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

Vendor Name/Organization	Product or Service, Purpose/Need and Basis of Cost (Provide additional support at bottom of page as needed)	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
EXAMPLE ONLY!!! ABC Corp.	REDACTED EXEMPTION 4				

FFRDC Name/Organization	Purpose	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
	REDACTED EXEMPTION 4				
Total Contractual					

AdditionalExplanations/Comments (as necessary)

REDACTED
EXEMPTION 4

g. Construction

PLEASE READ!!!

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

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

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

Overall description of construction actiivities:

xample Only!!! - Build wind turbine platform

General Description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Three days of excavation for platform site EXAMPLE ONLY!!!			
		REDACTED EXEMPTION 4	
Budget Period 1 Total			
Budget Period 2			
		REDACTED EXEMPTION 4	
Budget Period 2 Total			

General Description	Cost	Basis of Cost	Justification of need
Budget Period 3			
		REDACTED EXEMPTION 4	
Budget Period 3 Total			
PROJECT TOTAL			

dditional Explanations/Comments (as necessary)

g. Construction

h. Other Direct Costs

PLEASE READ!!!

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

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

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

General description	Cost	Basis of Cost	Justification of need
Budget Period 1			
(AMPLE ONLY!!! Grad student tuition			
			REDACTED EXEMPTION 4
Budget Period 1 Total			
Budget Period 2			
			REDACTED EXEMPTION 4
Budget Period 2 Total			
Budget Period 3			
			REDACTED EXEMPTION 4
Budget Period 3 Total			
PROJECT TOTAL			

Additional Explanations/Comments (as necessary)

i. Indirect Costs

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

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

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

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

Additional Explanations/Comments (as necessary)

REDACTED
EXEMPTION 4

Cost Share

PLEASE READ!!!

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

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

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

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

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

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
ABC Company EXAMPLE ONLY!!!						
		REDACTED EXEMPTION 4				

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
		REDACTED EXEMPTION 4 Totals				

Total Project Cost:

Cost Share Percent of Award:

Additional Explanations/Comments (as necessary)

The data contained in every page (pages 1 to 30) 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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Project Management Plan

Project Management Plan Index:

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3. Key Project Decision Points and Stage Gates 17
4. Project Milestones 18
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1. Project Management Overview for SzIBR

1.1. Project Management Approach

Solazyme will utilize a traditional project management approach to manage the Solazyme Integrated Biorefinery project (SzIBR). At a high level, this approach consists of five components:

- Initiation stage – This stage has been completed
- Planning and design stage – This stage is 75% complete and will be completed in Period 1
- Execution and production stage
- Monitoring and controlling systems
- Completion stage

1.1.1. Initiation

The initiation stage determines the best approach and scope for the project. Solazyme has completed all of the following essential tasks:

- Analyzed business needs in terms of measurable goals.
- Reviewed current operations.
- Completed conceptual design of the pilot production facility.
- Assessed equipment and contracting requirements including long-lead items.
- Completed financial analysis of the costs and benefits including a budget.
- Established users and support personnel for the project.
- Assembled project data including costs, tasks, deliverables, and schedule.

1.1.2. Planning and Design

The status of the key elements of this stage is described below:

