

MONTHLY PROGRESS REPORT FOR CONTRACT NO. 500-00-036

PROJECT 3.1 – DAIRY WASTE TO ENERGY PROJECT

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

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Contractor Project Director:	Patrick Lilly (360) 906-0616
Contractor Project Manager:	Bill Kitto (503) 235-5022
Commission Project Manager:	Zhiqin Zhang (916) 654-4063

What we planned to accomplish this period:

Activities planned for October included completion of the Task 3.1.1(a)3 *Draft Process Recommendation Report* assessing, evaluating and selecting dairy waste to energy technologies. This report would be followed by the completion of a draft of the *Final Process Recommendation Report* under Task 3.1.1(b) for internal CE Team Review. The Draft Task 3.1.1(a)3 report was to include assessment and evaluation of the technologies relevant to dairy waste to energy. It was also to include technical review of co-digestion technology practices and experience both in the US and in Europe. The *Final Process Recommendation Report*, Task 3.1.1 (b) was to include the incorporation of comments on the *Draft Process Recommendation Report* as well as the detailed system design, energy and material balances for the identified processes. Also in October bench scale testing was to begin and related design and *Test Plan* activities under Task 3.1.3 would continue.

Another area of activity anticipated in October was the planned completion of the draft reports describing environmental benefits of manure digester projects under Task 3.1.6. These reports were to be prepared and reviewed internally so they could be submitted to the technical project team's *Peer Review Group* previously established under that task and then by the Commission's PIER Technical Management team.

The final major activity planned for October was a scope review meeting on Project 3.1 future implementation activities involving Commonwealth Team members, representatives of the host site – IEUA, and Energy Commission PIER Renewables staff.

What we actually accomplished this period:

Task 3.1.1: Assess, Evaluate and Select Animal Waste to Energy Technology

- Efforts focused on finalizing the *Draft Process Recommendation Report* under Task 3.1.1a (3), which expanded on the *Interim Report*, which was submitted in August. The internal draft of this report, completed in September was modified to include information on co-digestion technologies and data collected on food waste sources that can be used at IEUA's RP-1 treatment facility. This draft report was completed, underwent internal CE Team review/comment and was then revised for submission to the Commission and the Project 3.1 TAC.
- Additional work activity was undertaken related to the Final Process Recommendation report under Task 3.1.1.b. This work centers on activities related to the Project's primary focus: co-digestion and gas cleaning, as identified through the biogas project prioritization activity under Task 1.1.10 and in accordance with the work completed under this Project. Once the Task 3.1.1.b report is submitted, currently estimated in late December 2004 or January 2005, all work on tasks 3.1.1 will be completed. This will include the *Digester Comparison Report* submitted last year and finalized earlier this year, as well as the other Project 3.1.1 reports that are described above.

Task 3.1.2: Site Selection and Tactical Marketing Plan

- Efforts on this task focused on selecting the optimal sites for the various components of the co-digestion system anticipated to be installed at the IEUA RP-1 treatment plant. This included, materials handling systems, improvements to the gas distribution system to handle the additional gas produced, as well as the associated infrastructure and related equipment.
- A key activity related to this task, as well as all other Project 3.1 tasks, was also completed in October. This activity included a meeting held with Commission Staff in Sacramento on October 15th to review the *Project Implementation Plan and future research and demonstration activities planned on Project 3.1*. The *Project 3.1 Implementation Plan* submitted in August reflected the results of ongoing work that was undertaken as an outgrowth of the March 9th meeting. The Plan was later updated at the October 15th meeting with additional information related to manure and food waste co-digestion. A key outcome of the October 15th meeting was the need to develop a plan to bring to market the technologies that are being developed under this Project. In general, information gathered under this project confirms that co-digestion of manure and food waste offers the most potential to improve dairy waste to energy project economics in California.
- In addition, at the October 15th meeting the potential opportunity to increase biogas energy in California by advancing co-digestion of food waste and biosolids was also presented to the Commission's PIER Renewables Manager. Overall, the technical merit and potential benefits of co-digestion was recognized at the meeting, but it became clear that a plan was needed to bring this potential to

market. It was agreed at the meeting that the Commonwealth Team should prepare a plan that would describe how the results of this project, if successful would be brought into the California market. Such a plan needed to be prepared within the next two months, so that it could be considered along with the other results in Project 3.1 before Tasks 3.1.4 and 3.1.5 would be authorized. It was agreed at this meeting that this work would be initiated and funded under an existing Task of Project 3.1 – the Project Lead selected Task 3.1.2.b for this purpose. A draft work plan for this effort was developed and reviewed internally by the CE Team. Work on this plan, entitled “*Tactical Marketing Plan: Bringing Co-digestion and New Biogas Electric Power to Market in California*” commenced following the directive received from the Commission staff at the meeting.

