Equipment Item	Qty	Unit Cost	Total Cos	Basis of Cost	Justification of need
				REDACTED EXEMPTION 4	
Budget Period 3 Total					
PROJECT TOTAL					

Additional Explanations/Comments (as necessary)

REDACTED
EXEMPTION 4

e. Supplies

PLEASE READ!!!

Supplies are generally defined as an item with an acquisition cost of $5,000 or less and a useful life expectancy of less than one year. Supplies are generally consumed during the project performance. Further definitions can be found at 10 CFR 600 found on the PMC Recipient Resources Forms page at https://www.eere-pmc.energy.gov/Forms.aspx#regs.

List all proposed supplies below, providing a bases of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying the need for the Supplies as they apply to the Statement of Project Objectives. Note that Supply items must be direct costs to the project at this budget category, and not duplicative of supply costs included in the indirect pool that is the basis of the indirect rate applied for this project.

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

General Category of Supplies	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
			Budg	Period 1	
EXAMPLE ONLY!!! Wireless DAS components					
				REDACTED EXEMPTION 4	
Budget Period 1 Total					
			Budget Period 2		
				REDACTED EXEMPTION 4	
			Budget Period 3		
			$0		

General Category of Supplies	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
				REDACTED	
				EXEMPTION 4	
Budget Period 3 Total					
PROJECT TOTAL					

Additional Explanations/Comments (as necessary)

f. Contractual

PLEASE READ!!!

The entity completing this form must provide all costs related to sub-recipients, vendors, contractors, consultants and FFRDC partners in the applicable boxes below.

Sub-recipients (partners, sub-awardees):
For each sub-recipient with total project costs of $100,000 or more, a separate SF-424A budget and PMC123.1 budget justification form must be submitted. These sub-recipient forms may be completed by either the sub-recipients themselves or by the preparer of this form. The budget totals on the sub-recipient's forms must match the sub-recipeint entries below.

The preparer of this form need only provide further support of the completed sub-recipient budget forms as they deem necessary. The support to justify the budgets of sub-recipients with estimated costs less than $100,000 may be in any format, and at a minimum should provide what Statement of Project Objectives task(s) are being performed, the purpose/need for the effort, and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Vendors (includes contractors and consultants):
List all vendors, contractors and consultants supplying commercial supplies or services used to support the project. The support to justify vendor costs (in any amount) should provide the purpose for the products or services and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Federal Research and Development Centers (FFRDCs):
For FFRDC partners, award recipient will provide a Field Work Proposal (if not already provided with the original application), along with the FFRDC labor mix and hours, by category and FFRDC major purchases greater than $25,000, including Quantity, Unit Cost, Basis of Cost, and Justification. The award recipient may allow the FFRDC to provide this information directly to DOE.

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

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
EXAMPLE ONLY!!! XYZ Corp.					
	REDACTED EXEMPTION 4				

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
					$0
	Sub-total	$476,740	$13,217,298	$0	$13,694,039

Vendor Name/Organization	Product or Service, Purpose/Need and Basis of Cost (Provide additional support at bottom of page as needed)	Budget Period 1	Budget Period 2	Budget Period 3	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:

Example Only!!! - Build wind turbine platform

General Description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Three days of excavation for platform site EXAMPLE ONLY!!!			
		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			

Additional Explanations/Comments (as necessary)

h. Other Direct Costs

PLEASE READ!!!

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

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

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

General description	Cost	Basis of Cost	Justification of need
Budget Period 1			
EXAMPLE ONLY!!! Grad student tuition	$		
Budget Period 1 Total			
Budget Period 2			
Budget Period 2 Total			
Budget Period 3			
Budget Period 3 Total			
PROJECT TOTAL			

REDACTED
EXEMPTION 4

REDACTED
EXEMPTION 4

REDACTED
EXEMPTION 4

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!!!**	Cash	Project partner ABC Company will provide 40 PV modules for product development at 50% off the of the retail price of $680	$13,600			**$13,600**
		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)

Solazyme's indirect rate is calculated based on the PMC 400.2 Sample Indirect Rate Proposal – Two Rate Method (Fringe and Indirect Rate).

Fringe rate justification:

____ **A fringe benefit rate has been negotiated with, or approved by, a federal government agency. A copy of the latest rate agreement is included 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 appliction of the approved rate, to arrive at the proposed fringes benefits dollars should also be provided.)

__X__ **There is not a current, federally approved rate agreement negotiated and available.**
(When this option is checked, the entity preparing this form shall submit a rate proposal in the format provided at the following website, or a format that provides the same level of information and which will support the rates being proposed for use in performance of the proposed project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal.)

REDACTED
EXEMPTION 4

Indirect rate justification:

____ **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.)

REDACTED
EXEMPTION 4

REDACTED

FOIA EXEMPTION 4

____ **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.)

DAVID F. BRINKMANN
561 Eccles Avenue
South San Francisco, CA 94040
650-780-4777
dbrinkman@solazyme.com

PRINCIPAL INVESTIGATOR

Chemical Engineer with over 33 years experience in process development, operations management, and technical leadership, mostly in the bio-process industry. Mr. Brinkmann has successfully developed and scaled up fermentation and downstream processes for a wide variety of bio-based products and organisms. He demonstrates extensive experience at design and management of bio-process facilities, as well as coordination of CROs & CMOs. Strengths include techno-economic modeling and strong communication skills.

PROFESSIONAL EXPERIENCE

Solazyme Inc – South San Francisco CA
Vice President Manufacturing (Mar'09 – present)
Senior Director Process Development & Manufacturing (Jul'07 – Feb'09)
• Responsible for Fermentation and Downstream Process Development teams, including in-house activities as well as scale up and toll manufacturing of Solazyme products at CROs & CMOs.
• Built a very strong Process Development Team. Designed and implemented highly functional fermentation and downstream process development lab facilities.
• Developed detailed techno-economic models for algal oil manufacturing. Contracted with a capital engineering firm for development of detailed mfg plant design and capital cost.
• Achieved very significant (many fold) improvements in fermentation productivity and mfg cost for algal oils, mainly via fermentation process optimization.
• Developed a functional process for extraction and conversion of algal oil.
• Transferred process technology and produced large quantities of algal oil at multiple CMOs.
• Coordinated closely with Solazyme Research, Bus Dev and Product Dev teams.
• Functioned as part of Solazyme senior management team. Presented to venture capitalists and potential strategic partners.

CP Kelco – San Diego CA
Director Biospecialties Operations (Apr'04 – Jul'07)
Manager Biotechnology Pilot Plant Operations (Jul'97 – Apr'04)
• Responsible for $7M operating budget and all operational aspects of a large Biotechnology Pilot Plant & Semiworks (up to 75 m3 fermentation scale) located at a xanthan gum mfg plant site.
• Member of Kelco's Site Management Team.
• Co-founded Kelco's Biospecialties Group (KBG). Collaborated closely on a) KBG strategic planning, and b) scouting and identification of potential KBG business venture partners.
• Served as primary contact for technical inquiries regarding KBG capabilities and services.
• Provided operational, technical, and mfg economics input for evaluation and negotiation of KBG deal structures and contracts.
• Directed on-site technical evaluation and implementation of KBG opportunities, including technology transfer and equipment modifications within BPP & Semiworks.
• Interfaced with Process R&D and Mfg Support teams to provide techno-economic modeling and to prioritize BPP fermentation & downstream process activities in support of Kelco biogums programs such as productivity improvement, cost reduction, introduction of new/differentiated biogums, etc.

• Directed and prioritized Semiworks production of a) new Kelco biogums for market evaluation, and b) toll mfg contracts for KBG products.
• Responsible for providing monthly KBG sales and mfg forecasts. Functioned as primary interface with KBG customers regarding technical performance, contract orders, shipments, invoices, etc.
• KBG opportunities spanned a very wide range, including fermentation and downstream processing for: algal oils (HUFAs & others), biodegradable plastics, enzymes, pharma intermediates, vitamins, antiviral proteins, carotenoids, flavors & fragrances, biopesticides, etal. Organisms included: bacteria, yeast, algae, and fungi.

A.E. Staley Manufacturing Co (Tate & Lyle) – Decatur IL
Manager Bioengineering Development (Oct'94 – Jul'97)
• Designed, implemented, and directed a biotechnology development lab / pilot plant located on-site at a large corn wet milling facility.
• Directed process development activities for lactic acid (bacterial) and citric acid (fungal).
• Provided operational, technical and mfg economics expertise in evaluation of potential new biochemicals ventures.

Weyerhaeuser – Federal Way WA
Sr. Bioengineering Specialist (Jan'88 – Oct'94)
• Responsible for process development and commercialization of bacterial cellulose ("Cellulon").
• Scaled up the Cellulon process (fermentation and downstream) from lab scale to commercial scale.
• Directed pilot scale fermentation development program at contract research facility.
• Designed, implemented and directed industrial scale (185 m3) production at toll manufacturing facility, to provide Cellulon in quantities suitable for market development.
• Provided detailed process technology transfer to potential Cellulon business venture partners / buyers.

Stauffer Chemical Co – Rochester MN
Technical Superintendent (May'84 – Dec'87)
• Designed, implemented, and directed on-site fermentation support lab at a whey-based fermentation and spray drying plant.
• Directed process development activities for anaerobic bacterial organic acid fermentation process.
• Scaled up aerobic bacterial polysaccharide process from lab scale to commercial scale.
• Implemented and directed industrial scale (175 m3) production at toll manufacturing facility, to provide product in quantity for market development.

Stauffer Chemical Co – San Jose CA
Manager Fermentation Operations (Nov'82 – May'84)
Fermentation Superintendent (Oct'81 – Nov'82)
Sr. Process Engineer (Jun'80 – Oct'81)

Diamond Shamrock Corp –Fairport Harbor OH and Redwood City CA
Process Engineering Supervisor, Redwood City CA (Aug'79 – Jun'80)
Process Engineer, Redwood City CA (Jul'77-Aug'79)
R&D Engineer, Fairport Harbor OH (Jun'75 – Jul'77)

EDUCATION
Case Western Reserve University, Cleveland, OH
BS Chemical Engineering *magna cum laude* **(Jun'75)**

JURGEN DOMINIK
Senior Vice President of Process Development and Manufacturing
Solazyme, Inc.
561 Eccles Avenue
S. San Francisco, CA 94080
650 780 4777

HIGHLIGHTS

Mr. Dominik's area of responsibility ultimately spanned operations in North America, South America, Europe, and Asia. His duties have included the management of design, construction, startup, and operation of several large-scale bioproduction facilities and natural product extraction manufacturing plants. Most recently he was responsible for the design and construction of two major expansions to the CP Kelco facilities in San Diego and Oklahoma, the design and construction of two pectin facilities in Denmark and Brazil, and provided design and engineering support for two biomanufacturing facilities in Danville, PA for Merck & Co. These projects all ranged from $40 million to over $100 million in size.

SYNERGISTIC ACTIVITIES

Throughout his career, Mr. Dominik has excelled at guiding new basic technologies in the field of bioproduction from the laboratory, through scale up, and into commercial processes. For example, he has developed multiple advanced bioprocesses and managed their commercialization, including processes to:

- Extract hydrocolloids (alginates) from macro alga (kelp).
- Produce xanthan biogum exploiting new mixing technology (which he developed and implemented) that more than doubled productivity and gave CP Kelco a competitive advantage that persisted for decades.
- Exploit orange peel as a new source of high grade pectin. For over 60 years, the industry could utilize only lime and lemon. This technology was developed in 2002, introduced into manufacturing in 2003, and rapidly expanded to become CP Kelco's major raw material by 2004. It lowered costs by 30% and provided an enormous competitive advantage.
- Produce LMA pectins with exceptional gel strengths based on a novel enzyme-based alternative technology. He moved the technology from the lab into production in a new custom-built facility in just 18 months.

Mr. Dominik was responsible for the technical groups at CP Kelco that developed the algal bioprocess that Martek Biosciences now employs to manufacture omega-3 fatty acids (a high-value nutraceutical oil). In two years, his groups scaled this process up from the laboratory to 150,000 liter vessels while also improving the product content and titer from low values to over 70% and 180 g dry cell weight / liter, respectively.

PROFESSIONAL EXPERIENCE

Solazyme, Inc.

- Senior Vice President of Process Development and Manufacturing **Oct 2007-Present**

CP Kelco **2004-2007**

- Consultant to Huber, new owners of CPK
- Located and managed the acquisition of a Chinese xanthan gum producer.

CP Kelco **2000-2004**

- Senior Vice President of Global Operations

Responsibilities included manufacturing, logistics, capital spending and bioprocess research and development.

Nutrasweet Kelco **1994**

Instrumental in developing high-volume, low-cost bioproducts produced by microorganisms, including algae, and turning them into global businesses.

- Vice President of Operations (This included all algin, aspartame, and biogum manufacturing world wide, as well as supply chain, capital engineering, and Pilot Operations.)
- Senior Vice President, added the responsibility for alginate and biogum research

Kelco Company, A Division of Merck & Co. **1973**

- Director of Process and Product Development
- Director of Biogum Operations
- Director of International Manufacturing
- Managing Director of the International Division
- Vice President of World Wide Operations

Kelco Company **1970**

- Research engineer when xanthan gum was an embryonic new product.

EDUCATION

Stanford University, Masters of Business Administration **1994**
Ohio University, Bachelor of Science, Chemical Engineering **1967**
Ohio University, Bachelor of Science, Chemistry **1967**

Stephen Decker

Solazyme, Inc., 561 Eccles Avenue, S. San Francisco, CA 94080; sdecker@solazyme.com

Education & Training:

Moravian College	1990 – 1994	B.S. in Biology

Graduate Studies:

University College, London	1998	10 MsC credits in Bioprocess Engineering
University of Georgia	1999	12 C.E. credits in Microbial Physiology

Professional Experience:

Solazyme, South San Francisco, CA
Process Development and Manufacturing
Senior Manager – Fermentation Process Development — July 2008 to present

Vaxgen, South San Francisco, CA
Manufacturing Operations
Associate Director – Bulk Mfg Operations — September 2006 to April 2008
Senior Manager – Manufacturing Sciences — April 2005 to September 2006

Amgen, Thousand Oaks, CA
Cellular Process Development
Senior Associate Scientist — August 2003 to April 2005

Merck Research Laboratories, West Point, PA
Bioprocess Research and Development - Department of Fermentation and Cell Culture
Research Microbiologist — June 2000 to August 2003
Staff Microbiologist — September 1997 to June 2000
Microbiologist — September 1996 to September 1997
Contract Microbiologist — January 1995 to September 1996

Moravian College, Bethlehem, PA
Biology Department
Laboratory Assistant — September 1992 to May 1994

Industrial Experience:

- Development and technology transfer of four manufacturing scale, GMP fermentation processes for the production of recombinant proteins (HPV Virus Like Particles) to support Phase I, II and III clinical trials and facility licensure (Gardisil®).

