STATE OF CALIFORNIA
CONTRACT REQUESTS FORM (CRF)
CEC-94 (Revised 5/11) CALIFORNIA ENERGY COMMISSION

☐ New Contract _____ ☒ Amendment to Existing Contract: 500-10-034 Amendment Number: 1

Division	Contract Manager:	MS-	Phone	CM Training Date
ERDD - Renewables	Rizaldo Aldas	43	916-327-1417	9/29/2009

Contractor's Legal Name	Federal ID Number
Delta Diablo Sanitation District	94-2432076

Title of Project
Bay Area Biosolids to Energy

Term	Start Date	End Date	Amount
New/Original Contract	5/9/2011	3/29/2013	$ 999,924

Line up the Amendment information as best as possible within the following table.

Amendment #	End Date *(mm/dd/yy)*	Amount
Amendment 1	3/31/2015	$0

Business Meeting Information			
Proposed Business Meeting Date	3/20/2013	☐ Consent	☒ Discussion
Business Meeting Presenter	Rizaldo Aldas	Time Needed:	5 minutes

Agenda Item Subject and Description

Possible approval of Amendment 1 to Contract 500-10-034 with Delta Diablo Sanitation District to provide a 24-month time extension to 3/31/2015, revise the scope of work to reflect a new technology for converting biosolids to energy, change subcontractors, reallocate the budget, and to update the terms and conditions of the contract. (PIER Electricity funding) Contact: Rizaldo Aldas

Business Meeting approval is not required for the following types of contracts: *Executive Director's signature is required in all cases.*

☐ Contracts less than $10k *(Policy Committee's signature is also required)*

☐ Amendment for a no-cost time extension. Must be first extension, less than one year and original contract less than $100k.

☐ Contracts less than $25k for Expert Witness in Energy Facility licensing cases and amendments.

Purpose of Contract or Purpose of Amendment, if applicable

The purpose of this amendment is for a 24-month time extension, revise the scope of work, change subcontractors, and reallocate the budget. The technology vendor acting as subcontracted project developer was unable to secure the needed cost share funding to run the project. This amendment will ensure that the original goal of this agreement is met, which is to develop, demonstrate, and implement a system or systems for converting biosolids to energy.

California Environmental Quality Act (CEQA) Compliance

1. Is Contract considered a "Project" under CEQA?
   ☒ Yes: skip to question 2 ☐ No: complete the following (PRC 21065 and 14 CCR 15378):
   Explain why contract is not considered a "Project":
   Contract will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .
2. If contract is considered a "Project" under CEQA:
   ☒ a) Contract **IS** exempt. (Draft NOE required)
   ☐ Statutory Exemption. List PRC and/or CCR section number: _____
   ☒ Categorical Exemption. List CCR section number: 14 CCR 15301
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why contract is exempt under the above section:
   Class 1 - Operation, repair, maintenance, or minor alteration of existing structures or facilities not expanding existing uses.
   ☐ b) Contract **IS NOT** exempt. The Contract Manager needs to consult with the Energy Commission attorney assigned to their division and the Siting Office regarding a possible Initial Study.

Budgets Information								
Contract Amount Funded		**Breakdown by FY**			**Funding Sources**			
Funding Source	**Amount**	**FY**	**Amount**	**Approved?**	**Funding Source**	**FY**	**Budget List No.**	**Amount**
ARFVTF	$		$					$
ECAA	$		$					$
State- ERPA	$		$					$
Federal	$		$					$
PIER - E	$		$					$
PIER - NG	$		$					$
Reimbursement	$		$					$
Other	$		$					$
TOTAL:	$0	TOTAL:	$0				TOTAL:	$0
Reimbursement Contract #:					Federal Agreement			

Contractor's Administrator/ Officer		**Contractor's Project Manager**	
Name:	Jayne Strommer	Name:	Caroline Quinn
Address:	2500 Pittsburg Antioch Hwy	Address:	2500 Pittsburg Antioch Hwy
City, State, Zip:	Antioch, CA 94509-1373	City, State, Zip:	Antioch, CA 94509-1373
Phone/ Fax:	925-756-1910 / 925-756-1960	Phone/ Fax:	925-756-1928 /
E-Mail:	jaynes@ddsd.org	E-Mail:	carolineq@ddsd.org

Contractor Is

☐ Private Company *(including non-profits)*
☐ CA State Agency *(including UC and CSU)*
☒ Government Entity *(i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)*

Selection Process Used

☐ Solicitation Select Type Solicitation #: _____ # of Bids: _____ Low Bid? ☐ No ☐ Yes
☒ Non Competitive Bid *(Attach CEC 96)*
☐ Exempt

Civil Service Considerations

☐ Not Applicable (Contract is with a CA State Entity or a membership/co-sponsorship)
☒ Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)
☐ The Services Contracted:
- ☐ are not available within civil service
- ☐ cannot be performed satisfactorily by civil service employees
- ☐ are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.