- As noted previously, co-digestion efforts were focused in two key areas. First, available co-digestion suppliers were screened and a preliminary assessment of the key parameters for these supplies was developed and reviewed with team members. This was needed so that initial consultation with suppliers could be planned and undertaken most efficiently. Second, an evaluation of the host (RP-1) facility’s ability to handle the increased gas production was undertaken. With the direction of the program changing to a focus on co-digestion and gas cleaning to improve the performance of anaerobic digestion projects, it became necessary to determine what steps would be needed to modify the existing infrastructure at the RP-1 facility to handle the increase in gas production as a result of the co-digestion demonstration. This analysis was initiated and the host, IEUA, has been actively involved in evaluating how the increased gas production can be accommodated most effectively within the plant’s gas collection and distribution infrastructure. This data collection and analysis effort by the Project Team continued in October.

Task 3.1.3: Develop Bench Scale and Other Test Plans and Protocols and Prepare Final Design and Test Plan

- Efforts on this Task in October included work on three activities, finalizing the *Bench Scale and Other Test Plans and Protocols* under Task 3.1.3.a, conducting the Bench Scale and other Tests under Task 3.1.3.b and the *Final Design and Test Plan* under Task 3.1.3.c. The initial draft of the Test Plan and Protocols prepared last year was revised so that it focused on co-digestion. A testing sequence was developed that laid out a strategy where the bench scale test results would be undertaken in a stepwise manner in order to optimize the full scale test phase of the co-digestion effort. A draft of this Task 3.1.3.a *Test Plan and Protocol* was prepared and reviewed in October and distributed to the Commission PIER staff at the October 15th meeting. Additionally, as a part of the planning of the bench scale testing, various laboratories were contacted about the use of their facilities for co-digestion tests involving a range of food waste feedstocks. After reviewing a number of options, it was determined that the optimal approach would be to use laboratory space provided by Orange County Sanitation District for the initial bench scale testing. The involvement of the Orange County Sanitation District laboratory in this activity will be a recognized high quality laboratory and improve

- the transfer of results from the program to other co-digestion demonstration applications.
- Other detailed planning for the bench scale testing was undertaken, including working with food waste providers to provide the various wastes to be tested. Work on the Final Design and Test Plan included efforts to integrate the bench scale testing with the Final Design. The iterative Test Plan proposed will enable the bench scale testing to be used to refine and update the full scale testing plan. This will enable optimization of the design and in refining the full scale testing approach to reflect the ongoing bench scale work that is completed.

Task 3.1.6: Conduct Economic and Environmental Assessment

- Work continued on Task 3.1.6 in October. The effort to update the baseline analysis was completed as it was determined previously that it would be necessary to use actual emissions information from the existing operations instead of general emission rate data that was not specific to the projects being evaluated. Minor updates of the *Monitoring, Reporting and Verification* protocol for quantifying the environmental benefits of the centralized digestion projects, was completed using input received during the *Digester Summit* held at IEUA's headquarters. The 3.1.6 report when finalized, will not only define the environmental benefits in accordance with the scope of this project, but will also enable those changes to be documented, so that others interested in credits associated with these benefits have information that defines them. Particularly relevant are findings related to the new South Coast Air Quality Management District (SCAQMD) rules that will affect dairy operations.
- Air emissions estimates being developed under this task are being considered in light of the ongoing regulatory activity of the SCAQMD. Extensive coordination with SCAQMD staff was undertaken in order to ensure that the findings of this task would be consistent with the District's pending rules related to emissions from dairy operations.
- Also on Task 3.1.6, following up on discussions at the October 15th meeting, a workshop was held at the IEUA headquarters on renewable energy credits. Participants at this workshop presented various viewpoints on the basis and potential importance of renewable energy and emission reduction credits. Although a variety of topics were addressed and no single set of positions on the value of these credits emerged from the meeting, the consensus of the attendees that environmental benefits that accrued as a result of manure collection was separate and distinct from the renewable energy credits associated with energy generation; and therefore represented another potential benefit that could be accounted for in future projects.
- The findings of this environmental benefit work (Tasks 3.1.6(0) through Task 3.1.6(6)) were assembled into a summary report, which was prepared for distribution to the Task 3.1.6 technical peer review group. Once the Summary Report is finalized and approved for release by the Commission, it will be made available to others involved in the project.

How we are doing compared to our plan:

As indicated in previous reports, the overall efforts on Project 3.1 were delayed pending incorporation of the results of the Commonwealth Business Plan and subsequent guidance from Commission staff. The meeting held with the Commission in March enabled development of a revised schedule and also permitted CE Team members to focus their efforts on developing a co-digestion and gas cleaning demonstration program that meets the Commonwealth Business Plan and overall PIER Renewables Mini-Grid Program objectives. The overall direction for this project will be further enhanced by development of a *Tactical Marketing Plan*, which will outline the market entry and implementation roles of Project Team participants, including Commonwealth Energy and CH₂M Hill in bringing the results of this project into the California marketplace. This draft *Tactical Marketing Plan* is to be completed in December.