- Management and technical oversight of upstream and downstream operations in manufacturing facility
  - Oversight for capital and engineering projects
  - Identification of corrective actions and preventative actions for closure of process related deviations
  - Conduct technical investigations and troubleshoot process upsets

- Trending and analysis of manufacturing data including application of statistical process control
- Implementation of process improvements

- Technical lead for process development /manufacturing and manufacturing facility due diligence teams as part of merger and acquisition opportunities

- Conducted and supervised scientists conducting microbial fermentation (*S. cerevisiae, E. coli, P. pastoris,* numerous algal strains) and mammalian cell culture (CHO) strain selection, process development, process characterization and GMP manufacturing

- Conducted lab scale, pilot scale and manufacturing scale fermentations to develop high cell density fermentation processes for production of recombinant proteins and natural products using bacterial, fungal, algal and mammalian cultures.

Selected Presentations:

- Vandusen, W.J., Decker, S.M., Apana, C., Fu, J., Herber, W.K., George, H.A.1995. On-line, non-invasive monitoring of some common analytes in fermentation media of *Saccharomyces cerevisiae, Neisseria meningitidis,* and *Escherichia coli.* Recent Advances in Fermentation Technology Joint Meetings (SIM and BIOT/ ACS), San Diego, CA.

- Decker, S., Vandusen, W., Hurni, W., Neeper, M., Schultz, L., Herber, W. and George, H. 1996. Effect of zinc ion on the galactose-regulated expression of a human papillomavirus protein and on general galactose catabolism in a recombinant strain of *Saccharomyces cerevisiae.* 211th Annual Meeting, American Chemical Society, New Orleans, LA.

- Shultz, L.D., Markus, H., Hofmann, K.J., Neeper, M., Lowe, R., George, H., Decker, S., Lehman, D, Joyce, J., Cook, J., Brown, D.R., Ellis, R.W., Shaw, A.R., Jansen, K.U. 1996. Expression of human papillomavirus (HPV) capsid proteins and formation of HPV virus-like particles (VLPs) by *Saccharomyces cerevisiae.* Yeast Genetics and Molecular Biology Meeting. University of Wisconsin. Madison, WI.

- Gadam, S., Decker, S., and Henrickson, R. 2001. Unintended interactions between fermentation and downstream chromatography steps in the purification of virus-like particles. Industrial Case Studies in Bioprocess Integration. 221st Annual Meeting, American Chemical Society, San Diego, CA.

Nicolas Lurty
561 Eccles Avenue
S. San Francisco, CA 94080
PH: 650-780-4777 nicklurty@solazyme.com

QUALIFICATIONS SUMMARY:

Technical/Project Manager with 12 years of effective technical leadership coordinating multi-disciplined teams to achieve objectives in the value added food and biotech manufacturing sectors. Five years pilot to scale process development experience working with algae-to-nutraceuticals technology. Multi-million dollar project management experience directing engineering, equipment, and automation firms through design, construction, and commissioning/qualification phases. In addition, a record of creating dynamic and innovative control solutions applying DCS and PLC technology. Possess exceptional team building, people management skills with a strong emphasis on safety and quality.

Professional EXPERIENCE

10/2007 – 12/2008, PetroAlgae LLC, Melbourne, FL
Downstream Engineering Director,
(Petroalgae is a photosynthesis based algal biofuel company.)

- Directly responsible for attempting to develop an economically viable commercial process to convert algae into bio-fuel
  - Applied non-solvent based lipid extraction in addition to percolation and immersion techniques
  - Developed an extraction pathway for green and stressed algae yielding 95%
  - Defined pre-treatment pathways for extracted crude
- Created and implemented an analytical program to support commercial development
- Coordinated external consultants, equipment designers and engineering firms to define commercial pathways to bio-fuel

7/2003 - 10/2007, Martek Biosciences Co., Kingstree, SC.
9/2006 - 10/2007, Downstream Technical Manager,
(Martek Biosciences Corp. is a world leader in the development and commercialization of health nutritional products derived from micro algae and fungus. Martek developed and patented two fermentable strains of micro algae which produce oils rich in docosahexaenoic acid (DHA) and one fungus strain that produces an oil rich in arachidonic acid, ARA.)

- Planned, directed and controlled technical activities to accomplish budgeted financial and production objectives for $115 million in recovery/downstream assets. Responsible for providing technical and managerial support to 44 operators, 4 specialists, and four engineers. Provided technical expertise to multi-national production facilities both in the US and Europe.

- Produced $9.7 million in increased revenue from process optimization and variable cost reduction initiatives. Increased productivity 50% in ARA Extraction and doubled productivity in the DHA Extraction process. Reduced capital expenditure by $1million for RBD Crystallization Project by providing creative process solutions utilizing existing equipment.

07/2003- 09/2006, Project Manager (Martek)

- Led and coordinated contract engineering, construction and process development firms in design and construction in $99 million of capital expansion

- Led internal Operations, Technical and Process Development teams through commissioning and qualification of an oil refinery, fermentation harvest recovery, two spray dryers and two extraction plant applying IQ, OQ, and PQ protocol. Developed innovative SA-88 application (DeltaV DCS) for Fermentation Harvest/Spray Drying process presented in Oct 2005 at the Emerson Global Conference as an innovative controls solution utilizing bus architecture.

01/2001 - 05/2003, AG PROCESSING, Saint Joseph, MO
Project Manager
(Ag Processing Inc is the world's largest cooperative soybean processor and a leading vegetable oil refiner in the United States. AGP is owned by local Midwestern and regional cooperatives representing farmers from 16 states throughout the nation)

- Responsible for managing all capital projects, generating budgets, bidding, contracting and supervising contractors for a 3.3million pound/day oil refinery.
- Process optimization and variable cost reduction

01/1999- 01/2001, CENTRAL SOYA, Ft. Wayne, IN
Corporate Engineer, Chemurgy Group

(The businesses of Central Soya Company, Inc. were primarily related to the production of food for human consumption. The process begins with the procurement of raw agricultural products and involves oilseed processing, vegetable oil refining and the manufacture of soy protein and lecithin.)

Designed, scoped and commissioned $5 million semi-works plant.

- Coordinated with research, production, and development teams for pilot studies and special product, toll processing events

12/1996 – 01/1999, ADM, Decatur, IL
Production Supervisor
(ADM is a world leading manufacturer of biodiesel, ethanol, soybean oil and meal, corn sweeteners, flour and other value-added food and feed ingredients).

- P&L responsibility for a $20 million state-of-the-art, ultra filtration extraction/packaging plant with 8 union operators
- Implemented a quality control program with modern analytical techniques to establish process optimization guidelines

EDUCATION

BS Chemical Engineering	University of Tulsa, Tulsa, OK
MBA	Indiana University, Ft Wayne, IN
Registered Engineer	(EI #11136)

Felipe Arana
561 Eccles Avenue
S. San Francisco, CA 94080
650-780-4777
farana@solazyme.com

PROFESSIONAL EXPERIENCE

Felipe Arana is Solazyme's Director of Downstream Process development. Prior to joining Solazyme, Mr. Arana held several positions while at Lloreda S. A, a major producer of fats and oils in Cali, Colombia, South America. Among his other duties, he served as Chemical Plant Engineer and managed over 100 employees including shift engineers, section supervisors and operators. As a Project engineer, he was intimately involved in process and equipment design, construction, commissioning and qualification phases for several oilseed and vegetable oil manufacturing plants. Mr. Arana has planned, directed and controlled multi-million dollar technical projects in multiple large scale production facilities. Throughout his career, Mr. Arana has demonstrated the ability to complete complex projects on time and within budget while managing multiple contractors including consultants, engineering and construction firms. During his career in process development, Mr Arana has:

- Pioneered the application of existing oilseed technologies to microalgal oil extraction and recovery
- Reduced capital investment by $2.0 million for palm oil physical refining and fractionation plants through creative and low cost modifications to existing equipment, software and processes
- Planned, directed and controlled technical projects worth in excess of $50 million at five production facilities
- Provided technical training and support to more than 200 engineers, supervisors and operators.
- Completed process and equipment design, construction, commissioning and qualification phases for several oilseed and vegetable oil manufacturing plants including :
    - A 500 ton per day soybean and cottonseed pressing, solvent extraction and lecithin plant
    - Two 500 ton per day vegetable oil refineries (caustic refining, acid degumming, deodorization, physical refining, hydrogenation, winterization and fractionation)
    - A 1000 ton per day oil bottling line
    - A 250 ton per day margarine packaging line
- Designed, built and installed solvent extraction, bleaching, deodorization, interesterification and fractionation equipment for pilot plant capable of processing 50 to 400 lbs/batch

- Responsible for developing a technically and economically viable downstream process to produce bio-fuel, food and feed, nutraceuticals and oleochemicals from micro-algae
- Plan, direct and control activities to accomplish downstream production objectives
- Designs and supervises on-site and off-site pilot testing of unit operations, including feed preparation, pressing, solvent extraction and other downstream processes (membrane separation, evaporation, drying, oil refining)
- Coordinates external consultants, equipment manufacturers and engineering firms
- Lead engineer for this start-up company developing new technologies in the dry-grind ethanol industry
- Scaled-up an innovative patented process from laboratory to semi-works scale (grams to kilograms and multi-ton quantities) for a health-specific corn oil and an industrial protein from corn
- Supervised on-site and off-site pilot testing for recovery and downstream unit operations
- Designed an industrial process in consultation with major engineering companies; calculated material and energy balances, supervised PFD, P&ID and construction drawings, equipment specification, construction.
- Optimized extraction and recovery of protein from whole corn for the biodegradable polymer market by ethanol extraction and membrane technology
- Conducted membrane screening and pilot plant testing to optimize process parameters in the downstream purification of 1,3-propanediol (3G), a biodegradable plastic precursor resulting in a commercial scale process employed by DuPont and Tate and Lyle for the manufacture of 1, 3 propanediol.

EDUCATION

B.S., Chemical Engineering, Universidad del Vale, Cali, Colombia — October 1989
M.S., Food Science and Technology, TEXAS A&M UNIVERSITY — May 2004

Harrison F. Dillon

561 Eccles Avenue
South San Francisco, CA 94040
650-780-4777
hdillon@solazyme.com

Dynamic leader with a diverse background building a pioneering biotechnology company in the energy sector, securing funding, presenting corporate achievements to the media and scientific community, leading a scientific organization, attracting and recruiting the scientific advisory board and board of directors, developing and managing corporate intellectual property portfolio. Demonstrated success recruiting, motivating, coaching, and developing cross functional teams that deliver unparalleled results.

WORK EXPERIENCE

Solazyme Inc., President, CTO and Co-Founder, South San Francisco, CA 9/03-Present

- Created the core concepts and initial intellectual property for founding Solazyme
- Led the organization through growth from 2 founders through ~50 employees
- Collaborated with CEO and business team to secure $75M in funding through Series C
- Responsibility for building, leading, and managing the scientific infrastructure for the organization
- Joint responsibility with CEO/Co-Founder for growing the business and technology portfolio and managing strategic direction of company
- Manage the legal affairs of the company
- Develop intellectual property, manage IP portfolio, create and lead IP organization
- Inventor of numerous patent applications and one issued patent owned by the company
- Collaborate with CEO and business leads to develop strategic alliances, partnerships, and joint ventures on a global scale aimed at the commercialization of Solazyme's product offering
- Develop an action/accountability plan in order to meet timelines, exceed expectations, and position Solazyme as the only company in the world with our product offering
- Publicize and promote Solazyme's accomplishments through accepting and conducting interviews for TV, radio, magazines, and other media vehicles
- Recruited scientific and business advisory boards

Townsend and Townsend and Crew, Associate and Patent Agent, Palo Alto, CA 6/02-6/04

- Draft opinion letters, patent applications, and Office Action responses for biotechnology inventions
- Perform due diligence on pending patent applications for venture capital clients
- Perform freedom-to-operate opinions and information for biotechnology clients

Research Triangle Institute, Consultant, Research Triangle Park, NC 9/01-05/02

- Perform patentability and commercialization assessments on biotechnology innovations developed by RTI clients
- Prepare marketability and IP assessments for in-house RTI technology

Parsons Behle and Latimer, Summer Associate, Salt Lake City, UT, 5/02-9/02

- Draft Office Action responses and trade secret transactional agreements
- Review and amend patent license agreements
- Research On Sale Bar and Markman issues for patent infringement lawsuit

Office of Technology Transfer, University of Utah Research Foundation, Patent and Licensing Agent, **Salt Lake City, UT, 11/98-8/00**

- Manage the Foundation's biotechnology portfolio of active licenses, invention disclosures and patents
- Review and amend biotechnology patent applications and Office Actions
- Draft, negotiate, and close patent licenses on patents covering technology such as: Cardiac arrhythmia-associated SNPs for pharmacogenetics; Neurotransmitter receptor genes; Cardiac ion channel genes for drug discovery; Bacterial protein x-ray structure data for antibiotic design; Pathogen gene sequences for microarray diagnostics

Emory University Department of Microbiology and Immunology, Laboratory Technician, Atlanta, GA, 12/91-5/93

- Clone bacterial virulence genes
- Perform research for and draft manuscript for publication on *Streptococcus* bacterial virulence genes

EDUCATION

Duke University School of Law, Durham, NC, J.D., 2003

University of Utah, Salt Lake City, UT, Ph.D., Genetics, 1998

Emory University, Atlanta, GA, B.S., Biology, 1993

PROFESSIONAL CERTIFICATIONS

Member of United States Patent Bar, Registration No. 45,661
Member of California Bar Association

SELECTED PUBLICATIONS – PATENTS

- USE OF CELLULOSIC MATERIALS FROM CULTIVATION OF MICROORGANISMS, US Patent App. Publication Number 20090011480, RENEWABLE DIESEL AND JET FUEL FROM MICROBIAL SOURCES, US Patent App. Publication Number 20090047721, Donald E. Trimbur, Chung-Soon Im, Harrison F. Dillon, Anthony G. Day, Scott Franklin and Anna Coragliotti, June 2, 2008.

- RENEWABLE DIESEL AND JET FUEL FROM MICROBIAL SOURCES, US Patent App. Publication Number 20090047721, Donald E. Trimbur, Chung-Soon Im, Harrison F. Dillon, Anthony G. Day, Scott Franklin and Anna Coragliotti, June 2, 2008.

- SUCROSE FEEDSTOCK UTILIZATION FOR OIL-BASED FUEL MANUFACTURING, US Patent App. Publication Number 20090035842, Donald E. Trimbur, Chung-Soon Im, Harrison F. Dillon, Anthony G. Day, Scott Franklin and Anna Coragliotti, June 2, 2008.