- Scope Planning. The scope has been defined and fixed.
- Work Breakdown Structure. The WBS has been completed at a level sufficient to ensure that it captures the full project scope and aligns properly to the project scope. In Period 1, some elements of the WBS will be expanded to an additional level of detail to correspond to effective work package units.
- Organizational Breakdown Structure. The OBS has been completed implicitly but not yet formalized. It will be formalized in Period 1.
- Design Development. The preliminary project, process and equipment designs have been completed and all major equipment items quoted. These designs will be revised as necessary in Period 1 to account for additional data obtained from vendor testing between now and the beginning of the project. Additional design that will be completed in Period 1 includes detailed engineering and preparation of Process & Instrumentation Drawings (P&ID).
- Resource Planning. Resource planning has been completed for the critical path activities to ensure no conflicts. The balance of detailed resource planning will be completed in Period 1.
- Project Schedule Development. The Gantt chart for the project has been completed to a level of detail sufficient to support and validate other planning activities. It will be completed to the full level of detail corresponding to the WBS in Period 1 to enable project control and tracking.
- Budget Planning. The budget has been completed and will be verified in Period 1. Once verified the budget will be transferred into Solazyme's accounting system.
- Procurement Planning. Vendors have been qualified and quotes obtained for all major equipment items. The remainder of the procurement process will be completed in Period 1 to enable purchase orders to be submitted in the first week of Period 2.
- Communication Planning. The communication strategy has been defined. The specific communication timetable for major meetings will be scheduled in the Period 1 calendar.
- Quality Planning. Planning for quality assurance to be applied to the project is mostly complete and will be finalized during Period 1.
- Risk Management Planning. Key project risks that impact the schedule and budget have been identified and mitigation strategies outlined. In Period 2, additional detail will be added to these contingency plans and additional risks (including process risks and operational hazards) will be analyzed.

1.1.3. Execution

The Execution phase of this project will consist of the processes used to complete the work defined in the SzIBR project management plan to accomplish the project's goals. The execution process involves coordinating people and resources, as well as integrating and performing project activities in accordance with the project management plan. The deliverables are produced as defined in the project management plan.

1.1.4. Monitoring and Controlling

The Monitoring and Controlling Phase follows the Execution Phase and will run concurrently with Period 2. Monitoring and Controlling involves the comparison of the actual performance with the planned performance and taking appropriate corrective action to get the desired results. The key benefit is that project performance is observed and measured regularly to identify variances from the project management plan.

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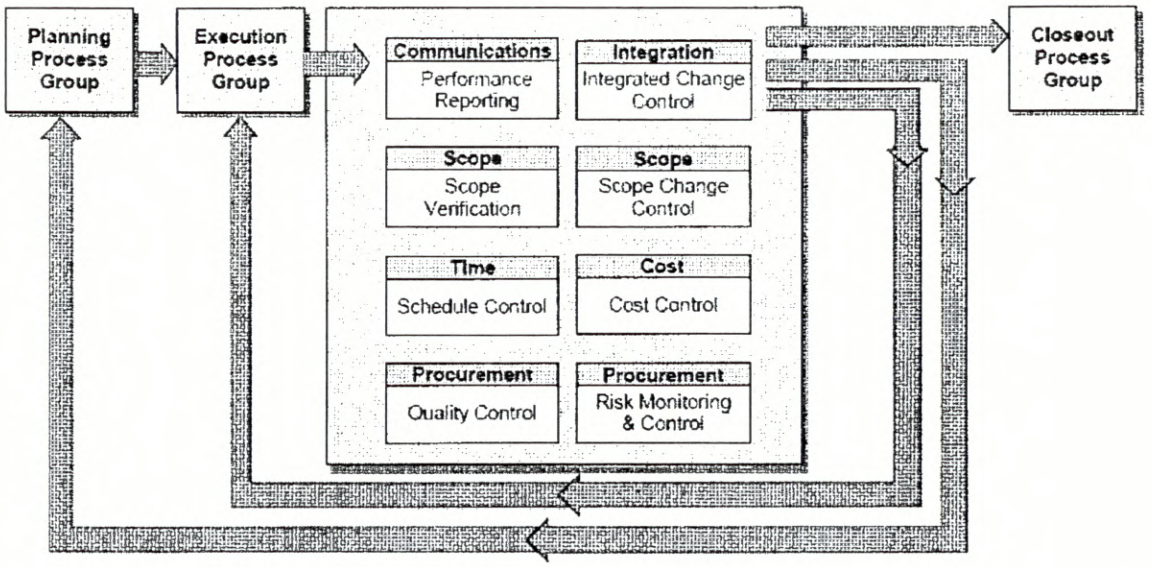

Figure PMP 1.1 – Monitoring and Controlling Phase Processes

During this phase, the Project Team is responsible for the following activities:

- Team Members execute the tasks as planned by the Project Manager.
- Project Manager is responsible for performance measurement which includes finding variances between planned and actual work, cost and schedule.
- Project Manager is responsible for providing Project Status Report to all key stakeholders to provide visibility.
- All Project Key stakeholders are responsible for the review of the metrics and variances.
- All Project Key stakeholders are responsible for taking necessary action on the variances thus determined so as to complete the project within time and budget.