☐ The Services are of such an:
- ☐ urgent
- ☐ temporary, or
- ☐ occasional nature

that the delay to implement under civil service would frustrate their very purpose.

Justification:
Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)

Payment Method

☒ A. Reimbursement in arrears based on:
☒ Itemized Monthly ☐ Itemized Quarterly ☐ Flat Rate ☐ One-time
☐ B. Advanced Payment
☐ C. Other, explain:

Retention

1. Is contract subject to retention?	☐ No	☒ Yes
If Yes, Do you plan to release retention prior to contract termination?	☒ No	☐ Yes

Justification of Rates

The rates charged in this contract by the Delta Diablo Sanitation District are competitive and reasonable rates that were comparable to their prior Request for Qualifications process.

Disabled Veteran Business Enterprise Program (DVBE)

1. ☒ Not Applicable
2. ☐ Meets DVBE Requirements DVBE Amount:$ _____ DVBE %: _____
   ☐ Contractor is Certified DVBE
   ☐ Contractor is Subcontracting with a DVBE: _____
3. ☐ Requesting DVBE Exemption (attach CEC 95)

Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?	☒ No	☐ Yes
If yes, check appropriate box:	☐ SB ☐ MB ☐ DVBE	

Is Contractor subcontracting any services?	☐ No	☒ Yes
If yes, give company name and identify if they are a Small Business (SB), Micro Business (MB) and/or DVBE:		

Chemergy, Inc.	☒ No	☐ SB	☐ MB	☐ DVBE
DOE-Lawrence Livermore National Laboratory	☒ No	☐ SB	☐ MB	☐ DVBE
Electrolytic Technologies Corp.	☒ No	☐ SB	☐ MB	☐ DVBE
De Dietrich Process Systems Inc.	☒ No	☐ SB	☐ MB	☐ DVBE
Gryphon Environmental, LLC	☒ No	☐ SB	☐ MB	☐ DVBE
ATI	☒ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE
	☐ No	☐ SB	☐ MB	☐ DVBE

Miscellaneous Contract Information

1. Will there be Work Authorizations?	☒ No	☐ Yes
2. Is the Contractor providing confidential information?	☒ No	☐ Yes
3. Is the contractor going to purchase equipment?	☐ No	☒ Yes
4. Check frequency of progress reports		
☒ Monthly ☐ Quarterly ☐ _____		
5. Will a final report be required?	☐ No	☒ Yes
6. Is the contract, with amendments, longer than a year? If yes, why?	☐ No	☒ Yes

The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.

The following items should be attached to this CRF		
1. Scope of Work, Attach as Exhibit A.	☐ N/A	☒ Attached
2. Budget Detail, Attach as Exhibit B.	☐ N/A	☒ Attached
3. CEC 96, NCB Request	☐ N/A	☒ Attached
4. CEC 30, Survey of Prior Work	☒ N/A	☐ Attached
5. CEC 95, DVBE Exemption Request	☒ N/A	☐ Attached
6. Draft CEQA Notice of Exemption (NOE)	☐ N/A	☒ Attached
7. Resumes	☐ N/A	☒ Attached
8. CEC 105, Questionnaire for Identifying Conflicts		☒ Attached
9. CEC 106, IT Component Reporting Form		☒ Attached

Contract Manager	Date	Office Manager	Date	Deputy Director	Date

The following signatures are only required when contract approval is delegated to the Executive Office and not approved at a Business Meeting. See Business Meeting Information Section.

Presiding Policy Committee	Date	Associate Policy Committee	Date	Executive Director	Date

Notice of Exemption **Form D**

To: Office of Planning and Research
PO Box 3044, 1400 Tenth Street, Room 222
Sacramento, CA 95812-3044

From: California Energy Commission
1516 Ninth Street, MS-48
Sacramento, CA 95814

Project Title: Bay Area Biosolids to Energy

Project Location – Specific: 2500 Pittsburg Antioch Hwy

Project Location – City: Antioch, CA **Project Location – County:** Contra Costa

Description of Project:

The goal of the project is to develop, demonstrate, and implement a system or systems for converting biosolids to energy that will maximize the energy production from the biosolids and minimize the solid and liquid waste disposal requirements while meeting California's environmental standards including air emission limits. The primary initiative will be demonstrating an innovative technology that will process wastewater and biosolids at moderate temperatures and pressures to produce high-grade fuel suitable for energy generation, heat, and useful solid by-products (primarily micro-nutrient fertilizer). Specific critical aspects related to biosolids to energy conversion will be explored, including: fuel supply characterization; process design requirements; energy production; site suitability issues; economics; environmental impacts; and by-product constituents, uses, management and permitting.