- GLYCEROL FEEDSTOCK UTILIZATION FOR OIL-BASED FUEL MANUFACTURING, US Patent App. Publication Number 20090004715, Donald E. Trimbur, Chung-Soon Im, Harrison F. Dillon, Anthony G. Day, Scott Franklin and Anna Coragliotti, June 2, 2008.

- LIPID PATHWAY MODIFICATION IN OIL-BEARING MICROORGANISMS, US Patent App. Publication Number 20090061493, Donald E. Trimbur, Chung-Soon Im, Harrison F. Dillon, Anthony G. Day, Scott Franklin and Anna Coragliotti, June 2, 2008.

ARTHUR GROSSMAN
Chief of Genetics, Solazyme, Inc., 561 Eccles Avenue, S. San Francisco, CA 94080,
agrossman@solazyme.com

Professional Experience:

Present Position:	Staff Member (Since 1982)	Professor by courtesy
	Carnegie Institution of Washington	Department of Biology
	Department of Plant Biology	Stanford University
	260 Panama Street	Herrin Hall
	Stanford, California, 94305	Stanford, California 94305
	Telephone: (650) 325-1521	
Past Position:	Assist. Professor by courtesy, 1982-1989, Dept of Biology, Stanford University	
	Assoc. Professor by courtesy, 1989-2000, Dept of Biology, Stanford University	

Education and Research Experience:

Postdoctoral Fellow. 1978-1982. The Rockefeller University, Department of Cell Biology. Research: Uptake of Polypeptides into chloroplasts (Nam-Hai Chua, Advisor).

Ph.D. 1978. Indiana University, Department of Biological Sciences. Dissertation: Characterization of Photosynthetic Mutants in *Chlamydomonas reinhardtii* (Robert Togasaki, Advisor)

B.S. with Honors. 1973. Brooklyn College, New York. Major in Biology.

Honors, Services and Fellowships (since 2000):

2009 Gilbert Morgan Smith Medal
2007 Editorial Board Eukaryotic Cell
2005 Editorial Board Annu Rev Genet
2004 Geographical represented for the International Society of Photosynthesis Research (elected position)
2002 Darbaker Prize for work on microalgae (Botanical Society of America)
2001 Recipient of Lady Davis Fellowship
2000-2008 Editorial Board, Current Genetics
2000-2003 Scientific Advisory Board for the Wallenberg Consortium North
2000 Advisory Committee, Arizona State University Consortium to establish a NSF funded Biotechnology Center
2000-2004 Editorial Board, Plant and Cell Physiology
2000 Organizer of Symposium 'The Dynamics and Evolution of Light Harvesting Complexes (to honor Elizabeth Gantt)

1982-2002 Numerous ad hoc reviews for NSF and USDA, and some for NIH and DOE (as well as for a number of international agencies). I have also done numerous reviews for a variety of journals including Science, Nature, PNAS, The Plant Cell, EMBO Journal, The Plant Journal, Molecular Microbiology, Plant Physiology and Journal of Bacteriology.

Present Graduate Students:

Wirulda Pootakham. Acclimation of Chlamydomomas to sulfur deprivation.
Kate Rose Mackey. Photosynthesis and nutrient deprivation responses in marnine cyanobacteria.
Blaise Hamel. Photosynthesis at high temperatures.
Michelle Davision. Diversity of cyanobacteria in the hot springs.

Present Postdoctoral Fellows/Research Associates:

Claudia Catalanotti. Anoxic control of metabolism in Chlamydomonas reinhardtii.

David Gonzalez-Ballester. The acclimation of photosynthetic organisms to sulfur deprivation.
Wenqiang Yang. Anoxia and hydrogen production.
David Dewez. Understanding photosynthetic function through integration of informatic and experimental approaches.
Mark Heinnickel. Spectroscopic and fluorescence analysis of photosynthetic function.
Rosario Gomez. The physiology of the hot springs.

Academic/Industrial Affiliations:
EU consortium on 'Towards a better sunlight to biomass conversion efficiency' (Advisory Board)
Joint project with Martek Biosciences Corporation in Columbia, MD. Molecular manipulation of chromophytic algae to facilitate production of metabolites and specific lipids (1993-2000).
Consultant for Exelixis Pharmaceuticals.
Chief of Genetics, Solazyme.

Selected Publications

1. Dubini, A. Mus, F., Seibert, M., Grossman, A.R., Posewitz, M.C. (2009) Flexibility in anaerobic metabolism is revealed in a mutant of *Chlamydomonas reinhardtii* Lacking hydrogenase activity. J Biol Chem. **284**: 7201-13.
2. Huang, B., Wu, H., Bhaya, D., Grossman, A.R., Zare, R.N. (2007) Counting low-copy-number proteins in a single cell. Science. **315**: 81-84.
3. Ryu, W.Y, Huang, Z., Park, Z.S., Moseley, J., Grossman, A.R., Fasching, R.J., Prinz, F.B. (2008) Open Micro-fluidic System for *in situ* Electrochemical Atomic Force Microscopy Analysis of a Single Cell to Measure Photosynthetic Electron Transport. Lab on a Chip. **8**: 1460-1467.
4. Cardol. P., Bailleul, B., Derelle, E., Béal, D., Rappaport, F., Breyton, C., Bailey, S., Wollman, F.-A., Grossman, A.R., Moreau, H., Finazzi, G. (2008) A novel adaptation of photosynthesis in the marine, picoeukaryote *Ostreococcus* sp. Proc Natl Acad Sci USA. **105**: 7881-6.
5. Steunou, A.S., Jensen, S., Bhaya, D., Ward, D.M., Brecht, E, Grossman, A.R., Kühl, M. (2008) Energetic Considerations for Expression and Activity of the Nitrogenase in Hot Spring Microbial Mats. ISME J. **2**: 364-78.
6. Merchant, S., Prochnik, S. and the Chlamydomonas Genome Project Team (Rokhsar and Grossman, Corresponding authors) (2007) *Chlamydomonas reinhardtii* genome reveals evolutionary insights into critical animal- and plant-associated functions. Science. **318**: 245-250.
7. Bhaya, D. Khuri, N., Grossman, A.R., Cohan, F., Alexander, Simpson, C., Steunou, A., Bateson, M., Melendrez, M., Hamamura, N., Rhee, S., Ward, D., Miller, S., Heidelberg, J. (2007) Genomic, metagenomic and functional analyses of cyanobacteria from hot-spring microbial mats reveal unexpected diversity in nutrient utilization strategies. ISME J. **1**: 703-13.
8. Mus, F., Dubini, A., Seibert, M., Posewitz, M.C., Grossman, A.R. (2007) Anaerobic adaptation in *Chlamydomonas reinhardtii*: Anoxic gene expression, hydrogenase induction and metabolic pathways. J Biol Chem. **282**: 25475-25486.
9. Steunou, A.S., Bhaya, D., Bateson, M., Melendrez, M., Ward, D., Brecht, E., Peters, J.W., Kühl, K, Grossman, A.R. (2006) In Situ Analysis of Nitrogen Fixation and Metabolic Switching in Unicellular Thermophilic Cyanobacteria in Hot Spring Microbial Mat. Proc Natl Acad Sci USA. **103**: 2398-403.
10. Zaslavskaia, L., J. C. Lippmeier, C. Shih, A. R. Grossman and K. E. Apt (2001) Trophic conversion of an obligate photoautotrophic alga through metabolic engineering. Science **292**: 2073-2075.

PETER J. LICARI

561 Eccles Avenue
S. San Francisco, CA 94080
plicari@solazyme.com

SUMMARY

Progressive biotechnology industry professional with extensive general management experience in global operational and executive management roles. Capable of assembling and managing multidisciplinary teams able to communicate effectively, resolve problems, and meet objectives.

EXPERIENCE

Solazyme Inc., South San Francisco, CA — October 2008 – Present
Senior Vice President, Research and Development
Responsible for directing Molecular Biology, Discovery, Strain Development, and Analytical Chemistry activities.

Kosan Biosciences Inc., Hayward, CA — 1998 – 2008
Director, Process Sciences, August 1998 to Senior Vice President, Manufacturing and Operations, September 2008

Member of the executive management team responsible for strategy development, prioritization of projects within Kosan's portfolio, realignment of organization to reduce burn, and relationship development with organizations outside of Kosan. Responsible for directing Process Development, Manufacturing, Quality Assurance, Quality Control, Facilities, and EH&S departments. Accountable for managing the development of the preclinical and clinical candidate pipeline, including all manufacturing and compliance aspects.

- Instituted development and manufacturing groups to support in-house production of drug compounds. Internal manufacturing routinely allowed Kosan to enter Phase 1 clinical trials 8-12 months faster than outsourcing.
- Established fermentation and purification development as a competitive advantage for Kosan. Developed and managed interdisciplinary teams capable of routinely improving fermentation titers from <10 mg/L to 500-1000 mg/L. Routinely reduced cost of goods 20-500 fold with processes that were successfully scaled to the 3,000-10,000 L fermentation scale.
- Implemented Quality Control and Quality Assurance groups and systems to assure compliance with cGMPs and GLPs. Successfully completed six audits from US and European partner audits.
- Created and optimized manufacturing and distribution strategies for APIs and drug products to support preclinical and clinical programs. Established and managed all outsourced manufacturing and development contracts, including activities in India, Taiwan, Italy, Denmark, Czech Republic, Germany, and US.
- Incorporated standardized documentation process for development, manufacturing and compliance purposes that also serves to retain institutional knowledge. Wrote CMC regulatory filings, including 8 INDs, associated annual reports, amendments, and responses to inquiries in US, Canada, Europe, Russia, and Australia.

Massachusetts Biologics Laboratories, Boston, MA — 1996 – 1998
Director, Vaccine Manufacturing and Development: Responsible for the manufacture and development of licensed and investigational vaccines, including diptheria, tetanus, acellular pertussis and *Haemophilus influenzae* type b-tetanus conjugated vaccines. Accountable for manufacturing facility and supply chain management.

- Ensured that the production of vaccines was in accordance with cGMPs relating to the production of human biologics.
- Communicated and interacted with the FDA on matters relevant to vaccine production, including audits, ELA, PLA, and INDs.
- Led the development of manufacturing scale fermentation, purification, and formulation processes for acellular pertussis, *H. influenzae* type b-tetanus conjugate, and hemolytic uremic syndrome vaccines.

BASF Bioresearch Corporation, Worcester, MA 1993 – 1996

Senior Scientist: Supervisor of the fermentation process development group, responsible for the production of proteins from animal cell, yeast, and bacterial cultures. Accountable for developing scalable processes and the successful transfer of these processes to the manufacturing plant.

- Served as project leader for an anti-TNF human monoclonal antibody project (Humira®). Coordinated Fermentation Development, Purification Development, Manufacturing, Quality Control, and Quality Assurance groups for the development and manufacture of clinical material.
- Coordinated and supervised an interdisciplinary team responsible for the transfection and amplification of human monoclonal antibodies produced in CHO and NS/0 cell lines. Developed and optimized a CHO batch and successfully scaled this process to the 1000 L manufacturing scale.
- Developed a high density *Hansenula polymorpha* fermentation for the production of hirudin at the 20 L scale and successfully scaled this process to 3000 L. Responsible for the fermentation and recovery of this product.

Merck Research Labs, Merck & Co., Inc., 1992 – 1993

Engineering Associate: Involved in the development of a perfusion based process for attenuated hepatitis A virus production used to produce Vaqta®.

- Investigated attachment kinetics and planting uniformity of cells as well as factors that influence these properties in novel perfusion bioreactors.

SELECTED PUBLICATIONS

Buchanan G., Regentin R., Piagentini M., Rascher A., McDaniel R., Galazzo J., Licari P. Production of 8-demethyl-geldanamycin and 4,5-epoxy-8-demethyl-geldanamycin from a recombinant strain of *Streptomyces hygroscopicus. J. Nat. Prod.* 2005. 68(4): 607-610.

Frykman S.A., Tsuruta H., Licari P., "Assessment of fed-batch, semi-continuous, and continuous Epothilone D production processes." *Biotechnol Prog*. 2005. 21(4):1102-1108.

Desai R.P., Rodriguez E., Galazzo J.L., Licari P., "Improved bioconversion of 15-fluoro-6-deoxyerythronolide B to 15-fluoro-erythromycin A by overexpression of the eryK gene in *Saccharopolyspora erythraea*." *Biotechnol Prog*. 2004 Nov-Dec; 20(6):1660-5.

EDUCATION

California Institute of Technology, Pasadena, CA

Ph.D., Chemical Engineering, Minor in Biology, 1992, Advisor: James E. Bailey

Tufts University, Medford, MA

M.S., Chemical Engineering, 1988. Advisor: Randal Swartz

B.S., Chemical Engineering, Second Major in Applied Physics, Summa Cum Laude, 1987

Pepperdine University, Malibu, CA,

M.B.A., 2005

Anthony Day, Ph.D.

Solazyme Inc., 561 Eccles Ave., South San Francisco, CA 94080

SUMMARY

A senior industrial biotechnologist with expertise in the design, and implementation of directed research programs. Demonstrated ability to lead multi-functional, multi-site research programs and identify and manage fruitful external relationships and collaborations. Over 20 years of biotechnology experience, project/functional leadership, technical-business development experience.

PROFESSIONAL EXPERIENCE

Solazyme Inc. **2006 - 2009**

VP of R & D

ADDAC Pharma Consultancy LLC, San Francisco, California **2005**

Founder and Principal

GENENCOR INTERNATIONAL, Palo Alto, California **1993 - 2005**

Director of Research

- Carried out due diligence on anti-inflammatory drug candidate, promoted in-licensing, and then led the project team that advanced it from research into pre-clinical development
- Managed a high performance team of 20 employees

Head of Structural Biology

- Led protease inhibitor program for the discovery of new therapeutics. This was a key program involving 25 employees at both the U.S. and European research sites
- Led the fungal anti-infective therapeutic discovery program, Genencor's first pharma program. This involved planning, initiating, and managing the program. Twenty employees reported to the project

Senior Scientist

- Chartered to form and lead Genencor's bioinformatics group. This involved hiring, software purchases, and promotion of the group's services within the company. The group is now an essential component of R&D
- Led a multi-site cellulase engineering project which led to patents being filed and a successful multi-million dollar product launch
- Led a short-term "hit and run" project to solve an urgent protein expression problem

Scientist

- Invented a new, genetically engineered amylase which is now a multi-million dollar product

CAMBRIDGE PROTEIN SCIENCE, Cambridge, England **1999 - 2000**

General Manager and Head of Research

- Co-founded a biotechnology company to commercialize novel protein expression technology

developed by a Nobel laureate and refolding technology developed at Cambridge University in the UK

- Conceived business model, wrote the business plan,and negotiated IP in-licensing and business contracts
- Signed term sheet for $5 million in venture capital from a consortium of three European venture companies.

