simple as plugging a spout or as complex as The consequences are listed to assist in determining the Severity of the problem.

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Hazard Category

The Hazard Category is a number and a letter that corresponds to the Severity and Frequency of a deviation.

Severity

1 – Catastrophic	Over $10,000 in equipment damage and 24 hrs in downtime
2 – Critical	$1000 – 10,000 in equipment damage and less than 24 hrs downtime
3 – Marginal	Minimal expense or less than 4 hrs downtime
4 – Negligible	Minimal expense or interruption

Frequency

A – Frequent	More than once a month
B – Probable	Once in 1-3 months
C – Occasional	Once in 3 – 12 months
D – Remote	Less than once a year
E – Improbable	Rarely ever occurs

For example, in most parts or the country, it is common to lose power 3 or 4 times a year. Therefore, Loss of Power automatically gets a "C" designation for frequency. If this is the the Severity gets a because if no course of action is taken, there will most likely be a

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Safeguards

Safeguards are reactive measures that are taken to prevent the possible Consequences. It is important to note that the Safeguards do not address the Deviation or Cause. For example, motorized equipment will stop when there is a power failure. There is nothing that can be done to prevent the power failure; however, reactive measures can be put in place to prevent the Consequences from spiraling into a catastrophic failure.

As a general guideline, if the Hazard Category is a 1,2 and A, B, C, then instrumentation and alarms/interlocks should be put in place to prevent the loss.

Standard Operating Procedures (SOPs)

In order to complete a HAZOP, SOPs are required of all complex process equipment including all the controls included with each package and a written description of the control logic of each control system. Complex equipment includes

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The process equipment SOPs are required in order to perform a HAZOP analysis because the HAZOP team has to know if the risk of each possible process deviation is managed properly or if additional controls or procedures are required to insure the safety and operability of operation.

8. Quality Assurance / Quality Control Plan (QA/QC)

8.1. Design Quality Assurance/Quality Control (QA/QC).

The Project Management Plan establishes the general requirements for Quality Assurance/Quality Control (QA/QC) to be used during the design phase. Standard design QA/QC documents will be utilized. The design QA/QC procedures include the following:

- An overall design QA/QC Plan.
- Design standards to be adhered to.
- Procedures for preparing and checking individual plans, specifications, estimates, calculations, and other submittal items.
- Procedures for coordinating work performed by different persons for related tasks, to ensure that conflicts, omissions, or errors do not occur between drawings or between drawings and other design documents.
- Procedures for coordinating and obtaining permits from permitting agencies, utility companies, and railroad companies.
- Peer reviews are staged at the 30%, 60% and 90% design completion and include constructability, operability and maintainability reviews.
- Procedures for reviewing and checking design drawings and documents required during construction. Pre-construction review phase.
- Documentation and submission procedures to ensure that the established design QA/QC procedures have been followed.

8.2. Construction Quality Assurance/Quality Control (QA/QC).

The Project Management Plan establishes the general requirements for Quality Assurance/Quality Control (QA/QC) to be used during the construction phase. Standard construction QA/QC documents will be appropriate. The construction QA/QC procedures include the following:

- An overall Construction QA/QC Plan.
- Construction standards to be adhered to for performing construction inspection. Frequency and agency involvement for construction coordination (progress) and/or partnering meetings.
- Procedures for coordinating with permitting agencies, utility companies, and railroad companies during construction to ensure that all requirements are incorporated into the project such that the overall project schedule is not delayed.
- Level and frequency of inspections to identify and correct any deficiencies in the project construction that do not meet the requirements of the plans, specifications, and other binding documents.

- Qualifications for all key construction personnel.
- Documentation and submission procedures to ensure that the established construction QA/QC procedures have been followed.

8.3. Management of Change Plan (MOC)-Production

8.3.1. Approach

Manage changes for operations and quality processes so that:

- The rationale for change, anticipated results, acceptance criteria and testing (if required) are evaluated and approved prior to initiation.
- The proposed change conforms to all regulatory and quality requirements applicable to the process.
- Documents affected by the change are revised and proper training has been conducted.
- Changes are communicated to the proper personnel.

8.3.2. Scope

The Management of Change Plan describes the procedure to be used when making changes to processes within the following areas: Operations, Chemical Labs, Customer and Quality Support Systems and/or other controlled systems. Examples of these changes include, but are not limited to:

- Standard Operating Procedures (SOPs), Work Instructions, Forms and Lists
- Changes in equipment and/or instrumentation
- Computer/control systems
- Methods
- Documentation and/or protocols
- Product specifications
- Materials
- Utilities

The Management of Change Plan does not apply to replacement with identical equipment, instrumentation, parts, etc.