Name of Public Agency Approving Project: California Energy Commission

Name of Person or Agency Carrying Out Project: Delta Diablo Sanitation District

Exempt Status: (*check one)*

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number 14 CCR 15301
- ☐ Statutory Exemptions. State code number.
- ☐ Common Sense Exemption. 15061(b)(3)

Reasons why project is exempt:

Class 1 - Operation, repair, maintenance, or minor alteration of existing structures or facilities not expanding existing uses.

Lead Agency
Contact Person: **Rizaldo Aldas** **Area code/Telephone/Ext:** 916-327-1417

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ **Date:** _____ **Title:** _____

☒ **Signed by Lead Agency**

☐ **Signed by Applicant** **Date received for filing at OPR: _____**

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1.0		Administration
2		~~SITE DESIGN AND LAYOUT~~**DESIGN SYSTEM, PROCURE COMPONENTS, AND PERFORM SAFETY ANALYSIS**
3		~~DEVELOP DEMONSTRATION TEST PROGRAM~~**SET TEST MATRIX FOR POST-ASSEMBLY AND FIELD OPERATION**
4	~~X~~	~~PLANT EQUIPMENT PROCUREMENT AND INSTALLATION~~**FABRICATE SYSTEM AND SHAKEDOWN TESTS**
5	X	~~EQUIPMENT START-UP, DEBUG AND COMMISSIONING~~**SHIP AND ASSEMBLE SYSTEM AT SITE**
6		~~DEMONSTRATION PLANT OPERATION~~**TEST AND EVAULATE SYSTEM**
7		ANALYZE PROCESS PRODUCTS, BYPRODUCTS AND EMISSIONS
8		ECONOMIC ANALYSIS ~~OF B2E SYSTEM~~
~~9~~		~~PRODUCTION READINESS PLAN~~
~~10~~		~~IMPLEMENTATION PLAN~~

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1.0	~~Caroline Quinn~~**Jayne Strommer**	~~Intellergy Corp.~~**Chemergy, LLNL**	
2	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	**ETC**
3	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	**ETC**
4	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	
5	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	**ETC**
6	~~Caroline Quinn~~**Bob Glass**	~~Intellergy Corp.~~**Chemergy, LLNL**	
7	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	
8	~~Caroline Quinn~~**Melahn Parker**	~~Intellergy Corp.~~**Chemergy, LLNL**	
9	~~Caroline Quinn~~**TBD**	~~Intellergy Corp~~**TBD**	
10	~~Caroline Quinn~~	~~Intellergy Corp.~~	

GLOSSARY

Specific terms and acronyms used throughout this work statement are defined as follows:

Acronym	Definition
B2E	Biosolids to Energy
BAB2E	Bay Area Biosolids to Energy Coalition
BTU	British Thermal Unit
CCM	Commission Contract Manager
CPR	Critical Project Review
~~CO_2~~	~~Carbon Dioxide~~
DTPD	Dry Tons Per Day
EPA	United States Environmental Protection Agency
ETC	**Electrolytic Technologies Corporation**
GHG	Green**h**~~H~~ouse Gas
GWh	Gigawatt-hours
LLNL	**Lawrence Livermore National Laboratory**
POTW	Publicly Owned Treatment Works
PAC	Project Advisory Committee
PIER	Public Interest Energy Research
~~RFQ~~	~~Request for Qualifications~~
RPS	Renewable Portfolio Standard
~~SOQ~~	~~Statements of Qualifications~~
TBD	To Be Determined
TPD	Tons Per Day

Problem Statement

Biosolids are the by-product of wastewater treatment facilities, produced by removing the organics from municipal sewage and treating them to reuse standards. In ~~2009~~**2011**, California generated ~~661~~**710**,000 dry metric tons of biosolids**.**[1] ~~.~~ The Bay Area alone generates over 158,000 dry metric tons of biosolids annually. Presently, the options for using biosolids are very limited (primarily land application and alternative daily cover in landfills) and face increasing challenges that may ultimately eliminate these options. For many Publicly Owned Treatment Works (POTWs), the present practice also involves long distance hauling of biosolids, requiring additional fuel and creating air pollution, including greenhouse gas **(GHG)** emissions. At the same time, there is great need to expand our renewable energy resources. Progress towards meeting California's ambitious bioenergy goals has been slow, and in some cases, California is losing ground.[2] Electricity generated from biomass fuels decreased from 6,192 gigawatt-hour (GWh) in 2002, to 5,724 GWh in 2008; while California's total electricity generation and demand has increased.[3] Meeting California's 20 percent Renewable Portfolio Standard (RPS) goal and the 2010 biopower targets would require an additional 6,562 GWh biopower generation annually assuming that total electricity consumption in 2010 will remain the same as in 2008 at 307,141 GWh.[4] The Global Warming Solutions Act, which requires a 25% cut in ~~the~~ California's ~~greenhouse gas (~~GHG~~)~~ emissions by 2020 and an 80% cut by 2050, is another consideration supporting local sustainable renewable energy solutions.