EDUCATION

Post Doctoral Fellow **1989 - 1993**
University of Cambridge, England.
Supervisor: Professor Alan R. Fersht, FRS

Ph.D. **1989**
Imperial College of Science, Technology and Medicine, University of London, England.
Supervisor: Dr. C. P. Lichtenstein

M.Sc.
1985

University of British Columbia, Canada.
Supervisor: Dr. S. G. Withers

B.Sc. (Hons) **1981**
Portsmouth Polytechnic, England.
Chemistry

SELECTED PATENTS AND PUBLICATIONS

1. D. Trimbur, CS. Im, H. Dillon, Harrison, A. Day, S. Franklin, A. Coragliotti. PRODUCTION OF OIL IN MICROORGANISMS PCT/US2008/065563 (WO2008/151149)
2. D. Trimbur, CS. Im, H. Dillon, Harrison, A. Day, S. Franklin, A. Coragliotti. USE OF CELLULOSIC MATERIALS FOR CULTIVATION OF MICROORGANISMS 12/131,783 (US20090011480)
3. D. Trimbur, CS. Im, H. Dillon, Harrison, A. Day, S. Franklin, A. Coragliotti. RENEWABLE DIESEL AND JET FUEL FROM MICROBIAL SOURCES 12/131,773 (US20090047721)
4. D. Trimbur, CS. Im, H. Dillon, Harrison, A. Day, S. Franklin, A. Coragliotti. SUCROSE FEEDSTOCK UTILIZATION FOR OIL-BASED FUEL MANUFACTURING 12/131,793 (US20090035842)
5. D. Trimbur, CS. Im, H. Dillon, Harrison, A. Day, S. Franklin, A. Coragliotti. LIPID PATHWAY MODIFICATION IN OIL-BEARING MICROORGANISMS 12/131,804 (US20090061493)
6. Y. Mao, C. Lai, G. Vogtentanz, B. Schmidt, A. G. Day, J. Miller, D. Brandon, & D.Chen; Monoclonal Antibodies Against Soybean Bowman Birk Inhibitor Recognize The Protease Reactive Loops; Protein J; **24**, 275-282, (2005).
7. C. Eggers, I. Murray, V. Delmar, A.G.Day, & C. S. Craik; The periplasmic serine protease inhibitor ecotin protects bacteria against neutrophil elastase; Biochem J.; **379**, 107-18 (2004).
8. M. Sandgren, P. Gualfetti, A. Shaw, L. Gross, M. Saldajeno, A. G. Day, T. A. Jones, & C. Mitchinson; Comparison of Homologous Family 12 Glucosyl Hydrolases and Recruited Substitutions Important for Stability; Protein Science; **12**,848-60 (2003).
9. A. Shaw, R. Bott, C. Vonrhein, G. Bricogne, S. Power, A. G. Day; A Novel Combination Of Two Classic Catalytic Schemes; J. Mol. Biol.; **320**, 303-9 (2002).
10. Shaw, A R. Bott, & A. G. Day; Protein Engineering of alpha-Amylase for Low pH Performance; Curr. Opin. Biotechnol.; **10**, 349-52 (1999).

Scott Franklin
561 Eccles Avenue
S. San Francisco, CA 94080
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sfranklin@solazyme.com

Scott Franklin, Ph.D. is Solazyme's Senior Director of Discovery and Molecular Biology. Prior to joining Solazyme, Dr. Franklin was a founder, V.P. of Technology Development, Board of Directors and Scientific Advisory Board member at Rincon Pharmaceuticals, Inc. where he played a critical role in helping to raise over $5 million in venture and angel capital to launch the company. During his tenure at the company he led a team that was the first in the field to undertake detailed characterization of recombinant proteins expressed in algal chloroplasts while developing new vectors and strategies for implementing high throughput screens. In the process they developed methods for strain improvement as it relates to recombinant protein productivity and expression. Dr Franklin played a key role in developing intellectual property for the company, securing Phase I SBIR funding relating to expression of mAbs in algal chloroplasts while managing over twelve research alliances with industry partners such as Biogen-Idec, Insmed, and Shire Pharmaceuticals as well as academic partners including The Scripps Research Institute, University of Erlangen, and the University of Alberta. Prior to co-founding Rincon Pharmaceuticals, Dr. Franklin also served as Director of Molecular Biology at Cyanotech Corporation, Kailua-Kona, HI. Where he directed work aimed at adding value to existing product lines through the application of molecular genetic approaches.
Throughout his career Dr. Franklin has played a key role at small start-up companies and been on the cutting edge of technologies that seek to exploit microalgae as bio-production platforms. Dr Franklin brings a unique breadth of experience spanning a range of disciplines from building molecular genetic capabilities *de novo* to working in large scale (600,000 L) photo bioreactor systems. For example during this time he has:

- Demonstrated for the first time expression, assembly and activity with a variety of complex monoclonal antibodies in algal chloroplasts.
- Developed new vectors and selection strategies to allow for expression of multiple genes in algal chloroplast genomes.
- Developed novel vectors for use in high throughput screens designed to identify strains and regulatory elements capable of supporting increased recombinant protein productivity.
- Led team that developed chloroplast transformation vectors, selection strategies and protocols resulting in increases in transformation efficiencies by three log orders.
- Developed tools to discriminate between various cyanobacterial isolates of commercial interest.
- Led teams that scaled cyanobacterial isolates from laboratory to commercial production scale (600,000 L).
- Led teams that developed cultivation and media optimization regimes for new cyanobacterial isolates and scaled to 30,000 L.
- Secured funding from National Institutes of Health (NIH) and National Oceanic and Atmospheric Administration (NOAA) around recombinant protein expression in algae.
- Repeatedly built and led molecular biology teams *de novo*

PhD. University of Texas, Austin.
Austin, TX 1985-1991. Demonstrated the feasibility of using nonsense suppression in plants to modify amino acid sequences of proteins as part of Ph.D. dissertation.
B.S. University of California at Davis
Davis, CA 1982 – 1985

Select Publications:

1. Barnes, D., Franklin, S., Schultz, J., Henry, R., Coragliotti, A. and Mayfield, S. **Contribution of 5' and 3' untranslated regions of plastid mRNAs to the expression of *Chlamydomonas reinhardtii* chloroplast genes.** *Mol. Gen. Genomics*. 2005, 274:625-636.
2. Franklin, S.E. and Mayfield, S.P. **Recent developments in the production of human therapeutic proteins in eukaryotic algae.** *Expert Opin. Biol. Ther*. 2005, **5**:225-235.
3. Mayfield, S.P. and Franklin, S: **Expression of human antibodies in eukaryotic micro-algae.** *Vaccine*. 2005. 23: 1828-1832
4. Franklin, S.E. and Mayfield, S.P. **Prospects for molecular farming in the green alga *Chlamydomonas reinhardtii*.** *Curr. Opin. Plant Biol*. 2004, **7**:159-165.
5. Mayfield, S., Franklin, S.E., and Lerner, R. (2003) **Expression and assembly of a fully active antibody in algae**. Proc. Natl. Acad. Sci. USA 100: 438-442.
6. Franklin, S.E. Ngo, B., Efuet, E. and Mayfield, S.P. (2001) **Development of a GFP reporter gene for *Chlamydomonas reinhardtii* chloroplasts**. *The Plant Journal* 30: 733-744.
7. Franklin, S.E., Young,L., Watson,D., Cigan,A., Meyer, T. and Bulla, L.A. (1997) **Southern blot analysis of BT-R1, the *Manduca sexta* gene encoding the receptor for the Cry1Ab toxin of *Bacillus thuringiensis*.** *Mol. Gen. Genet.* 256:517-524.
8. Franklin, S.E., Zwick, M.G. and Johnson, J.D. (1995) **Characterization and partial purification of two pre-tRNA 5' processing activities from Daucus carrota (carrot) suspension cells**. *The Plant Journal* 7:553-563.
9. Franklin, S.E., Lin, T.S. and Folk, W.R. (1992) **Construction and suppression of nonsense mutations which function in plant cells**. *The Plant Journal* 2:583-588.

Jonathan S. Wolfson
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EXPERIENCE

SOLAZYME, INC. - South San Francisco, CA — November 2003 – Present
Chief Executive Officer and Co-Founder
Solazyme is a biotechnology company specializing in the optimization of microalgae for production of biofuels, human/animal nutrition, chemicals and health and wellness materials.

- Responsible for overall corporate strategy and execution.
- Manage all business functions and commercialization
- Built a world class executive team and advisory board required to lead the company past proof of concept to large scale production and commercialization.
- Leading all efforts to establish critical strategic business partnerships; from developing a strategy, to attracting and securing partners, to managing and expanding existing relationships.
- Repeated demonstration of ability to optimize overall capital and cash flow efficiency - - successfully raised approximately $75 million to date with combination of equity, debt and government grants.

7TH ONLINE, INC. - New York, NY — November 2002 – November 2003
Vice President of Finance and Business Development
7thOnline is a venture backed provider of supply chain software targeted to the global retail industry. Applications include collaborative assortment and financial planning and order management technology.

- Ran corporate finance, including modeling, cash/debt management, and capital raising
  - Perform detailed financial and valuation analyses for pricing, business forecasting, project costing/financing, project appraisal, capital raising, and potential acquisitions
  - Build, maintain and update corporate and project level financial models
  - Manage external audit
- Managed financing round including the creation and delivery of roadshow financing presentations, due diligence reviews, preparation of documentation through successful closure.
- Together with Sales, responsible for developing, preparing and delivering sales collateral and presentations to generate sales bookings and revenue for the company by developing, pursuing and closing sales opportunities. During first nine months of employment, oversaw approximately 300% increase in annualized revenues.
- Responsible for identifying and building crucial strategic business partnerships; from developing a strategy, to attracting and securing partners, to managing and expanding existing relationships.

HUNTER COLLEGE (CITY UNIVERSITY OF NEW YORK) *- New York, NY* — *Fall 2001 – Fall 2003*
Adjunct Assistant Professor of Economics (Part Time – Evenings)

- Taught undergraduate classes each semester including lecturing, preparation of lesson plans exams and projects.
- Developed and administered novel standalone corporate malfeasance curriculum as part of advanced accounting and corporate governance course.

INVESTORTREE, INC. *- New York, NY* — *December 1999 – November 2002*
Co-President
InvestorTree was a financial software and services firm specializing in the installation and customization of lead generation (CRM) software and service tools to the financial advisory community.

- Ran strategy and business development team focusing on planning, project management, channel management, account management, and strategic alliances with direct responsibility for the negotiation and closure of agreements.
    - Partnerships created include: Fidelity Investments, AXA/Equitable, Raymond James, Fiserv/DATAlynx, Morningstar/Marketwatch and others
- Responsible for corporate finance function, including modeling, cash and debt management, and capital raising
    - Performed detailed financial and valuation analyses for pricing, business forecasting, project costing/financing, project appraisal, capital raising, and potential acquisitions
    - Built, maintained and updated corporate and project level financial models
    - Managed fundraising including roadshow and investor relations through closure
- Co-inventor of InvestorTree's analytical applications (Patent Application Serial No. 09/668,828)
- Ran technical and sales level marketing function including education on integration with ERP and CRM solutions and upgrading of software to provide additional CRM services.

POSITIONS HELD DURING GRADUATE SCHOOL:

MORGAN STANLEY *- New York, NY*

Summer Associate in Investment Banking Division

- Developed comprehensive financial model and prepared internal commitment documents and external board materials for $4 billion buy-side M & A assignment.
- Analyzed industry and company specific data and prepared quantitative and written summaries for management buyout of an airline.
- Prepared valuation and pitch materials for telecommunications IPO resulting in new business.

FRIED, FRANK, HARRIS, SHRIVER & JACOBSON *- New York, NY*

Summer Associate

- Member of deal team for Forstmann Little & Co. $1.4 billion LBO of Community Health Systems, Inc. and represented Merrill Lynch in IPO of Jack Nicklaus' Golden Bear Golf.

TRIARC COMPANIES, INC. - New York, NY

Associate (Full (Summer) and Part Time (Academic Years))

- Financial Analyst and legal coordinator on major corporate restructuring that included sale of Graniteville, Inc., IPO of National Propane Partners, LLP, and acquisition of Mistic Beverage.

DNA – PEOPLE'S LEGAL SERVICES *- Tuba City, AZ*

Case Handler with special admission to Navajo Bar (Full Time)

- Practiced employment, family, and disability advocacy law as legal aid case handler for indigent Navajos and Hopis on the Navajo reservation.

EDUCATION

NEW YORK UNIVERSITY: Leonard N. Stern School of Business - New York, NY — December 1999

Masters in Business Administration - Emphasis in Finance

NEW YORK UNIVERSITY: NYU School of Law - New York, NY — December 1999

Juris Doctor

EMORY UNIVERSITY - Atlanta, GA — May 1993

Bachelor of Arts, Political Science

- Deans List all Semesters
- Pi Sigma Alpha National Political Science Honors Society

Tyler W. Painter

561 Eccles Avenue, S. San Francisco, CA 94080 tpainter@solazyme.com

Accomplished finance executive with industry experience spanning operations in the U.S., Europe and Asia and across private, public and Fortune 500 companies. Proven ability to quickly analyze key business drivers and develop strategies to increase shareholder value.

HIGHLIGHTS

- Extensive capital structuring experience raising over $500 million in equity and debt in both private and public markets
- Corporate officer of $1B public software company with direct responsibility for managing corporate assets in excess of $200 million
- 10+ years leading Investor Relations strategies and managing Wall Street relationships
- Winner of 2006 Pinnacle Award for Risk Management from the Association of Financial Professionals for creating industry leading approach to global treasury and finance operations that enhanced internal controls and resulted in over $500K of annual savings
- Successfully implemented SOX 404 compliance across multiple finance departments, creating and implementing procedures that were highlighted as industry best practice

PROFESSIONAL EXPERIENCE

SOLAZYME • South San Francisco, CA — Oct 2007 - Present

Leader in Algal Biotechnology creating sustainable solutions for Renewable Fuels, Chemicals and Nutritional markets

Chief Financial Officer

- Responsible for managing capital structure to support rapid growth of company managed series C fundraising process resulting in equity raise in excess of $50 million
- Managing allocation of resources and cash burn against budgets and strategic initiatives
- Leading all administrative functions for company including operations, human resources and IT
- Enhancing existing procedures and processes to ensure compliance with all regulatory requirements including GAAP, SEC, government project accounting and project financing.