8.3.3. Responsibilities

Requestor

- Initiates Process Change Order (PCO).
- Communicates the change to approvers (i.e. by attending change control meetings or communicating directly with each approver).
- Works with change owners and quality representatives to identify all approvers of the change.
- Works with various managers (Quality, Operations, Laboratory, etc.), as necessary, to determine documentation needed to complete the change.
- Ensures that the required approvals are obtained during each step of the PCO in order to proceed with the change.
- Ensure that the required resources are available to implement the change.
- Prepares, executes and completes documentation protocols or test plans as required.
- Ensures the training documentation is completed as the process change is being implemented.
- Ensures that the PCO is brought to closure in a timely manner.

PCO Facilitators (Document Specialists)

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- Receives PCO requests.
- Schedules and conducts change control meetings or verifies that proper PCO approvals are obtained.
- Ensures the change is documented correctly in the PCO files.
- Ensures that documents are issued as per the change owner's direction.
- Coordinates the overall PCO process.

Approvers – Change Owners

- Reviews and approves PCO requests.
- Provides review and approval of documentation protocols, test plans and other documentation as required by the change.
- Works with requestor to determine and complete documentation (i.e. SOPs, forms, HMI graphics, etc.) that requires updating to proceed with the change.
- Provides training support and resources to ensure that the required training is completed in a timely manner.

Approvers – Quality Representatives

- Reviews and approves PCOs to assure that the changes comply with quality system requirements.
- Reviews and approves change order request to assure that method changes are consistent with established scientific principles and changes in methods and/or procedures are in accordance with industry accepted standards.
- Works with requestor to determine and complete attachments for Installation Qualifications (IQ), Operational Qualifications (OQ), Performance Qualifications (PQ) and test plans.
- Provides review and approval of documentation protocols, test plans and other documentation as required by the change.

Supporting Departments / Partners

- Reviews and approves PCOs as necessary.
- Works with the requestor to determine and complete documentation that requires updating in the supporting departments and/or partners to proceed with the change.
- Works with the requestor to ensure that the appropriate resources are available to implement process changes to established quality systems within the supporting departments and/or partners.

9. Earned Value Management System (EVMS)

The EVMS that will be utilized for the SzIBR project is comprised of several well structured and time proven formats that will adhere to ANSI/EIA 748-A-1998, DOE Order 413.1A, and DOE M 413.3-1 guidelines. A software package, such as Timberline™ will be used to integrate financial and project management data.

9.1. GENERAL OVERVIEW

A. Organization – Most of the Contractual Responsibilities have been defined, and the subcontractors have been briefed on their anticipated effort. The scope of work and completion times of the major subcontractor's responsibilities has also been identified.

B. Planning, Scheduling and Budgeting – A database format has been created to assign value to each of the project's milestones. This allows for the establishment of budgets for work through various cost types (labor, material, equipment, etc.), and facilitates the measurement of progress of task performed internally and by subcontractors.

C. Accounting – During the planning phase the accounting department manager participated on the project budget allocation task, and each project milestone was assigned area and subarea numbers to facilitate detailed tracking of the cost. At the end of the month the accounting department will work with the Project Manager to confirm that the charges to each account are accurate, and that the invoicing task can continue as planned.

D. Analysis and Management Reports – The schedule variance analysis will be performed weekly, and summarized by the end of each month to identify the amount of budget earned for the period. The cost variance analysis will also be performed weekly, and summarized by the end of each month to compare the budget earned against the actual cost for each task. It is customary and critical to report the reasons for unexpected changes of schedule variance and cost variance (higher or lower), as this is indicator of how the project is performing in budget and schedule. The report must include forecasts of budget and schedule to complete the project.

E. Revisions and Data Maintenance – Authorized (signed) change orders will be used to increase or reduce the overall budget. The Change Order's will be tracked individually, but the overall budget will be adjusted to reflect an accurate earned value (or percent completion).

9.2. Performance Measurement Baseline

A. Total Project Cost and Project Schedule – Define the WBS into work packages to allow for tracking of subcontractors' responsibilities, cost and timeline for each work package

B. Risk Management – Will define risk ownership, identify potential risks to both the budgeted cost and schedule along with a course of action of any risks and the possible mitigation of such.

C. Value Management/Engineering – Indicated through the baseline and milestones that are determined prior to the project beginning.

D. Project Controls – Assigns the responsibility of monitoring the schedule and budget and will ensure the project is going according to plan with the WBS and PMB.

9.3. Project Controlling

A. Cost – Use a cost variance (reference above to 9.1.D)

B. Schedule Position – Use a schedule variance (reference above to 9.1.D)

9.4. Financial Controlling

A. Estimate to Complete – Tracking of all direct costs and indirect costs that will be incurred between a specific point in time and the expected project end date. Also, include all future costs for items that were in addition to scopes that will be labeled in change orders.

B. Estimate at Completion – All previously recorded costs along with the estimate to complete and additional indirect costs that will potentially be allocated to the project.