Due to the responsibility that wastewater treatment agencies bear for providing an essential public service at ratepayer expense, they have historically been slow to adopt new technologies. Still, industry awareness of the inherent energy potential in the resource they manage is growing and many wastewater agencies are interested in increasing the energy tapped from wastewater. However, barriers exist, particularly in the area of utilizing biosolids. Principle barriers to utilizing biosolids as an energy resource include: overcoming the high water content to achieve net energy production; air quality issues; negative public perception**;** and high cost with limited funding alternatives. Municipal agencies will require guidance from successful projects to use as a foundation in their decision-making.

The Bay Area Biosolids to Energy (BAB2E) Coalition is a consortium of ~~sixteen~~**nineteen** Bay Area public agencies seeking innovative, local, sustainable solutions to biosolids management by utilizing the latent energy contained in the material. ~~The Coalition issued a request for qualifications (RFQ) from teams interested in developing a regional biosolids to energy facility. The RFQ also asked teams to identify proposed technologies. The resulting Statements of Qualifications (SOQ) were evaluated and screened down to the three most qualified teams with the most promising concepts. One of the concepts, while promising, involves a technology that has yet to be commercially demonstrated with biosolids. The Coalition proposes to research the viability of this technology, known as "steam/ carbon dioxide (CO_2) reforming" for converting biosolids to renewable fuels and products, mainly hydrogen.~~

---

[1] U.S. EPA Region 9**.**

[2] *2009 Progress to Plan, Bioenergy Action Plan for California*, prepared for the Bioenergy Interagency Working Group, April 2010.

[3] Daryl Metz presentation at the 2009 Integrated Energy Policy Report staff workshop on Research Development and Demonstration of Advanced Generation Technologies, "California Generation Portfolio," California Energy Commission, August 10, 2009.

[4] *2009 Progress to Plan, Bioenergy Action Plan for California*, prepared for the Bioenergy Interagency Working Group, April 2010.

~~Demonstration of the steam/CO_2 reforming technology to reliably and efficiently process biosolids and produce hydrogen gas can potentially address the technical and economic barriers to the use of biosolids for energy application.~~ **Over the last four years, the BAB2E Coalition has grown from six to nineteen agencies representing a population of over 4 million. Its range and growing size reflect the great need to maximize the energy value of biosolids as a means of achieving sustainable management of biosolids. The BAB2E Coalition identified and partnered with a technology developer that has a proprietary technology capable of converting aqueous waste streams (such as sludge, biosolids, manure, agricultural residuals, municipal waste, wood, pulp and paper) into low-cost (i.e., less than $2 per gallon of gas equivalent) hydrogen, thermal energy, and sterile fertilizer. The technology uses unique chemical processing at moderate temperature and provides an opportunity for breakthrough in biosolids to energy (B2E) technology.**

~~The objective of the technology demonstration will be reliable and efficient processing of biosolids to produce electricity, addressing the identified barriers, which are discussed below. It will also provide a public model that other agencies can replicate.~~

Goals of the Agreement

The overall goal of the project is to develop, demonstrate, and implement a system or systems for commercially converting biosolids to energy ~~(B2E)~~ that will maximize the energy production from the biosolids and ~~minimize the~~ **use of the** solid and liquid waste ~~disposal~~ **byproducts for their resource value** ~~requirements~~ while meeting California's environmental standards including air emission limits. ~~Specific studies will investigate comprehensive aspects of biosolids conversion ranging from fuel supply characterization, site suitability issues, economics, and environmental impacts. An implementation plan that will guide the succeeding phases such as design, installation, and operation of a biosolids to energy facility will also be developed. Beneficial use alternatives for the residual material will also be determined.~~

Objectives of the Agreement

The objectives of this Agreement are to:

- Design and ~~construct a~~**procure components for** ~~conversion~~ a **plant that will utilize electrochemical conversion**~~facility to~~ to process approximately ~~7~~ **10** ~~dry~~ tons per day (~~D~~TPD) **of** biosolids;
- Demonstrate that this process can reliably convert biosolids to hydrogen gas for electrical power production or as alternative fuel;
- Demonstrate electrical power generation using the fuel generated by conversion of biosolids,
- ~~Analyze the process emissions to verify that all applicable California environmental standards can be met~~**Test and evaluate the conversion system**;
- ~~Estimate the net energy available from the process~~**Verify the conversion efficiency of biosolids to hydrogen**;
- ~~Assess capital and operational costs and economic performance of the process~~**Establish ash treatment procedures and confirm bromine recovery**;

- **Confirm a preliminary cost for hydrogen production via this process;**
- **Prepare an economic analysis of the system;**
- **Complete a preliminary permitting assessment for regulatory and safety issues; and**
- Make available technical data for use by agencies interested in developing a biosolids to energy program.