PMC-SIERRA • Vancouver, British Columbia, Canada — May 2007 – Oct 2007

Leading provider of broadband communications and storage semiconductors

Interim Vice President Finance & Corporate Controller

- Recruited for international assignment as key finance executive of $2 billion company.
- Accountable for strategic planning and leadership of global accounting organization, day-to-day operations management and SEC reporting.
- Recruited, developed and managed team of 40+ finance professionals, managers and support staff.
- Championed initiative to review and update accounting policies in order to ensure compliance with GAAP guidelines.

WIND RIVER SYSTEMS, INC. • Alameda, CA **Jan 2001 – April 2007**

Global leader in Device Software

Vice President Finance, Investor Relations & Corporate Treasurer • 2005 – 2007
Corporate Treasurer and Senior Director Investor Relations & Tax • 2003 - 2005
Director Investor Relations • 2001 - 2003

Investor Relations Achievements
Maximize shareholder value through actively managing Wall Street communications and relationships.

- Awarded 2007 Top 5 Best Corporate Governance Practices in the U.S by IR Global Rankings, a comprehensive ranking system for Corporate Governance and Earnings Release & Disclosures.
- Increased average holding period of top 35 institutional investors from 1 year to over 18 months.
- Managed financial disclosures and ensured compliance with Reg FD.

Corporate Treasury Achievements
Centralized treasury function to minimize risk, improve cash flow and maximize return on assets.

- Delivered returns that exceeded benchmarks in 16 out of 18 quarters for $200M+ portfolio
- Raised $150 million through subordinated convertible debt offering, secured various lines of credit totaling $60 million and managed global capital requirements for entities in 18 countries
- Consolidated banking systems to one global platform and reduced operating costs by 15%.
- Improved cash flow forecasting and reversed negative cash flow to positive $55 million annually.

CARSDIRECT • Culver City, CA ***1999 - 2001***
#1 online car buying resource (as rated by Forbes, Time and Yahoo!)

Director Finance and Investor Relations

Key member of start-up management team that grew company revenues to $160M in 2 years. Charged with developing corporate financial model and managing private fundraising.

- Developed annual operating budgets, monthly financial reporting of actuals vs. forecast and identified opportunities to improve performance against targets.
- Secured $300 million in equity funding from leading private investors.
- Managed S-1 filing process with investment banks, legal counsel and auditors.
- Acted as primary contact for investors to answer financial and strategic due diligence inquiries.

GAP, INC. • San Francisco, CA **1993 - 1999**
Fortune 200 Specialty apparel retailer
Senior Manager Investor Relations • 1998 - 1999
Senior Analyst / Manager – Investor Relations & International Finance • 1995-1998
Staff Accountant – Product Cost Management • 1993-1995

EDUCATION

B.S., Business Administration / Finance Management
California Polytechnic University • San Luis Obispo, CA

PROFESSIONAL AFFILIATIONS

National Investor Relations Institute
Association of Financial Professionals

TROY J. CAMPIONE, PhD. Senior V.P. Business Development, Solazyme, Inc.
561 Eccles Avenue • S. San Francisco, CA 94080 • tcampione@solazyme.com

Differentiating Strengths and Unique Qualifications

- **Stellar track record of monetizing technology across diverse industries and geographies built on rare combination of extensive business, technology and leadership experience**
- **High energy, passionate, ultra-creative optimist, strategist and visionary**
- **Consummate relationship builder and dealmaker**

TECHNICAL EXPERTISE Chemicals, energy/fuels (alternative/"green-tech"), catalysis, polymers, materials science

Professional Experience

SYMYX TECHNOLOGIES, INC. - SANTA CLARA, CA **2000 – OCT 2006**

Symyx is a $120+ million dollar, 400+ employee high tech company providing high throughput research and informatics technologies globally to the chemical, energy, polymer, pharmaceutical and electronics industries.

General Manager and Vice President (2004-Oct. 2006)
Collaborative Research, Strategic Alliances and Materials Licensing
($45M budget, 120 member scientific organization, P/L responsibility, leadership team)

Vice President- Business Development (2000-2004)
Alliances, Sales and Marketing

Grew the business by >25%/yr to $65M/yr @40% gross margin (2003-06) and attractive royalty upside by developing and executing on innovative business strategies and tactics and leading the organization to success
Leveraged Symyx's strong technology position to develop and successfully negotiate over $400M (million dollars) of new research services, products and licensing revenue

- $225+M, 5 year landmark alliance with ExxonMobil (2002)
- $120+M, 5 year alliance with The Dow Chemical Company (2004)
- $14M, 5 year collaboration with Univation Technologies (2003)
- $10M, 3 year collaboration with Innovene (formerly BP) (2003)
- $10+M, 4 year collaboration with Celanese (2001)
- $8+M collaboration with BP (2004)
- Plus several multi-million dollar research deals with Honda, ExxonMobil, Dow, JSR, and (2) undisclosed companies resulting in multiple commercial successes (through mid-2006)
- JSR – electronic applications – LFRP polymers (2)
- Dow Chemical – elastomeric and blocky polymers (2)
- Celanese – catalyst for vinyl acetate production (1)

EXXONMOBIL CHEMICAL - HOUSTON AND BAYTOWN, TX **1991 - 2000**

Worldwide Basic Chemicals Technology Manager (1997-2000)
($20M budget, 45 researchers, 27 labs and pilot plants) ***and***

Site Operations Manager ($7M/yr, 27 person organization)

Led research and development activities for advanced catalyst and process technologies in support of 4 billion dollars/yr of light olefins production

- Managed multi-site R&D activities, most notably resulting in the advancement of breakthrough technologies in catalytic cracking and gas conversion
- Effectively orchestrated worldwide collaborative research activities with five institutes and private industry to deliver enhanced technology options
- Revamped global intellectual property and licensing strategy and aligned with business objectives resulting in stronger IP protection and lower costs

Effectively managed the safety, health, environmental, site services and operations of a 450 person R&D and Engineering complex

Intermediates Business Manager (1996-1997)
($600 M/yr business segment)

Delivered continued success and growth of the Vinyl Intermediates leadership business by championing strategic initiatives and delivering on earnings growth, operating targets and competitive positioning

- Evolved a compelling vision and strategic business agenda, translated into aggressive measurable goals and led a cross-functional business team to achieve growth and cost reduction targets
  - Aligned marketing, manufacturing and technology organizations to deliver on plans
  - Achieved $15M earnings growth and 5% cost reduction
  - Stewarded a $20M investment plan delivering 30% ROCE
- Negotiated complex feedstock, toll processing, IP license and new product development deals worth >$90M
- Improved and unified worldwide experience curves and competitive analysis methodology to strengthen ECC's strategic investment rationale

Multi-site Headquarters Safety Chairman *(15 member committee, 900 people)*

Department Head - Polymer Science Materials Characterization (1994-1996)
($8M budget, 34 researchers, 13 labs)- Lab operations, tech service

Senior Section Supervisor - Polymers Pilot Plants (1993-1994)
($12M operating budget, 37 scientists/engineers, 24 hour shift operation)
Semi-commercial development and scale-up activities

Strategic Business and Investment Planner - Intermediates (1991-1993)
(Prioritized, championed and secured the appropriation of $280M of capital investments including (2) major chemical plant expansions)

EXXON CHEMICAL COMPANY - BATON ROUGE, LA **1985 - 1991**

Technical Section Supervisor - Performance Products (1989-1991)
($2.5M budget, 12 engineers; also ***Investment Planner*** *($14M/yr))*
Plant operations and design; capital investment champion and steward

Senior Research Engineer - Intermediates Technology (1988-1989)
Research and development, modeling

Research Engineer - Intermediates Technology (1985-1988)
(3 patents for catalyst and process innovation)

EDUCATION

PhD Chemical Engineering, 1985 - University of Texas at Austin, 4.0 GPA
ME Chemical Engineering, 1982 - Tulane University, 4.0 GPA
BS Chemical Engineering, 1982 - Tulane University, cum laude
plus extensive executive business education at The Wharton School of Business, Cal Tech, University of Wisconsin Business School, and ExxonMobil

OTHER

Board of Editors - Industrial Research Institute
University of Texas at Austin – Department of Chemical Engineering – Advisory Committee
Numerous publications, articles and conference presentations

MATTHEW J. FROME
561 Eccles Avenue
South San Francisco, CA 94040
650-780-4777
mfrome@solazyme.com

EDUCATION

University of California at Berkeley
May 1995 *Master of Business Administration,* Walter A. Haas School of Business
May 1995 *Master of Public Health,* School of Public Health

Stanford University
June 1987 *Master of Science,* Department of Biology

University of Santa Clara
June 1985 *Bachelor of Science,* Department of Biology

EXPERIENCE

2005 – 2006 **FOCUS Biology, Inc.,** San Jose, CA
Business Development / Product Management
Founded start-up bioinformatics company developing machine learning algorithms for the analysis of genetic data. Raised initial start-up funds, and developed marketing and business plan. Signed agreements with beta partners, TGen, CHORI, and Celera Diagnostics. Created web-site, trade show booth, scientific posters and hand out materials generating a hundreds of leads. Led product development for use cases and feature priority developed through customer input.

2005 **Velocity11,** Menlo Park, CA
Consultant
Created business development plans for automation and software products slated for development.

1997 – 2005 **GE Healthcare/Amersham Biosciences/Molecular Dynamics,** Sunnyvale, CA
Business Development Manager
Global Sales Manager, Informatics
Responsible for sale and partner development for the discoveryHub Data Integration Technology and Scierra Laboratory Workflow Systems. Managed informatics sales specialists and worldwide regional sales organizations. Managed collaborative efforts for large custom software installations.
Marketing/Product Manager, Bioinformatics
Developed marketing plans, materials, and managed the product launch of the Scierra product line. Responsible for commercial relationships and product development of Amersham's strategic software
initiative, focusing on Laboratory Workflow Systems. Managed the sub-contracting partner, Cimarron Software, and various Amersham business units in Sweden, United Kingdom, Germany, Japan and United States. Provided support for Amersham's equity investment in Cimarron Software.

Gene Expression Product and Applications Manager
Lead the specification and development of the GenIII microarray platform, including software development and collaborations. Implemented the Microarray Technology Access Program (MTAP) which generated over $25 million in revenue and placed Molecular Dynamics as a leader in the area of spotted Gene Expression Microarrrays. Developed and managed a new team of scientists to liaison between Molecular Dynamics, Amersham and our MTAP Partners.

1995 – 1997 **Sangamo BioSciences, Inc.** Richmond, CA

Director of Business Development and Operations
First full time employee of biotechnology start-up developing the ZFP DNA binding technology. Responsible for the development, award, and execution of over $4.6 million in grant funding. Developed business plan for potential investors. Instituted research agreements with government and academic institutions. Negotiated lease agreements for research facilities and had responsibility for most business functions including marketing, personnel, intellectual property and accounting.

1989 – 1992 **Applied Biosystems Inc.** Foster City, CA

Field Sales Representative, New Jersey/New York

Generated over $8 million dollars in yearly sales. Led region in sales each year in the field.
Award for most DNA Sequencers sales, FY1992. Determined with R&D and customers solutions to technical problems encountered with dye-terminator sequencing.

Jeffrev L. Haney

REDACTED
EXEMPTION 6

PROFESSIONAL EXPERIENCE

CHEROKEE PHARMACEUTICALS, Riverside, PA **2008 - 2009**
Manufacturer of pharmaceutical and specialty chemicals

Director, Fermentation Services **2007 - Present**

- Responsible for all aspects of developing and managing the new *"Fermentation Contract Manufacturing Business"* for Cherokee Pharmaceuticals.
- Write and/or review Confidentiality Agreements for potential new customers.
- Follow up on initial contacts from potential customers to evaluate potential fit for the facility, including technical discussion and site visits.
- Write and/or review Pilot Manufacturing Agreements for the evaluation of products for potential new customers.
- Develop cost models for evaluation of economic feasibility, and also in support of negotiating cost for pilot and supply agreements.
- Recruit and develop a technical and operating staff to operate the new fermentation business.
- Direct all aspects of the manufacturing business, including assisting in technical coverage for new product demonstrations. To date six new product candidates have been evaluated at the production scale. Products categories' include biofuels, biopesticides, food products, and neutraceuticals.
- Interface with the VP of New Business Development for Cherokee Pharmaceuticals on all new potential customers.
- Develop financial operating plan (budget) for the new business and manage to that plan.

MERCK & CO., INC., Danville, PA **1979 - 2008**
Manufacturer of pharmaceuticals

Director of Manufacturing - Factory 6, 61, & 7 **2002 - 2007**

- Directed all aspect of the Active Pharmaceutical Ingredients (API) manufacturing for the Danville facility. Active ingredients produced at the site included antibiotics and animal health produces.
- Prepared and management a multi-million dollar budget for the manufacturing operation.
- Responsible for the Manufacturing Technical Support organization which assisted the Factories with day-to-day troubleshooting and process improvements.
- Managed a staff of approximately 150 individuals, 35 salaried and 115 hourly.
- Responsible for insure compliance in cGMP, Safety, and Environmental.
- Responsible for driving the employee involvement efforts within the manufacturing area. This effort included but was not limited to self-managed teams, operator driven process improvement efforts, and operator performed maintenance.
- Member of the Danville Plant Staff, Quality Council, Employee Involvement Steering Committee, Labor Contract Negotiating Team, Plant Staffing Committee, and other groups responsible for managing the Danville Plant.

Area Head - Factory 1 & 2 **1989 – 2002**

- Directed the fermentation and recovery operations in Factory 1 and 2 at the Danville facility, which was responsible for the production of biologics, food ingredients, animal health products, and other industrial fermentation products. Managed a staff of approximately 85 individuals, 17 salaried and 68 hourly.
- Prepared and management a multi-million dollar budget for the Factory 1 & 2 manufacturing operation.
- Served as the Plant Lead for the design, construction, and demonstration of the Xanthan Gum Process at the Danville facility. Upon completion of Phase II of this project, Danville was the second largest producer of Xanthan Gum for our customer in the world.
- Instituted a stand-alone quality system for the Xanthan Gum operation as part of the efforts to streamline operations and reduce costs. As part of this quality effort the Factory 1 & 2 area became the only area on the Danville site that received certification for ISO 9000, Kosher, HACCAP, and American Institute of Baking.
- Responsible for regulatory compliance, including cGMP's, Safety, and Environmental.
- Co-Chaired the Design Team that developed and eventually implemented the "First Self-Managed Work Teams" at the Danville Facility.

Department Head – Factory 1 & 2 **1986 - 1989**

- Directed the fermentation and recovery operations in Factory 1 and 2 at the Danville facility, which was responsible for the production of avermectin and asparaginase. Managed a staff of approximately 32 individuals, 9 salaried and 23 hourly.
- Prepared and management a multi-million dollar budget for the Factory 1 & 2 manufacturing operation.
- Responsible for process improvement efforts, achieving profit plan and yield targets for area.
- Responsible for regulatory compliance, including GMP's, and Safety and Environmental.