C. Elaborate past for controlling the future – Tracking of previous schedule and cost variances to determine if the schedule is behind, on track or ahead of schedule to determine if any unexpected costs or savings will be incurred to get on schedule or remain on schedule.

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10. Invoicing System Plan

Invoicing throughout the project will be based on criteria being met through milestones that are set in place. Milestones are indicated throughout the Work Breakdown Structure (WBS) and the Performance Measurement Baseline, outlined in section 9.2. Invoicing will occur on a monthly basis and dated the 1st business day of every month.

There will be several general areas set up in the EVMS (e.g. R&D, site & civil, equipment, operations, etc.) and more defined sub-areas. Each sub-area will have a dollar amount allocated based on estimates for completion through bids, quotes, and other pre-determined cost structures that will be listed in a schedule of values (SOV). The number of milestones could vary depending on the length of time estimated for each sub-area to be completed along with the depth of scope for each sub-area. The time and intensity of each sub-area will impact the number of milestones needed on each sub-area. The EVMS will show in detail the position of invoicing through the previous billings, the current billings and the remaining amount on the contract of each milestone.

With the possibility that any change orders could delay the milestones from being met, a plan of action will be created as described in the Risk Management section to avoid financial overruns.

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Clarifications:

For each facility, similar information is gathered throughout the application package. Take care to provide the same information in each location as to aid the Merit Review Committee in evaluating the application.

Each sheet should contain information specific to the facility being described. For example, if the proposed facility will sell any product, the "Break Even Sales Price" should relate to the "Proposed Facility" and not the "Future Commercial" facility.

Short Technology Description

This should only be a short, one sentence description to clarify the "Conversion Technology Type" stated above.

Project Partners

Include any other Federal or State contributions under "Other." If the contribution will be in-kind, describe what will be donated and how the value was obtained.

Yield

State the condition of the product, ie.: anhydrous, undenatured, raw.

Consumables

Examples of expenses to include in this section are (but not limited to): Chemicals such as wastewater treatment consumables or catalyst and catalyst regeneration expenses, Electricity, Natural Gas, Fermenting Organisms, Steam, Water

Budget Information - Subtotal

This subtotal should match the value stated on the SF-424a. Total Project Costs should include the allowable preparatory work, construction or modification of the proposed facility and startup costs through completion of the independent engineer performance test.

Feedstock Storage Costs

Include both onsite and offsite storage costs. Offsite storage could include storage and handling costs, such as those paid to a farmer or tree plantation.

The data contained in every page (pages 1 to 20) of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant.

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Business and Commercialization Plan

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1. Commercialization Pathway from SzIBR to Forecasted Commercial Facility

1.1. Overview of the First and Subsequent Forecasted Commercial Facilities

Commercial facilities arising out of the technology pathway embodied in this proposal will comprise a front-end module that converts lignocellulosic biomass to fermentable sugars coupled to a back-end module that converts the fermentable sugars to algal oil suitable for refining to liquid transportation fuels. The back-end module will implement Solazyme's cellulosic-sugar-to-algal-oil technology that the pilot-scale

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1.3. Value Proposition

Solazyme's value proposition for customers includes:

- *Supply the renewable, scalable, environmentally sustainable,* ***oil-based fuels*** *— including renewable diesel, biodiesel, and jet fuel — that customers want.* Solazyme is not aware of any competing technology that simultaneously satisfies all four of these critical criteria. (See PEP Sections 2.2 and 3.10.) The Energy Information Administration predicts that domestic diesel fuel prices will rise considerably over the next decade, tracking the anticipated trajectory of crude oil, yet wholesale ethanol prices will remain steady or fall in real terms. This stark contrast, which appears to be robust in EIA's model against differing assumptions about the shape of economic recovery, clearly and concisely captures the added value to the customer of converting lignocellulosic biomass to petroleum-equivalent biofuels rather than ethanol.

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- *Remain fully compatible with existing petroleum-based infrastructure — including pipelines and other forms of distribution, storage, retailing, and end-use vehicles.* Biofuels refined from Solazyme's algal oil not only displace but also directly *replace* existing petroleum-based fuels. Other biofuels, such as ethanol, imperfectly substitute for petroleum-based fuels. As mandates under the Renewable Fuel Standard (RFS) steadily increase, the amount of ethanol consumed will surpass the amount that can be blended into the domestic gasoline pool as E10 ("the blend wall"). When this occurs in the middle of the next decade, the ability of existing infrastructure to absorb more ethanol will reach an intrinsic limit that will require the nation to make a substantial capital investment to overcome and will require at least some consumers to explicitly choose unfamiliar fuels. At this point, recognition of the value of Solazyme's oil-based technology will increase substantially, enabling direct refining customers to comply with the RFS without the enormous cost of marketing new fuels and enabling indirect downstream customers to continue to utilize existing assets.
- *Deliver high quality and high performance biofuels.* REDACTED EXEMPTION 4 (-5° C)

  Renewable Energy Group, the leading US biodiesel refiner and project team member has stated, "REG has extensive experience in producing biodiesel from a wide variety of feedstock including moringa oleifera, jatropha, camelina and many others. Over the last two years, REG has received algal oil produced by Solazyme, converted the oil to biodiesel in our pilot scale production system and analyzed the quality of the finished product. We have found the final biodiesel quality to be excellent and the performance characteristics to be superior to that of other oils we have converted."