Preliminary work on the co-digestion projects is being initiated so that the projects can be initiated as soon as the Commission's feedback is received. This will result in co-digestion and gas cleaning projects being implemented starting in January and being completed over a 9-month testing period. The final reports will be completed in late 2005 and the first quarter of 2006.

Significant problems or changes:

It continues to be clear that a key element of the project is the definition and quantification of the environmental and economic benefits of the dairy waste to energy project. This is particularly true for centralized dairy projects, which may offer the best potential for achieving environmental benefits for a range of dairy digestion project options. The CE Team continues to work with IEUA and has pursued cost information for centralized dairy waste to energy projects in a form that can be appropriately used to present the relative benefits of on-farm and centralized facilities in Europe and North America. This topic is being addressed in part under Task 3.1.6 and has been addressed earlier in the program than originally envisioned. Similarly the program's focus has redirected to co-digestion and gas cleaning. These areas offer considerable potential to make renewable energy more affordable and also align well with Commonwealth's business objectives and the overall priorities of the Program as reflected in the Commonwealth Project *Prioritization Report* developed in under Project 1.1 - Task 1.1.10.

There are no significant fiscal problems to report during this period and work is proceeding within budget. Progress and expenditures will result in project being completed on time under a revised schedule and within budget, based upon the near-term acceptance of the revised *Project 3.1 Implementation Plan*.

What we expect to accomplish during the next period:

Activities planned for November include preparing the annotated outline and initial draft components of the *Project 3.1 Tactical Marketing Plan: Bringing Co-digestion and New Biogas Electric Power to Market in California*. Coordination meetings involving Commonwealth and IEUA are anticipated. On Task 3.1.1, the *Draft Process Recommendation Report* should be submitted to the Commission. Efforts to finalize the internal draft of the Task 3.1.1.b report should also be completed by the team so that it can be submitted once the comments are received on the draft.

On Task 3.1.2, site selection activities will continue as will efforts related to the *Tactical Marketing Plan*. Under Task 3.1.3 the bench scale tests will begin at the Orange County Sanitation District laboratory. Further coordination is anticipated with IEUA staff regarding the bench scale tests and using the results in the design of the co-digestion systems. On Tasks 3.1.6, the *Draft Task Reports* for Tasks 3.1.6.0 through 3.1.6.5 are completed and the CE Team anticipates distributing them to the peer technical team reviewers upon receiving approval to do so by the Commission's Contract Manager.

Status of Milestones and Deliverables:

Table 1 on the following page summarizes the status of Project 3.1 task deliverables as of the end of the current reporting period.

Table 1: Summary of Project Status and Deliverables – Project 3.1

Task No.	Description	Start Date		Due Date		Status (%)
		Planned	Actual	Planned	Actual	
3.1.1a(1)	Technical Memorandum Comparing Plug Flow and Complete-Mix Digestion Performance & Economics	01/24/02	04/04/03	06/27/03	06/27/03	100%
3.1.1a (2)	Preliminary Draft Process Recommendation Report	01/24/02	04/04/03	10/25/03	8/6/04	100%
3.1.1a (3)	Draft Processes Recommendations Report	01/24/02		11/18/03		95%
3.1.1.b	Assess Evaluate, and Select Animal Waste to Energy Technology	01/24/02		01/17/04		90%
3.1.2a & b	a) Site Selection and b) Tactical Marketing Plan	01/24/02 10/20/04	10/18/04	12/20/03 1/15/04		70% 5%
3.1.3a	Bench Scale and Other Test Plan and Protocols	03/25/02	04/04/03	09/10/03		95%
3.1.3b	Conduct Bench Tests	7/14/03	10/18/04	12/5/03		10%
3.1.3c	Design Memorandum and Draft and Final Test Plans	11/20/03	9/16/04	4/8/2004		10%
3.1.6.0 through 3.1.6.6	Conduct Economic and Environmental Assessment – Environmental Benefits Task	07/12/05	12/15/04	12/13/05		95%