Senior Staff Microbiologist **1985 - 1986**

- Managed the Biotechnology Pilot Plant, comprised of 5L to 4000L scale fermentation vessels.
- Managed the performance of 5 hourly technicians.
- Responsible for scale-up of new processes, use testing of new raw materials, and general process improvements in support of manufacturing operations.

EDUCATION

Master of Science, Microbiology, University of Arkansas, Fayetteville, AR, 1979
Thesis: *"Effects of Trace Elements on the Growth and Metabolism of Rhizopus nigricans"*

Bachelor of Science, Biology/Chemistry, Arkansas Tech University, Russellville, AR, 1977

Gregory A. Spancake

REDACTED
EXEMPTION 6

PROFESSIONAL EXPERIENCE

CHEROKEE PHARMACEUTICALS, Riverside, PA **2008 - 2009**
Manufacturer of pharmaceutical and specialty chemicals

Department Head, Fermentation Services

- Manage the Technical Support Dept. which is responsible for providing technical support for the Fermentation Services contract manufacturing operation. Interact with the customers technical experts for technology transfer, develop process fits for the facility and provide support for process introductions.
- Review processes from potential new customers to determine if they are suitable opportunities for our business.
- Chair the Institutional Biosafety Committee to ensure facility compliance with NIH guidelines regarding recombinant organisms.

MERCK & CO., INC., Danville, PA **1996 - 2008**
Manufacturer of pharmaceuticals
Department Head, Factory 1 & 2 **2000 – 2005**

- Managed the fermentation and isolation facility responsible for production of asparaginase and xanthan gum.
- Responsible for process improvement efforts, achieving profit plan and yield targets for area and the implementation of a high performance work system.
- Responsible for regulatory compliance, including GMP's, ISO, Kosher, Safety and environmental.
- Shut down the xanthan gum process at the end of the contract and helped transition the facility to contract manufacturing.

Department Head, Factory 1 **1996 - 2000**

- Managed the F1 fermentation facility responsible for production of avermectin, asparaginase and xanthan gum.
- Responsible for process improvement efforts, achieving profit plan and yield targets for area and the implementation of a high performance work system.
- Responsible for regulatory compliance, including GMP's, ISO, Kosher, Safety and environmental.

GENENCOR INTERNATIONAL, INC., Rochester, NY **1991 - 1995**
Manufacturer of industrial enzymes and specialty chemicals

Manager, Microbiology

- Managed the Culture Collection which resulted in safekeeping of important company strains, generation of validated seed stocks for production processes, and ISO 9002 Certification.
- Provided technical support for Manufacturing Operations resulting in smooth introduction of new processes.
- Chaired the Institutional Biosafety Committee to ensure facility compliance with NY State and NIH guidelines regarding recombinant organisms.

- Managed strain and process development efforts for several industrial enzymes resulting in significant yield improvement.

EASTMAN KODAK CO., Bioproducts Div., Rochester, N.Y. **1988 – 1991**
Manufacturer of industrial enzymes, diagnostic enzymes and specialty chemicals

Laboratory Supervisor
- Managed Operations Microbiology and Analytical as part of plant management team. Labs provided necessary testing and monitoring of fermentations performed in Operations and performed development work in support of Bioproducts R&D activities.
- Provided technical leadership, personnel development and managed operating budget.
- Served as the Bioproduct Divisions Biosafety Officer and a member of the Eastman Kodak's Institutional Biosafety Committee.
- Managed the microbial assets of the division and served as microbiology consultant for the Biomanufacturing Program resulting in successful completion of numerous manufacturing contracts.
- Served as a member of the Contamination Control Task Force which investigated and solved contamination problems in the Operations Department.

MERCK & CO., INC., Danville, PA **1985 - 1988**
Manufacturer of pharmaceuticals

Senior Staff Microbiologist
- Managed culture development programs for the production of riboflavin, avermectin, cephalosporin C, and L-dopa, that improved productivity through the use of UV and chemical mutation.
- Developed culture storage procedures for new strains resulting in improved culture stability.

EDUCATION

Ph.D., Microbiology, Syracuse University, Syracuse, NY, 1985

B.S., Biology/Chemistry, University of Miami, Coral Gables, Fl, 1975

Additional training:

Fermentation Technology at Massachusetts Institute of Technology

John E. Cuzens

Senior Vice President, Chief Technology Officer, BlueFire Ethanol, Inc.

Education and Training:

University of California Berkeley, Bachelor of Science in Chemical Engineering.
College of Marin, Associate of Science in Physical Sciences

State of California, Registered Professional Mechanical Engineer, 1980, License No. 20891.
State of California, Contractors "A" License Responsible Managing Employee for ARK Energy, Inc. No.A700016

Past Member - American Institute of Chemical Engineers.

Selected Patents/Applications - 8 x "Method of Producing Sugars using Strong Acid Hydrolysis of Cellulosic and Hemicellulosic Materials" U.S.#5,562,777, 5,580,389, "Conversion of Glucose to Levulinic Acid" and other patents pending.

Technical Papers Presented and Published - "Sugar Cane Bagasse Conversion to Ethanol", World Renewable Energy Congress, Denver 1996. "Continuous Chromatographic Separation", National Renewable Energy Conference, Colorado Springs 1997, "Fuel-Flexible, Fuel Processors" ESD Conference, Los Angeles 1998, "Fuel Cells for Modern Buildings" Fuel Cell 98, Palm Springs.

Professional Experience:

BlueFire Ethanol, Inc, Irvine, Ca 2006 to present
Senior Vice President, Chief Technology Officer

Wahlco, Inc., Santa Ana, Ca. 2004- 2006
Director of Projects; Supervised Project Managers, Project Engineers and a scheduling group managing projects, mostly Utility or Engineer/Procure/Construction company clients. Process development and implementation of new urea to ammonia technology for the safe production of ammonia gas for Selective Catalytic Reduction environmental systems.

Applied Utility Systems, Inc., Irvine, Ca. 2001 – 2004
Manager of Operations, Manager of Project Management; Worked in a matrixed organization as the lead on development, design, fabrication and construction projects related to refinery

utility and chemical process industries. Responsible for customer satisfaction and maintenance of project deliverables quality. Completed $15MM SCR retrofit of 2 x FT4 30 MWe gas turbines on schedule and to satisfaction of customer while maintaining highest gross margin in company history.

Hydrogen Burner Technology, Inc., Long Beach, Ca. 1997-2001
Director of Manufacturing, Director of Engineering; Supervised engineering, manufacturing and project management personnel in this technology development company. Responsible for managing the fourteen ongoing contracts worth approximately $7 mm for clients such as the U.S. DOE, Los Alamos National Laboratory and several private companies. Helped double project backlog through responsive customer

service by exploiting compatible opportunities. Co-patent applicant for a process patent covering the integration of a fuel-flexible, fuel processor subsystem.

ARKENOL, Inc., Laguna Hills, Ca. 1991-1997
Director Engineering & Technology; Supervised the development and implementation of the ARKENOL "Acid Hydrolysis of Cellulosic Materials to Fermentable Sugars" technology. Supervised activities of employed and subcontract engineers & scientists in developing improvements and add-on technologies to further enhance the commercialization of the technology. Supporting company growth by making technical presentations, writing technical articles, networking and formulating technical proposals.

ARK Energy, Inc. (ARK), 1991-1997
Vice President Sacramento Power Inc., Senior Program Manager; Led Sacramento Ethanol and Power Cogeneration (SEPCO) project, a 149 mW gas fired combined cycle power plant and a 12.5 mm gal. per year cellulose to ethanol process plant. Sucesses included execution of Development Agreement and contracts with the Sacramento Municipal Utility District Financing Authority. Leader for CEQA, EIR permit activities at the CEC, for the AFC process. Lead technical coordinator for preliminary design for permitting and development of EPC contracts. Responsible for coordination of Political interface, and regulatory agencies. Project proponent speaker before community groups and public workshops. Responsible for schedule and budget performance compliance. Responsible Managing Engineer on ARK Energy, Inc. corporate State of California Contractors License for construction law and trade practice.

Senior Program Manager providing development assistance for potential projects in Brazil, Holland, Philippines, Indonesia, Italy, Australia, Hawaii, Texas and Minnesota. Potential projects included gas to coal fired 25-850 MW power plants with & without acid hydrolysis cogeneration thermal hosts. Biomass fired 2-50 MW utility plants for combined steam and power. Supported included cycle analysis, permit evaluation, technical communications, schedule and budget development.

DR. ROBERT J. WOOLEY

Education and Training

PhD Chemical Engineering, 12/1987
The University of Florida, Gainesville, Florida
MS Chemical Engineering, 8/1979
The University of Michigan, Ann Arbor, Michigan
BS Chemical Engineering, 5/1976
The University of Michigan, Ann Arbor, Michigan

Professional Experience

Abengoa Bioenergy New Technology, Lakewood, CO, 2007 to present
Director, Process Engineering

Responsible for the development of engineering for all technologies in the New Technology group. Leading a group of 10-15 engineers in the analysis of experimental data; development of models, PFDs, P&IDs and equipment and instrumentation specifications. Projects include cellulose conversion to ethanol and enhancements to the starch ethanol process.

National Renewable Energy Laboratory, Golden, CO, 2006 to 2007
Strategic Principal Engineer

Responsible for assuring appropriate and complete analyses, including risk and scenario analysis, are performed to support the objectives of the U.S. DOE's Biomass Program. Led the efforts to maintain a rigorous stage gate review process of all Biomass projects.

NatureWorks-Cargill, LLC, Minnetonka, MN, 2002 to 2006
Biomass Technology Manager

Led efforts (~ $5 million annually) to develop alternative feedstocks (biomass sugars) for the production of inexpensive lactic acid and polylactide polymers. This includesd managing Natureworks' efforts to develop intellectual property in biomass conversion, coordinate with strain and fermentation development at NatureWorks, and external partnerships with suppliers of supplemental technology (e.g., enzyme and feedstock collection). Responsible for process modeling and economic analysis of alternative biomass processes through the production of polylactide.

National Renewable Energy Laboratory, Golden, CO, 1991 to 2002
Technology Manager – Biofuels Program (2000 – 2002)

Accountable to DOE for the planning and execution of NREL and outside subcontracted research of approximately $20 million annually for advancing the National Biofuels Program. Considerable amount of stakeholder interaction and reviews were required to maintain support for the program at DOE and NREL.

Team Leader - Process Engineering (1996 – 1999)

Led a group of engineers responsible for developing and validating the process design and evaluating the economics through advanced modeling (ASPEN+) for the cellulosic biomass to ethanol process.

Manager/Team Leader - Alternative Fuels Data Center (1991 – 1995)
Advanced Separation Technologies, Inc., Lakeland, FL
Chief Engineer/Scientist
1989 to 1991

Development of laboratory and pilot plant procedures and design data for the ISEP continuous ion exchange and chromatographic process.

JSD Simulation Service Company, Houston, TX
Engineering Sales Manager
1988 to 1989
Responsible for program improvements and support of the process simulator ASPEN/SP.

Dow Corning Corporation, Midland, MI & Carrollton, KY
Engineering Specialist
1979 to 1984
Responsible for all chemical design aspects of several major capital projects.

Dow Chemical Company, Midland, MI
Chemical Engineer
1976 to 1978
Responsible for defining equipment and experiments to obtain scale-up information and customer samples of new products.

Selected Publications & Patents

"The eco-profiles for current and near-future NatureWorks® polylactide (PLA) production", with E. T. H. Vink, D. A. Glassner, J. J. Kolstad and R. P. O'Connor, Industrial Biotechnology, (3) 1, 58:81, 2007.

"Process for Fractionating Lignocellulosic Biomass into Liquid and Solid Products", with R. O'Connor, J. Kolstad, R. Kean, D. Glassner, B. Mastel, J. Ritzenthaler, J. Birk, J. Hettenhaus, R. Brooks, Patent Application WO 2007/120210 A2, October 25, 2007 "The Lignocellulosic Biorefinery: A Strategy to Return to a Sustainable Source of Fuels and Organic Chemicals" invited presentation with Davis Clements at Biorefinica 2004, Osnabrück, Germany, October 27-28, 2004.

"Standing Wave Design of Single and Tandem SMB Processes for Multicomponent Fractionation: Linear Isotherm Systems", with B. Hritzko, Y. Xie, N.-H. Wang, *AIChE J.*, (48) 2769, 2002.

"The effect of overliming on the toxicity of dilute acid pretreated lignocellulosics: the role of inorganics, uronic acids and ether-soluble organics", with T. Ranatunga, J. Jervis, R. Helm, J. McMillan, *Enzyme and Microbial Technology,* (27), 240, 2000.

"Process Design and Costing of Bioethanol Technology: A Tool for Determining the Status and Direction of Research and Development", *Biotechnology Progress,* with M. Ruth, D. Glassner, J. Sheehan, (15) 5:794, 1999.

"A Nine-Zone Simulated Moving Bed for the Recovery of Glucose and Xylose from Biomass Hydrolyzate" with Z. Ma and N.-H. L. Wang, *Industial and Engineering Chemistry*, (37) 9:3699, September 1998.

"Novel Three Component Separation Using a Single Continuous Counter-current Chromatographic Unit", presented at the AIChE National Meeting, Chicago, IL, November 1996.

ANDREA BOZZANO
UOP LLC
Development Manager - Renewables

EDUCATION AND TRAINING

Iowa State University	Chemical Engineering	MS	1989
University of Illinois	Chemical Engineering	BS	1987

PROFESSIONAL EXPERIENCE

UOP LLC	Manager, Renewables Development	Manager of Process Development group which is developing the UOP Ecofining and Renewable Jet technologies, as well as other technologies based on renewable feedstocks.
UOP LLC	Senior Specialist, Olefins and Detergents Development	Worked on a number of projects in development of technologies related to light olefins.
UOP LLC	Specialist, Olefins and Detergents Development	Worked on a number of projects in development of technologies related to detergents.
UOP LLC	Field Advisor	Worked on a number of startups in refineries and petrochemical plants.

Selected Publications

	PAT. NO.		Title
1	7,396,966	T	Olefinic feedstock treatment processes
2	7,189,885	T	Staged process for producing linear 2-phenyl-alkanes
3	6,979,394	T	Alkylaromatic process with catalyst regeneration
4	6,756,515	T	Dehydrogenation process using layered catalyst composition
5	6,740,789	T	Alkylaromatic process with catalyst regeneration
6	6,486,370	T	Dehydrogenation process using layered catalyst composition

SYNERGISTIC ACTIVITIES

AIChE membership

REG

Renewable Energy Group

Glen Meier

Director, Technology & Feedstock Development

Renewable Energy Group®, Inc.,

For more than 15 years, Glen Meier has managed diverse and entrepreneurial businesses. Currently, Meier serves as Director of Technology & Feedstock Development at Renewable Energy Group®, Inc.