- *Deliver biofuels with extremely low sulfur content* — REDACTED EXEMPTION 4 less than 1.5 ppm for biodiesel produced to date and less than 2.5 ppm for renewable diesel.
- *Compete on cost with petroleum-derived fuels* — Estimated break-even production cost ranges from ıer gallon of purified algal oil See Section 2.5.

1.4. Justification of Federal Investment

Federal investment in the proposed project is justified because it advances several top-tier national priorities, including energy independence and security, climate and environmental goals, and economic development. Solazyme's value proposition for the collective national interest includes all the points discussed in the previous section and also the following:

- ***Connect the domestic resource potential of renewable, sustainable, high-impact lignocellulosic biomass feedstocks to production of advanced biofuels fungible with petroleum.***

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- *Address a significant fraction of the RFS requirements* — the fast commercialization pathway could potentially result in installed capacity that reaches

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- *Counteract "food vs. fuel" pressures* — Solazyme's process applied to lignocellulosic biomass not only avoids the use of food crops as a feedstock, but will also generate premium quality animal feed as a coproduct, even from biomass sources such as switchgrass.
- *Enhance energy security more than other biofuels* — by not merely displacing petroleum imports, but replacing them with a portfolio of domestic, renewable transportation fuels identical to their petroleum equivalents and fully compatible with existing infrastructure and vehicles.

Solazyme's value propositions that further justify federal investment include:

- *Enhance the value of a wide range of complementary biomass technologies already funded by DOE* — many technically promising technologies that might not be commercially viable producing ethanol (if, as EIA projects, ethanol fails to track crude oil prices upward) may become competitive if linked to Solazyme's back-end process. Solazyme's technology therefore provides a valuable hedge for a significant portion of DOE's lignocellulosic technology portfolio.
- *Deliver against promises* — Solazyme has manufactured over 2,000 gallons of purified algal oil in commercial facilities, limited only by the high cost of tolling. No other microbial biofuel company has achieved this scale with an oil-based fuel. Solazyme has demonstrated multiple refined biofuels that fully comply with applicable ASTM standards. No other microbial biofuel company has demonstrated even one unblended oil-based biofuel that meet *any* standard. Solazyme's diesel fuels have powered an unmodified diesel truck and three cars driven thousands of miles on a mix of blends ranging from 20% to 100% (neat). No other microbial biofuel company has road tested an oil-based fuel in unmodified engines at *any* blend percentage.
- *Leverage existing facilities, substantial private investment, and substantial investments by Solazyme* in R&D activities in parallel with but outside the project scope to maximize return on DOE's investment.
- *Obtain essentially a pilot-scale facility and a demonstration-scale facility for the cost of a pilot project.*
- *Execute a project plan tailored specifically for speed to address the company's commercialization objectives, national RFS goals, and ARRA objectives.*
- *Catapult the technology* — DOE funds will enable Solazyme to consolidate technology validation and demonstrations steps at a critical inflection point, accelerating progress along the commercialization pathway far faster than Solazyme could accomplish without a partnership with DOE. DOE funds will complement and enhance private investment, not replace it, and therefore achieve a large impact.

2. Commercial Vision

2.1. Critical Success Factors for the Commercialization Pathway

Critical success factors (CSFs) for the proposed pilot project (to proceed to commercialization) are discussed in PEP Section 2.1. Further CSFs for the commercialization pathway include:

- Compete on price with fuels derived from petroleum.
- Deliver high quality fuels that identically replace their fossil-fuel equivalents and remain fully compatible with all refining, storage, distribution and retailing infrastructure and existing vehicle fleets.
- Compete on value extracted from lignocellulosic feedstocks compared with other biofuel technologies.
- Assure and encourage supply of biomass feedstocks at attractive prices.
- Forge partnerships with others in the biofuel value chain (including established and emerging fuel refiners and distributors, vehicle manufacturers, feedstock suppliers, and especially companies with technologies to saccharify lignocellulosic feedstocks).
- Raise equity and debt financing after pilot-scale demonstrations to build commercial plants.
- Enable significant reductions in greenhouse gas emissions.
- Monitor, evaluate and incorporate complementary and competing technologies.
- Maintain an agile strategic posture to adapt to evolving technologies and changing market conditions.
- Diligently protect the company's intellectual property and trade secrets.