TASK 1.0 ADMINISTRATION

MEETINGS

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

The Contractor shall:

- Attend a "kick-off" meeting with the Commission Contract Manager, the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the Commission Contract Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Contract Manager will provide an agenda to all potential meeting participants.

  The administrative portion of the meeting shall include, but not be limited to, the following:
  - Terms and conditions of the Agreement
  - CPRs (Task 1.2)
  - Match fund documentation (Task 1.7)
  - Permit documentation (Task 1.8)

  The technical portion of the meeting shall include, but not be limited to, the following:
  - The Commission Contract Manager's expectations for accomplishing tasks described in the Scope of Work;
  - An updated Schedule of Deliverables
  - Progress Reports (Task 1.4)
  - Technical Deliverables (Task 1.5)
  - Final Report (Task 1.6)

The Commission Contract Manager shall designate the date and location of this meeting.

Contractor Deliverables:

- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits

Commission Contract Manager Deliverables:

- Final Report Instructions

Task 1.2 CPR Meetings

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Contract Manager and as shown in the Technical Task List above and in the Schedule of Deliverables. However, the Commission Contract Manager may schedule additional CPRs as reasonably necessary, and any additional costs will be borne by the Contractor.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

The Commission Contract Manager shall:

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Contractor the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks. If the Commission Contract Manager concludes that satisfactory progress is not being made, this conclusion will be referred to the Energy Commission's Research, Development and Demonstration Policy Committee for its concurrence.
- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

The Contractor shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the project. This report shall be submitted along with any other deliverables identified in this Scope of Work. Submit these documents to the Commission Contract Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

Contractor Deliverables:

- CPR Report(s)
- CPR deliverables identified in the Scope of Work

Commission Contract Manager Deliverables:

- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Contractor shall:

- Meet with the Energy Commission to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

  This meeting will be attended by, at a minimum, the Contractor, the Commission Contracts Officer, and the Commission Contract Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Contract Manager.

  The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Contract Manager and the Contracts Officer about the following Agreement closeout items:

  - Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
  - "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
  - Final invoicing and release of retention
  - Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Monthly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement.

The Contractor shall:

- Prepare progress reports which summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

Deliverables:

- Monthly Progress Reports

Task 1.5 Test Plans, Technical Reports and Interim Deliverables

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

http://www.energy.ca.gov/contracts/pier/contractors/index.html

The Contractor shall:

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

Task 1.6 Final Report

The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

http://www.energy.ca.gov/contracts/pier/contractors/index.html

The Final Report shall be a public document. If the Contractor has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Contractor shall perform the following subtasks for both the public and confidential versions of the Final Report.

Task 1.6.1 Final Report Outline

The Contractor shall:

- Prepare a draft outline of the Final Report.
- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

Deliverables:

- Draft Outline of the Final Report
- Final Outline of the Final Report

Task 1.6.2 Final Report

The Contractor shall:

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.
- Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.
- Submit one bound copy of the Final Report with the final invoice.

Deliverables:

- Draft Final Report
- Final Report

MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT

Task 1.7 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:

1. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter.
2. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
    - A list of the match funds that identifies the:
        - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
        - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
        - A copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured.
        - Discuss match funds and the implications to the Agreement if they are significantly reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
        - Provide the appropriate information to the Commission Contract Manager if during the course of the Agreement additional match funds are received.
        - Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

Deliverables:

- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

Task 1.8 Identify and Obtain Required Permits

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. While the PIER budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits for which the Contractor will request reimbursement.

The Contractor shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
  1. If there are no permits required at the start of this Agreement, then state such in the letter.
  2. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
     - A list of the permits that identifies the:
       - Type of permit
       - Name, address and telephone number of the permitting jurisdictions or lead agencies
     - Schedule the Contractor will follow in applying for and obtaining these permits.
- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

Deliverables:

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

Task 1.9 Electronic File Format

The goal of this task is to unify the formats of electronic data and documents provided to the Energy Commission as contract deliverables. Another goal is to establish the computer platforms, operating systems and software that will be required to review and approve all software deliverables.

The Contractor shall:

- Deliver documents to the Commission Contract Manager in the following formats:
  - Data sets shall be in Microsoft (MS) Access or MS Excel file format.
  - PC-based text documents shall be in MS Word file format.

- Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
- Project management documents shall be in MS Project file format.

- Request exemptions to the electronic file format in writing at least 90 days before the deliverable is submitted.