The basic processes of the project Monitoring and Controlling phases will be:

- Project Plan Execution.
- Review of Metrics and Status Reports.
- Project MOC (Management of Change) Control Process. This defines the procedures to handle the changes that are introduced during the project Monitoring and Controlling phases. The procedure is covered in greater detail in section 8, Quality Assurance / Quality Control Plan (QA/QC).

The facilitating processes during project Monitoring and Controlling phases will be:

- Quality Assurance and Quality Control.
- Performance Monitoring.
- Information Distribution
- Status Reporting.
- Risk Monitoring and Control.
- Scope Control.
- Schedule and Cost Control.
- Contract Administration.

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1.1.5. Closing

A number of activities will be carried out and reports compiled and submitted at close of Period 2. Note that the SzIBR will continue uninterrupted operation following Period 2 in Period 3 outside the scope of this proposal; however, reports will continue to be provided to DOE.

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Some closing activities are outlined below.

- Independent Engineer Performance Test will be carried out at the end of Period 2.
- Administrative closure includes preparation of closure documents and process deliverables. This includes the release and redistribution of unneeded project resources.
    - All reports required according the American Recovery and Reinvestment Act of 2009 will be finalized and submitted.
    - All other required reports required for closeout, such as Patent and Property Certification will be compiled and submitted.
    - IEPT Report submitted.
- Development of the project post implementation evaluation report include:
    - Project sign-off
    - Staffing and skills
    - Project organizational structure
    - Schedule management
    - Cost management
    - Quality Management
    - Customer expectations management
    - Lessons learned

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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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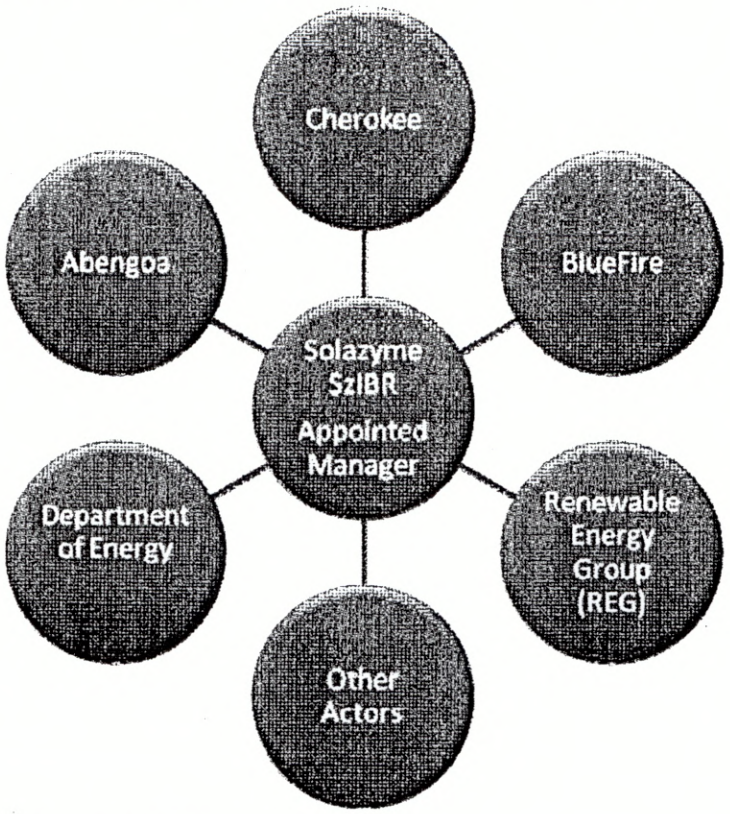

Figure PMP 1.4 – Hub and spoke communication model

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.

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.