Renewable Energy Group, Inc., (REG) is a biodiesel industry sales leader offering a complete biodiesel solution. Renewable Energy Group markets REG-9000™ biodiesel through large petroleum companies and fuel distributors. REG-9000 is used by on-highway fleets, municipalities, and power generator, mining, military, home heating and agriculture applications. REG's network production facilities consist of state-of-the-art proprietary multiple-feedstock technology. Renewable Energy Group offers procurement and risk management, production operations and technology services in addition to alternative feedstock research and commercialization.

As Director of the Technology & Feedstock Development department, Mr. Meier investigates new technologies that are complementary to REG's business and assigns priorities, staff and resources to multiple projects. The Technology & Feedstock Development department is a core strength of REG and the department supports many other functions of the business including Quality, Production, Procurement and Construction.

Todd A. Potas, PE, QEP
e-mail: tapotas@NRG-LLC.com

Todd A. Potas, P.E., Q.E.P., is a Principal at Natural Resource Group, LLC (NRG) with over 22 years of professional experience. He is a registered Qualified Environmental Professional and a registered professional engineer in Minnesota, Nebraska, North Dakota, Louisiana and Florida. Todd leads our Renewables environmental services for the biofuels industries; his primary responsibilities include business development, quality assurance/quality control, project management, air permitting and environmental compliance management, regulatory negotiations, alternative fuel source and process engineering and control evaluations. Todd previously was a principal investigator for several coal beneficiation projects for coal companies, public utilities, and the U.S. Department of Energy, using technologies that included high temperature and pressure drying, oil agglomeration, and conventional physical cleaning of various coals. Todd's combination of experience with biofuels and coal technologies allows him to evaluate environmental and permitting challenges for advanced biofuels projects.

Selected Project Experience

- Ethanex Energy: Project Manager, environmental permitting for four 100 MMgal/yr ethanol plants to be built in Illinois, Missouri and Kansas; work included fractionation and biomass boiler processing.
- DOE Biofuels funding applications. Have assisted with NEPA process and other application requirements for serveral applicant proposers.
- Biofuels Energy: Principal, environmental permitting for two 100 MMgal/yr ethanol plants built in Fairmont, Minnesota and Wood River Nebraska; work includes storm water and water discharge permitting and stack testing on-going compliance.
- Red Trail Energy: Principal, environmental permitting for a 50 MMgal/yr ethanol plant operating in Richardton, North Dakota; project includes a coal-fired bubbling bed boiler and was permitted as a PSD major source with BACT analysis and NAAQS and Class I air dispersion modeling. Work includes support for on-going compliance.
- Vector Pipeline Project: managed air permitting for the Springfield, Indiana and Highland, Michigan compressor stations from start to finish.
- Guardian Pipeline Project: completed the RR9 for the Joliet, Illinois compressor station.
- Buccaneer Pipeline Project: completed the air quality section of the third-party EIS, including a compressor station, off-shore construction operations through a National Wildlife Refuge, and a liquid separation facility. The RR9 work included the required noise sections.
- International Paper, Mansfield, Louisiana: project task manager for installation and operation of a PSD pre-construction ambient air monitoring network for sulfur dioxide and MET parameters near a pulp and paper manufacturing facility.
- Waste Management, Inc. Air Quality Work: preparation of over 15 Title V air permit applications for landfill gas flare systems, reciprocating engines, and landfill gas-fired turbine generators; preparation of air quality training manuals and Title V emission inventory guidance for landfills; and presenter at four air quality seminars.

Education and Training

- M.E., Chemical Engineering, University of North Dakota, Grand Forks, North Dakota
- B.S., Chemical Engineering, University of North Dakota, Grand Forks, North Dakota

- Presenter, Annual Fuel Ethanol Workshop, Bryan and Bryan International, Air Emissions from Ethanol Plants, June 1999, 2001, 2002, 2003, 2005, Environmental Issues related to Biomass Gasification, June 2008, Moderator, June 2009.
- Presenter, DOE biomass programs, biofuels facility environmental siting and permitting issues, Argonne National Labs, February 2006.
- Instructor, Executive Enterprises, Inc., Air Quality Compliance Case Histories, Chicago, Illinois, 1997; Cincinnati, Ohio, 1997; and Farmington Hills, Michigan, 1997
- Prevention of Significant Deterioration/New Source Review Workshop, presented by EPA and the Air and Waste Management Association, Denver, Colorado, 1992

CHEROKEE
PHARMACEUTICALS
A PRWT LIFE SCIENCES COMPANY

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June 29, 2009

Mr. Tyler Painter
Chief Financial Officer
Solazyme, Inc.
561 Eccles Avenue
South San Francisco, CA 94080

RE: Cost Share - Integrated Biorefinery Operations

Dear Tyler:

Cherokee Pharmaceuticals LLC looks forward to the opportunity to participate in the U.S. Department of Energy project for the Demonstration of Integrated Biorefinery Operations in response to Funding Opportunity Announcement Number DE-FOA-0000096.

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We are pleased that you have selected us as the site for your integrated biorefinery and we will endeavor to help make the project a success. We believe that Solazyme's heterotrophic algal technology represents an important advance both for renewable biofuels and for industrial bioproduction, and we are excited to play a pivotal role in this project.

Best regards,

Dennis P. Bauer, Ph.D.
Vice President – Sales & Marketing

cc: Mkt Files, Elliot, Haney, Noll

UOP LLC
25 E. Algonquin Rd.
Des Plaines, IL 60017-5017

Tel: 847.391.2000
Fax: 847.391.2253
www.uop.com

June 16, 2009

Dr. Matthew Frome
Director of Business Development
Solazyme
561 Eccles Avenue
South San Francisco, CA 94080

RE: Letter of support for the cost share for the DOE-FOA-0000096 application:
Solazyme Integrated Biorefinery (SzIBR): Diesel Fuels from Heterotrophic Algae

Dear Dr. Frome:

UOP, LLC looks forward to the opportunity to participate in the U.S. Department of Energy project for the Demonstration of Integrated Biorefinery Operations in response to Funding Opportunity Announcement Number DE-FOA-0000096.

UOP LLC is a leading international supplier and licensor of process technology, catalysts, adsorbents, process plants, and consulting services to the petroleum refining, petrochemical, and gas processing industries. Launched in late 2006, our Ecofining™ process technology is the first commercial product from UOP's Renewable Energy & Chemicals business unit. UOP is developing and commercializing technology to produce transportation fuels and chemicals from biofeedstocks ranging from vegetable and algal oils to second generation cellulosic waste feedstocks like corn stover or wood chips.

As a member of this project team, we agree to contribute cost share of Ex 4 of the project costs if the program is selected. Based on the current budget, the UOP costs are expected to be Ex 4 with UOP contributing Ex 4

We are pleased to be included in this program to produce renewable diesel from Solazyme's algae oil. We believe that Solazyme's heterotrophic algal technology represents an important advance for renewable biofuels, and are excited to play an important role in this project.

If you have any questions, please feel free to contact me.

Best Regards,

Jennifer Holmgren
General Manager
Renewable Energy and Chemicals

ABENGOA BIOENERGY
ABENGOA BIOENERGY NEW TECHNOLOGIES

11500 W 13th Avenue
Lakewood, CO 80215
Telephone (+) 303-928-8500
Fax (+) 303-928-8510

June 26, 2009

Dr. Tony Day
Solazyme, Inc.
561 Eccles Avenue
South San Francisco, CA 94080

Dear Dr. Day,

I write in support of your application "Sustainable Feedstock Production Supply Systems to Support Cellulosic Biorefinery Industries" to be submitted to the U. S. Department of Energy's Funding Opportunity.

Your efforts in the utilization of algae to ferment sugars, specifically derived from cellulosic, to lipid based fuels aligns with our research, demonstration and production of low cost fermentation sugars from biomass. We are willing to produce fermentable sugars from biomass in our pilot plant in York, NE for your use in the production of lipid oils from algae. If your proposal is awarded by the DOE,

We look forward to your success in this project.

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Sincerely,

Robert J. Wooley, PhD, PE
Director, Process Engineering

Science. Solutions. Service

The data contained in every page (pages 1 to 15) 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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Environmental Questionnaire for FOA Applicants
(To Be Completed by Applicant)

PART I: General Information

Applicant Name: Solazyme, Inc.
Proposed Project Title: Solazyme Integrated Biorefinery
Solicitation Number: DOE FOA-0000096
Applicant Preparer:
Applicant Phone: REDACTED EXEMPTION 4 REDACTED EXEMPTION 6
Applicant Email:

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

   Solazyme, Inc. (Solazyme) intends to use DOE funding for all aspects of the Solazyme Integrated Biorefinery (SzIBR) project proposed for funding under DOE FOA-0000096. *Solazyme proposes to build, operate, and optimize a pilot-scale integrated biorefinery in order to demonstrate an integrated scale-up of its heterotrophic algal oil biomanufacturing process and to validate the projected commercial-scale economics.*

   One of Solazyme's main intents is to show that the SzIBR process can be used to produce inexpensive, high-quality renewable oil with current industrial biomanufacturing technology usable by the existing petroleum refining, distribution, and retail infrastructure grid. In order to demonstrate this concept, Solazyme will be utilizing multiple facilities for the feedstock, bench-scale fermentation optimization, processing of algae biomass into algal oil, and refining of algal oil into diesel fuels. A detailed description of the design, facilities, installation and use of existing equipment, data analysis, schedule, capital purchases, and processes associated with the SzIBR can be found in Project Execution Plan. For purposes of the environmental questionnaire, the main components of the SzIBR are summarized below:

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Feedstock

The SzIBR project will use domestically-sourced sucrose as a transitional feedstock. During the later phases of the pilot-scale project, Solazyme intends to run several small batches of cellulosic sugars derived from switchgrass, wheat straw, corn stover and municipal green waste. An existing and fully permitted facility in York, Nebraska operated by Abengoa BioEnergy Corporation will convert switchgrass, wheat straw, and / or corn stover biomass to cellulosic sugars via enzymatic hydrolysis and deliver them to one of several locations associated with the project (discussed below). Additionally, an existing and fully permitted facility in Irvine, California operated by Blue Fire Ethanol will convert municipal green waste to cellulosic sugars via acid hydrolysis and deliver them to Solazyme.

R & D Laboratory Work

Solazyme will utilize feedstock supplies delivered to their preexisting and fully permitted laboratory facilities in South San Francisco, California to optimize fermentation processes during set up of the pilot-scale equipment. Work at this facility will only include ordinary, on-going laboratory activities and no algal oil refining will occur at this location.

Pilot Scale SzIBR

Solazyme will construct the pilot-scale SzIBR at the site of Cherokee Pharmaceuticals' (Cherokee) existing commercial chemical manufacturing and fermentation plant in Riverside, Pennsylvania. Cherokee has extensive spare fermentation capacity and the necessary supporting infrastructure, which will avoid the need for Solazyme to construct a new facility. No structural modifications will be required at Cherokee to accommodate the SzIBR and will only require the installation of skid mounted process equipment needed for EX 4 *Only relatively minor remodeling of the interior space will be required to install the equipment necessary for the SzIBR. The fermentation, drying, extraction, and algal oil purification process is described in detail in Section 2.2 of the Project Management Plan.*

Refining Algal Oil to Biodiesel and Renewable Diesel

The SzIBR project will utilize an existing biorefinery in order to transesterify the refined algal oil into ASTM D6751 standard biodiesel. Solazyme will transport a majority of the refined algal oil produced at Cherokee (200,000 gallons) to a transesterification refining facility operated by Renewable Energy Group (REG) in Iowa. The remaining 25,000 gallons of algal oil produced at Cherokee will be transported to a biodiesel refining facility operated by UOP near Houston, Texas, for conversion to renewable diesel.

2. Does any part of your project require review and/or permitting by any other federal, state, regional, local, environmental, or regulatory agency? If yes, please describe.

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Yes. Permit modifications required for the Project area are described by resource below:

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3. Has any review (e.g., NEPA documentation, permits, agency consultations) been completed? If yes, is a finding or report available and how can a copy be obtained?

   No NEPA documentation, permit applications, or agency consultations have been completed for the project.

4. Is the proposed project part of a larger scope of work? If yes, please describe.

   Yes. Solazyme anticipates upgrading and increasing throughput of the pilot-scale SzIBR in place, into a demonstration-scale SzIBR as part of an accelerated pathway to commercialization. The ultimate goal of the pilot-scale project is to demonstrate economic feasibility of the process for eventual commercialization.

   a. Do you anticipate requesting additional federal funding for subsequent phases of this project? If yes, please describe.

      At this time it is unclear if Solazyme will request additional federal funding for the demonstration-scale SzIBR. Funding sources for the demonstration-scale and commercial scale SzIBR are not currently defined.

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5. Does the scope of your project **only** involve one or more of the following:
   - Information gathering such as literature surveys, inventories, audits,
   - Data analysis including computer modeling,
   - Document preparation such as design, feasibility studies, analytical energy supply and demand studies, or
   - Information dissemination, including document mailings, publication, distribution, training, conferences, and informational programs.

   No, the project will involve activities beyond the scope of the activities listed above.

PART II: Environmental Considerations

Section A. Please indicate if any of the following conditions or special areas is present, required, or could be affected by your project. For each item listed below please indicate:

- Yes or No,
- The specific nature or type of activity or condition,
- Whether a consultation, approval, or permit applies and a description and status of the permitting/approval/documentation process.
- Where appropriate, please indicate if additional documentation is available.

1. Clearing or Excavation (indicate if greater than 1 acre)
   No. The project will not involve any ground disturbing activities (i.e. clearing or excavation). All construction and operation activities associated with the project will occur in existing structures.

2. Dredge and/or Fill. Specify the number of acres.
   No dredge or fill activities, which would potentially require U.S. Corps of Engineers Section 10, 401, and 404 permits, will be conducted for the project.

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4. Pre-Existing Contamination
   Solazyme is not aware of any pre-existing contamination at any of the facility locations associated with the project. No ground disturbing

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activities that could expose existing contamination will occur associated with the project.