Deliverables:

- A letter requesting exemption from the Electronic File Format (if applicable)

TECHNICAL TASKS

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5. Deliverables not requiring a draft version are indicated by marking "(no draft)" after the deliverable name.

TASK 2 ~~SITE DESIGN AND LAYOUT~~ DESIGN SYSTEM, PROCURE COMPONENTS, AND PERFORM SAFETY ANALYSIS

The goal~~s~~ of this task ~~are~~ **is** to ~~prepare a set of construction plans and specifications as required for the fabrication and installation of the Intellergy system for processing up to 7 DTPD with power generation component. The project will be located at a site that is approved by the CCM.~~**design and procure components for a demonstration system, including an appropriately sized reactor and an electrolysis system and subsystems scaled to process 10 wet tons per day (WTPD) of biosolids. Power generation equipment will be obtained and modified to run on a hydrogen and biogas mix to evaluate hydrogen rich combustion performance at small combined heat and power scales.**

The Contractor shall:

- ~~Prepare design drawings for biosolids conversion and power generation facility with an approximate capacity of 7 DTPD~~
- ~~Prepare Final Equipment and Site Modification Specifications~~
- ~~Prepare and submit task report that includes generalized diagrams and description of design, plans and specifications~~
- **Use a simplified model that incorporates ongoing research results and mass/energy balances to predict and optimize the reaction rates and yields for the integrated system.**
- **Specify system component requirements based on feedstock composition, temperatures, and flow rates.**
- **Prepare design drawings for the biosolids conversion system.**
- **Specify the power generation component to be tested with hydrogen and biogas mixtures.**
- **Perform Hazard and Operability (HAZOP) safety analysis.**
- **Interact with suppliers and procure the equipment in a timely manner.**
- **Include summaries of Task 2 activities in the monthly progress report and consolidate results and conclusions into a Task 2 Report.**

Deliverables:

- Task 2 Report (no draft)

TASK 3 ~~DEVELOP DEMONSTRATION TEST PROGRAM~~ SET TEST MATRIX FOR POST-ASSEMBLY AND FIELD OPERATION

The goal of this task is to ~~develop a demonstration test program.~~ **establish the test conditions for the initial post-assembly in the developer's facility and for the two-month test program in the Bay Area demonstration facility.**

The Contractor shall:

- Prepare the draft Demonstration Test Program which shall include~~, but is not limited to,~~ the parameters to be measured, number of hours of operation, type of monitoring, a site security plan, and the manner in which the data will be validated, analyzed, and reported. Parameters that may be continuously measured include, but may not be limited to: processed volume, input flow (biosolids), output flows (hydrogen, ~~air~~ emissions, and solid residuals), ~~operational~~ **operating** parameters ~~throughout~~ **of** the production units, and electric and heating ~~usage~~ **use**. Power generation parameters,~~ such as fuel cell performance~~ will also be monitored. **The document shall include but not be limited to: a description of the process to be tested; a rationale for required tests; test objectives and technical approach; a description of facilities, equipment, and instrumentation required to conduct the tests; a description of test procedures, including parameters to be controlled and control methods; parameters to be measured and instrumentation to measure them, calibration procedures to be used, recommended calibration interval, and maintenance of the test log; description of data analysis procedures; description of quality assurance procedures; and contingency measures to be considered if test objectives are not met.**
- ~~Conduct three (3) site visits and three (3) demonstration team meetings and prepare and submit meeting minutes.~~
- ~~Review test plan internally and submit the Draft Demonstration Test Plan. The document shall include, but not be limited to: a description of the process to be tested; rationale for required tests; test objectives and technical approach; a description of facilities, equipment, and instrumentation required to conduct the tests; a description of test procedures, including parameters to be controlled and control methods; parameters to be measured and instrumentation to measure them, calibration procedures to be used, recommended calibration interval, and maintenance of the test log; description of data analysis procedures; description of quality assurance procedures; and contingency measures to be considered if test objectives are not met.~~
- Prepare and submit the Final Demonstration Test ~~Plan~~**Program**. Key elements from this document shall be included in the Final Report.
- ~~Prepare and submit meeting minutes~~**monthly updates** ~~to CCM.~~

Deliverables:

- Demonstration Test Program
- ~~Minutes of demonstration team meetings (no draft)~~

TASK 4 ~~PLANT EQUIPMENT PROCUREMENT AND INSTALLATION~~ FABRICATE SYSTEM AND SHAKEDOWN TESTS

The goal of this task is to ~~install a fully functioning biosolids to energy conversion and power generation plant with an approximate capacity of 7 DTPD, ready for start up.~~ **fabricate the system, including the bromination reactor, the hydrobromic acid electrolysis system, the power generation component, and all necessary accessories, as well as to test the integrated prototype before shipment to the demonstration facility for full testing.**