Explanation of any Difference(s) in Schedule

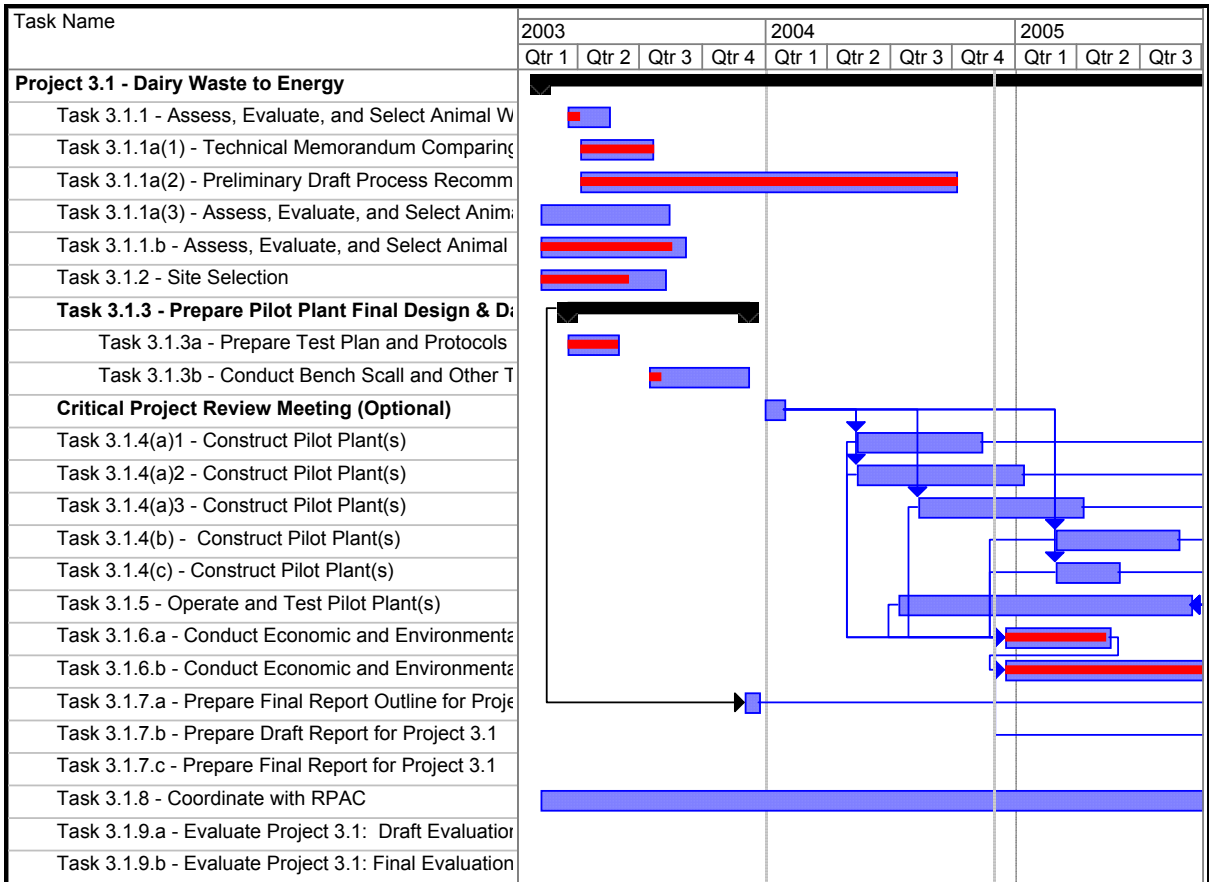
The following discussion provides the explanation for the reported changes in the schedule at the project task/deliverable level.

Task 3.1.1.(a) 3 and 3.1.1.b Draft and Final Process Recommendation Report – The revised implementation plan for Project 3.1 will be finalized once the *Tactical Marketing Plan* is complete. When completed, it will provide a plan and basis for making biogas energy projects in California more affordable using co-digestion. This is expected by January of 2006 enabling the deliverable under the task, which is largely completed, to be submitted in final form.

Task 3.1.3.a – Test Plan and Protocols – The initial *Test Plan and Protocols Report* was based on plans to conduct tests at the IEUA RP-5 treatment facility. Due to comments received from the Commission staff, no CE PIER Program projects are

planned at RP-5. The *Test Plan and Protocol Report* has been revised to reflect that situation. In addition, the Test Plan has been revised to be consistent with the Commission Test Plan guidelines and to reflect the results of the discussions held with Commission staff in March and the prioritization effort, which identified co-digestion as the primary focus of Project 3.1.

Overall Schedule for Project 3.1



Overview of Fiscal Status:

Table 2 below summarizes the fiscal status of Project 3.1 by task as of the end of the current reporting period.

Table 2: Fiscal Status by Task – Project 3.1

Task Number	Budget	Invoiced To-Date	Fiscal Status *
3.1.1 a (1)	\$48,000	\$48,000	OT
3.1.1 a (2)	\$72,000	\$72,000	OT
3.1.1 a (3)	\$120,706	\$0	OT
3.1.1.b	\$240,706	\$0	OT
3.1.2	\$171,240	\$0	OT
3.1.3	\$301,177	\$0	OT
3.1.6.0 through 3.1.6.6	\$103,910	\$0	OT

*Fiscal Status – Please indicate if you are “On Track” (OT), OverBudget (OB), or UnderBudget (UB)