5. Asbestos
   No asbestos will be produced, present, or disturbed by construction and operation of the project.

6. Criteria Pollutants

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   Potential criteria emissions are negligible compared to a commercial scale facility. Cherokee Pharmaceuticals staff will ensure that proper permit coverage either through exemption or permit is obtained. The SzIBR project will

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7. Non-Attainment Areas
   The Cherokee facility, in Riverside, Pennsylvania, is not located within in any area designated by the EPA for non-attainment of CO, NO2, Ozone (1-hour and 8-hour), SO2, PM 2.5, PM10, or Pb pollutants. The laboratory facility in South San Francisco is located in a non-attainment area for 8-hour Ozone. The project will generate a small amount of Ozone emissions in the non-attainment area associated with transportation of feedstock materials and algae to/from the Solazyme lab facility. These emission levels would be minor and would not significantly contribute to Ozone levels present in the San Francisco area.

8. Class I Air Quality Control Region
   The project facility locations are not located within or near any Class I Air Quality Control Regions.

9. Navigable Air Space
   The project will not be located in or interfere with any navigable air space.

10. Areas with Special Designation (e.g., National Forests, Parks, Trails)
    The project will not be located within or near any special designation areas including National Forests, National Parks, or trail systems.

11. Prime, Unique or Important Farmland
    The project will not disturb any prime, unique, or important farmland. The project will not involve any ground disturbing activities and will be located within existing facilities.

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12. Archeological/Cultural Resources
    No known archeological or cultural resources will be impacted by the project. No ground disturbing activities will occur. Additionally, the facility modifications and equipment installation will not occur in any structures listed as eligible or potentially eligible for listing on the National Register of Historic Places.

13. Threatened/Endangered Species and/or Critical Habitat
    No threatened or endangered species will be impacted by construction and operation of the project. No critical habitat will be impacted or modified as a result of the project. Development of the project will not involve any ground disturbing activities that would impact species or habitat.

14. Other Protected Species (Wild Burros, Migratory Birds)
    No other species will be impacted by construction and operation of the project. Development of the project will not involve any ground disturbing activities that would impact species or habitat. No structures or overhead transmission lines, which could lead to impacts on migratory birds, will be constructed in association with the project.

15. Floodplains
    Floodplains will not be impacted by the project. No buildings or other structures that could change surrounding floodplain elevations will be constructed in association with the SzIBR project.

16. Special Sources of Groundwater (e.g., Sole Source Aquifer)
    No groundwater will be used in association with the project. All water supplies for the project will come from municipal sources and/or permitted surface water intakes.

17. Underground Extraction/Injection (non-hazardous substances)
    No underground extraction or injection will occur during the course of the project.

18. Wetlands
    The project will not be located within or near any wetland areas. Additionally, no ground disturbing activities will occur as a result of the project.

19. Coastal Zones
    No coastal zone consistency determinations or associated permits will be required for the construction and operation of the project.

20. Public Issues or Concerns

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Solazyme has not identified any public issues or concerns associated with construction and operation of the proposed project. None are expected because the project will use existing facilities. The SzIBR project will be a very small operation amongst a large existing industrial operation. All newly installed equipment will be enclosed in an existing building. No outward impact can be observed.

21. Noise
    Noise above ambient conditions could be generated from the installation of process equipment at the Cherokee facility, but would be short term in nature and only occur during daylight hours. Operation of the fermenters at Cherokee would generate noise levels that necessitate the use of ear protection, but would not increase ambient noise levels due to current noise mitigation measures at the facility. Because noise will be short term and minimal, no permits, consultations, additional mitigation measures or approvals associated with noise will be required for construction and operation of the project.

22. Depletion of a Non-Renewable Resource
    Non-renewable resources that will be used in association with the project include diesel fuel used to transport the feedstocks and algal oil. Other non-renewable resources for the project include natural gas used to operate the burner associated with the dryer at Cherokee.

23. Aesthetics
    Construction and operation of the project will occur in existing structures, therefore no changes or negative impacts to aesthetics will occur.

24. Odor
    Odor generated from the project will be minimal and at levels below that which could be considered a nuisance outside of the facility boundaries.

Section B. Would your project use, disturb, or produce any chemicals or biological substances? (i.e., pesticides, industrial process, fuels, lubricants, bacteria) For each materials or processes listed below please indicate:

- Yes or No,
- Quantity,
- Whether a permit is required and if so what type of permit,
- Specific type, use, or condition,
- Where appropriate, please indicate if additional documentation is available.

1. Polychlorinated Biphenyls (PCBs)
   The proposed project would not use, disturb, or produce any Polychlorinated Biphenyls.

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2. Import, Manufacture, or Processing of Toxic Substances
   The SzIBR project will not import, manufacture, or process any toxic substances listed on the Toxic Substances Control Act of 1976. The transesterification of algal oil into biodiesel at the REG facilities will involve the use of methanol. The methanol is contained within a closed loop system for the refining process and only trace amounts are present in the glycerin byproduct. REG currently has small quantity hazardous waste permits to properly dispose of methanol. UOP will not import, manufacture, or process any toxic substances during the refining process.

3. Chemical Storage, Use, and Disposal

   Solazyme
   During laboratory activities very small amounts of chemicals for work supporting the SzIBR effort, including media nutrients, ammonia, and potassium hydroxide that will be stored, used, and disposed of at the Solazyme laboratory facility. Solazyme utilizes protocols outlined in their Laboratory Chemical Hygiene Plan and Hazardous Materials Business Plan to properly handle, store, and dispose of these chemicals.

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4. Pesticide Use
   The proposed project would not use, disturb, or produce any pesticides.

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5. Hazardous, Toxic, or Criteria Pollutant Air Emissions
   Emissions of Hazardous Air Pollutants (HAPs) or toxics not listed as HAPs will be negligible. SzIBR will not trigger new applicability of any NESHAP regulation or emit toxic air emissions of any concern.

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   EXEMPTION 4

   Potential criteria emissions are negligible compared to a commercial scale facility. Cherokee Pharmaceuticals staff will ensure that proper permit coverage either through exemption or permit is obtained. The SzIBR project REDACTED EXEMPTION 4 *will involve new emission units but will emit at levels below the PSD Significant Emission Rates (SER).*

6. Liquid Effluent

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7. Underground Extraction/Injection (hazardous substances)
   The project will not involve underground extraction or injection of hazardous substances.

8. Hazardous Waste
   Based on the current regulations regarding hazardous waste (Title 10 CFR § 261.31-33) no materials used or produced by the SzIBR are classified as hazardous waste. The transesterification of algal oil into biodiesel at the facility will involve the use of methanol. The methanol is contained within a closed loop system for the refining process and only trace amounts are present in the glycerin byproduct. REG currently has a small quantity hazardous waste permits to properly dispose of methanol.

9. Underground Storage Tanks

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The project will not involve the use of any underground storage tanks.

10. Biological Materials. Indicate if genetically altered materials are involved.

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Section C. Would your project require or produce any radiological materials? For each item below, please indicate:

- Yes or No,
- Quantity,
- Whether a permit is required and if so what type,
- Specific nature of use,
- Where appropriate, please indicate if additional documentation is available.

1. Radioactive Mixed Waste
   The project will not require or produce any radioactive mixed waste.

2. Radioactive Waste
   The project will not require or produce any radioactive waste.

3. Radiation Exposures
   The project will not generate any radiation exposure.

Section D. The following questions are designed specifically to guide applicants who are doing laboratory/bench-scale projects or who will have laboratory work associated with their projects.

NEPA R&D Laboratory Questions

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

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

Laboratory activities, mainly consisting of algae fermentation optimization, will occur at the Solazyme facility located at 561 Eccles Avenue, South San Francisco, California, 94080.

Fermentation and algal oil refining activities will occur at the Cherokee facility, which is located at Avenue C, Riverside, Pennsylvania, 17868.

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2. What type of safety protocols are in place in the areas where work will take place? Who monitors these? Internally and externally? OSHA standards?

Solazyme

Solazyme is committed to protecting employee health and complying with all applicable laws and regulations. This is accomplished through the implementation of OSHA compliant safety policies and procedures. These policies and procedures include: A Hazardous Materials Business Plan compliant with the California Health and Safety Code, an Injury and Illness Prevention Program, a Laboratory Chemical Hygiene Plan as well as a Radiation Safety Program and License. These programs are monitored internally by Solazyme and externally by the California Department of Health. These plans include provisions to identify and prevent safety and health hazards, inspection protocols, safety training, communication and record keeping protocols, emergency action planning, fire prevention and planning, personal protective equipment use, and hazardous substance handling procedures.

Cherokee

Cherokee is committed to protecting employee health and complying with all applicable laws and regulations. This is accomplished through the implementation of OSHA compliant safety policies and procedures. These policies and procedures include: Hazardous Work Permits, Hazard Communication, Safety Incident Reporting & Investigation, Safety Shower/Eyewash Stations, Biosafety, Portable & Fixed Ladders, Aerial Lifts, Scaffolds, Job Safety Assessments, Internal Safety Assessments (Audits), Fixed Cranes, Hoists, & Rigging, Mobile Cranes, Contractor Safety Management, Personal Protective Equipment, Laboratory Spill Response, Fork Lift Trucks, Hearing Protection, Ventilation, Control of Hazardous Energy, Respiratory Protection, Process Safety Management, Electrical Safe Work Practices, Fall Protection, Ergonomics, and Emergency Evacuation. All affected employees are trained on the requirements of these procedures prior to starting work at the facility and again when changes are made and/or per the site's training schedule.

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

Solazyme

Solazyme utilizes protocols outlined in their Laboratory Chemical Hygiene Plan and Hazardous Materials Business Plan to properly handle, store, and dispose of gases, chemicals, and heavy metals. Specific protocols include monitoring use and disposal of chemicals used in the lab, conducting audits, correcting deficiencies, and maintain appropriate documentation of chemical use and disposal, identifying adequate protective measures, and conducting training for lab employees. Chemical fume hoods are used when working with volatile substances and fire extinguishers are available throughout the laboratory. Emergency eye wash stations and safety showers are available within a 10 second walk of any area of expected exposure. Solazyme has a stringent set of administrative and safety controls for the procurement, distribution, and storage of chemicals which are outlined in the Laboratory Chemical Hygiene Plan.

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Cherokee

The site has procedures to review every raw material, product, and/or byproduct used prior to it entering the site including gases, chemicals, and raw materials. Cherokee also conducts a detailed environmental review of new processes prior to implementation. Part of this review is to characterize (for disposal) any wastes and/or byproducts that will be generated by the process. Prior to disposal, a contracted laboratory is used to perform any testing requested by the disposal facility.

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

Solazyme

Chemical flume hoods are used when working with volatile substances and fire extinguishers are available throughout the laboratory. Emergency eye wash stations and safety showers are available within a 10 second walk of any area of expected exposure. Personal protective equipment available at the laboratory includes safety glasses, protective gloves, safety shoes, and respiratory equipment. Other safety equipment on-site includes fire alarms, telephones for emergency use, respiratory protection and ventilation, and first-aid kits.

Cherokee

Cherokee Pharmaceuticals provides personal protective equipment to all employees, including but not limited to, safety glasses, steel-toed shoes, face shields, respiratory protection, hearing protection, and chemical resistant gloves and aprons. Protective equipment requirements are determined by the site safety department when new chemicals are brought on-site. Portable fire extinguishers and safety eyewash / showers are provided throughout the facility and all employees are trained on their use. Additionally, the site is equipped with automatic sprinkler protection and utilizes a Simplex fire alarm system. All fire protection systems are inspected and maintained per National Fire Protection Association (NFPA) and state Fire Marshall (FM) recommendations.

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

Solazyme

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Cherokee

No operation permits, aside from the existing environmental permits listed in Part 1, Question 2 are required for the SzIBR project.

Abengoa, BlueFire, UOP, and REG

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All actors other than Cherokee and Solazyme are independently responsible for proper permit coverage of their activities. These are existing operations with existing permit coverage which the SzIBR will transact business with not extensions of the SzIBR pilot facility.

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

<u>Solazyme</u>
No additional permits will be required to conduct work for the SzIBR project.

<u>Cherokee</u>
No additional permits will be required to conduct work for the SzIBR project.

<u>Abengoa, BlueFire, UOP, and REG</u>
All actors other than Cherokee and Solazyme are independently responsible for proper permit coverage of their activities. These are existing operations with existing permit coverage which the SzIBR will transact business with not extensions of the SzIBR pilot facility.

7. How is liquid effluent handled and discharged?

REDACTED
EXEMPTION 4

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

REDACTED
EXEMPTION 4

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REDACTED
EXEMPTION 4

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

REDACTED
EXEMPTION 4

11. Will prototypes be tested in a separate location, if so, please describe the location and answer questions #1-9?
No prototypes will be tested in separate locations.

12. Are subcontractors being used for some of the work? If so please answer Questions #1-10 for work being completed by subcontractors.
No subcontractors will be used for any additional R & D lab work.

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

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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.

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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.

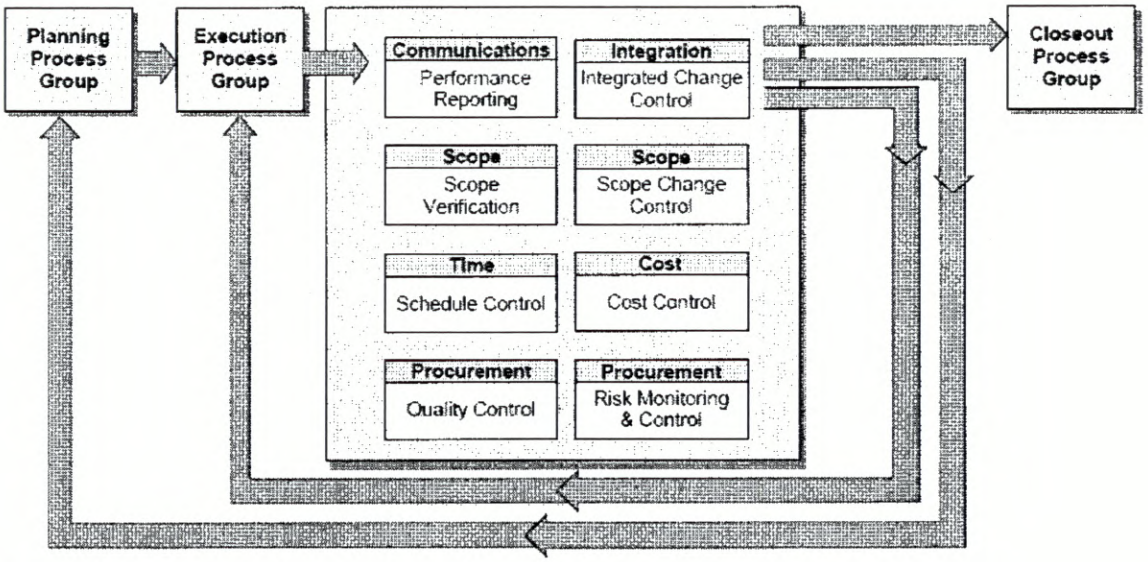

Figure PMP 1.1 – Monitoring and Controlling Phase Processes

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.