The Contractor shall:

- ~~Solicit bids for select system components based on Final Equipment and Site Modification Specifications.~~
- ~~Purchase select equipment and system components.~~
- ~~Prepare site for assembly and installation of system and equipment~~
- ~~Install the biosolids to energy conversion and power generation system and equipment~~
- ~~Prepare and submit a letter documenting completion of plant installation~~
- ~~Document and provide photographs of installation~~
- ~~Participate in CPR per Task 1.2.~~
- **Assemble the designed system with procured parts into two ISO containers, one "reactor" container for bromination of biosolids and storage of bromine solutions, the other "electric" container for electrolysis of hydrobromic acid and electric transformer equipment. A third smaller pad will be assembled with the hydrogen-biogas genset.**
- **Pre-test the integrated system in the developer's facility before shipment to the demonstration site to confirm operation of all components, controls, and data acquisition equipment.**
- **Prepare instructions for shipping, assembling and operating the equipment.**
- **Verify that active and passive safety measures are operational and meet expectations.**
- **Prepare and submit a Task 4 Report that summarizes the results of Task 4 activities.**

Deliverables:

- **Task 4 Report**
- ~~Letter of Completion (no draft)~~
- ~~Photographs of installation~~
- ~~CPR Report~~

TASK 5 ~~EQUIPMENT START-UP, DEBUG, AND COMMISSIONING~~SHIP AND ASSEMBLE SYSTEM AT SITE

The goal~~s~~ of this task ~~are~~ **is** to ~~commission the facility, test the equipment, bring the Intellergy biosolids conversion facility to the point that the Test Program developed under Task 2.2. Successful completion of this task will be measured by consistent and reliable operation of the demonstration plant at full output for seven days.~~**install a fully functioning biosolids conversion system, ready for start-up at the demonstration site.**

The Contractor shall:

- ~~Conduct preliminary start-up testing of the biosolids conversion facilities to ensure that all equipment and data acquisition are working properly~~
- ~~Prepare and Submit Monthly Start-Up and Debug Activity Reports, integrated with the regular monthly progress reports~~
- ~~Calibrate test equipment and install data acquisition system.~~
- ~~Prepare Outline of Start-Up Activities and Field Notes~~
- ~~Provide written notification to the CCM certifying readiness to operate for Test Program~~
- ~~Participate in CPR per Task 1.2~~
- **Procure selected system components based on Final Equipment and Site Modification Specifications.**
- **Prepare the site for assembly and installation of system equipment.**
- **Install the biosolids conversion system and equipment.**
- **Prepare and submit a letter documenting completion of plant installation.**
- **Document and provide photographs of installation.**
- **Participate in a CPR per Task 1.2.**

Deliverables:

- **Letter of Completion (no draft)**
- **Photographs of installation**
- **CPR Report**
- ~~Written Notification Certifying Readiness to Operate (no draft)~~
- ~~CPR Report~~

TASK 6 ~~DEMONSTRATION PLANT OPERATION AND EVALUATION~~TEST AND EVALUATE SYSTEM

The goal of this task is to successfully complete a minimum ~~6~~**2**-month ~~demonstration operation of the Intellergy steam/CO_2 reforming process on biosolids.~~**testing and evaluation of the system.** Successful completion of this task will be measured by collection of data and operating experience. ~~Other measures of success will be demonstrating that consistent product quality can be achieved at various throughput rates and that energy recovery from demonstration plant waste streams can be accomplished by WWTP operations.~~

The Contractor shall:

- Operate the ~~demonstration unit~~**process** ~~as~~ continuously as possible**.**
- Conduct routine operations and maintenance of the demonstration plant including ~~daily~~ status checks**, as required.**
- Conduct preventive maintenance procedures on a regular basis**, and all routine monitoring and special testing and inspections per the approved test plan.**
- Conduct an on-site plant inspection on a daily basis and make non-routine repairs**.**
- ~~Conduct all routine monitoring and special testing and inspections per approved test plan~~
- Develop and study performance trends**, and troubleshoot performance and reliability problems.**
- ~~Troubleshoot performance and reliability problems~~
- ~~Prepare and submit monthly performance summary reports indicating the performance parameters identified in the test plan~~
- Coordinate ~~staffing~~ **resources**, material delivery, and product export**.**
- Monitor and record **consumable usage and** information for energy and mass balance evaluations.
- ~~Monitor and record consumable usage~~
- Coordinate sampling and testing of inputs and outputs**.**
- ~~Prepare and submit monthly performance summary reports covering the performance parameters identified in the test plan~~
- ~~Prepare and refine energy and mass balance for the facility, comparing to simulation results~~
- Prepare and submit a Task 6 report ~~that includes~~ document~~ation~~**ing** ~~of~~ operations (electrical power generation, net energy produced, process emissions, etc.), **and covering the performance parameters identified in the test plan and** key results ~~and lessons from the monthly performance report~~**.**
- **Disassemble and remove the system after testing is complete and restore the site.**

Deliverables:

- ~~Monthly Performance Summary Reports (no draft)~~
- Task 6 report

TASK 7 ANALYZE PROCESS PRODUCTS, BY-PRODUCTS AND EMISSIONS

The goals of this task ~~is~~ are to evaluate the process products and waste streams, including solid, liquid and air emissions, ~~and~~ identify the corresponding handling and management requirements**; and evaluate the electricity generation component**.

The Contractor shall:

- Determine potential physical and operational issues, including technological deficiencies**.**
- **Prepare and refine energy and mass balance for the facility, comparing them to simulation results and updating process models as applicable.**

- ~~Develop a refined mass and energy balance for Intellergy technology~~
- Measure the volume and characterize (e.g. identify and quantify constituents) and analyze the management needs of solid, liquid, and gaseous products and by-products., ~~including the wastewater from the dryer~~
- Analyze air emissions, identifying and measuring constituents, including GHG and criteria pollutants; ~~perform air modeling and risk assessment;~~ compare emissions to state and local air quality management district air quality regulations, and evaluate emission control needs and alternatives.
- Determine ~~a range of~~**and calculate** system performance criteria including ~~identifying~~ product quality control, ~~and identifying and measuring~~ energy generation, and waste residual management and emissions.
- Determine electricity production ~~from fuel cells~~ **using specified power generation equipment, including NOx and efficiency under the range of operating conditions identified in the test plan.**
- Prepare and submit a **T**~~t~~ask **R**~~r~~eport containing data, analyses, and results.

Deliverables:

- Task 7 **R**~~r~~eport

TASK 8 ECONOMIC ANALYSIS ~~OF B2E SYSTEM~~

The goal of this task is to assess the costs associated with the installation and operation of the ~~Intellergy~~ system as it relates to biosolids processing.

The Contractor shall:

- ~~Provide~~ **Determine the** cost to operate and maintain a facility based on a dry and wet ton basis~~. This should be~~**, including** both total annual costs and total life cycle costs.
- Provide power costs to operate **the** facility **and document electrical production.**
- ~~Document electrical production from installed fuel cell~~
- ~~Provide hydrogen production analysis~~
- Estimate costs to transport biosolids and potential to reduce hauling distances.
- Provide cost estimates for regional and sub-regional ~~Intellergy~~ facilities **at scales suitable for Bay Area WWTP implementation.**
- Prepare and submit **a** report on the economic analysis of the biosolids to energy conversion and power generation system.~~, based on the Intellergy technology~~

Deliverables:

- Economics of the B2E System Report

~~TASK 9 PRODUCTION READINESS PLAN~~

~~The goal of this task is to determine the steps that will lead to the mass manufacturing of the modular process skid-mounted plants developed in this project.~~

The Contractor shall

- Prepare a Production Readiness Plan. The degree of detail in the Production Readiness Plan discussion should be proportional to the complexity of producing the proposed product and its state of development. The plan shall include as appropriate but not be limited to:
    - Identification of critical production processes, equipment, facilities, personnel resources, and support systems that will be needed to produce a commercially viable product
    - Internal manufacturing facilities, as well as supplier technologies, capacity constraints imposed by the design under consideration, identification of design critical elements and the use of hazardous or non-recyclable materials. The product manufacturing effort may include "proof of production processes"
    - A projected estimated cost for the equipment when in full production
    - The expected investment threshold to launch the commercial product
    - An implementation plan to ramp up to full production
- Prepare and submit the draft and final Production Readiness Plan

Deliverables:

- Production Readiness Plan

TASK 10 IMPLEMENTATION PLAN

The goal of this task is to generate a comprehensive plan for procurement, parts quality control, skid fabrication and installation, and operation of the selected B2E system. The BAB2E Coalition will use the information gathered in this process to assess the Intellergy technology and determine whether it meets the Coalition's needs for producing energy from biosolids. The Coalition will also be able to determine whether it is economically feasible to utilize the technology at its individual wastewater treatment facilities or on a regional basis with larger Intellergy facilities.

The Contractor shall:

- Prepare an Implementation Plan utilizing the information gathered during the demonstration project. Prepare a site analysis report to determine potential locations for regional or sub-regional full scale biosolids processing facilities
- Conduct an equipment cost analysis
- Conduct an operating cost analysis
- Conduct an analysis of potential environmental impacts
- Prepare and submit an analysis report integrating the results of equipment cost, operating cost, and potential environmental impacts analyses

Deliverables:

- Implementation Plan
- Analysis Report (no draft)