

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

PROJECT 3.1 – DAIRY WASTE TO ENERGY PROJECT

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

July 2004

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 July included completion of the Task 3.1.1 *Interim Report* assessing, evaluating and selecting dairy waste to energy technologies. It was also anticipated that the *Draft Task 3.1.1* report would follow and was to include an assessment and evaluation of the technologies relevant to dairy waste to energy. It will also include technical review of co-digestion technology practices and experience, both in the US and in Europe. Also in July additional plans were to be developed regarding how to best utilize available co-digestion sources for this project. CE Team members were planning to work with IEUA staff to develop an approach for determining which co-digestion feedstock sources are most suited for the research work under this program.

It was anticipated that work on the environmental benefits of dairy digestion projects would continue as well. The initial draft of individual sections of the report, with the exception of the air quality section, was completed in June. It was anticipated that the draft of the entire subtask (1-6) report was to be completed in July. The air quality section lagged the other sections because of the ongoing regulatory activity in this area by the South Coast Air Quality Management District (SCAQMD). Two rules have been proposed with expected adoption later this summer. The effect of these rules was to be considered in the evaluation of environmental benefits and in identifying steps that can be taken to increase the likelihood that economic benefits could be realized for such air quality benefits as related to criteria pollutants.

**What we actually accomplished this period:**

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

- Efforts on this task focused on completing the assessment, evaluation and selection of technologies in light of the project's previous work and the project's focus on co-digestion and gas cleaning. Additionally, a revised Project 3.1 *Implementation Plan* was submitted to the Commission for review and comment. This plan reflected the results of the March 9<sup>th</sup> meeting with Energy Commission staff and subsequent Project 1.1 analysis where it was recognized that research and demonstration efforts on this project would focus on co-digestion and gas cleaning. The plan also reflected subsequent evaluations conducted since the meeting where co-digestion feedstocks and strategies were identified and evaluated by the Project Team.

Also as a part of this task, input for the Task 1.1.10 report was also provided. This included evaluation of co-digestion technologies in light of their ability to increase gas and electricity production and also their ability to be applied elsewhere in California. Efforts continued on evaluating technologies that would be most relevant for meeting the objectives of the Commonwealth Business Plan and the overall objectives of the Commonwealth PIER program. Specific technologies evaluated under this task previously, were analyzed in the context of the objectives of the Commonwealth Business Plan. Findings of the prioritization effort suggested that efforts should focus on co-digestion and gas cleaning. Efforts continued on the interim Task 3.1.1 report and an internal review draft was finalized in June. The Task 3.1.1 Draft Report summarizes technologies considered and identifies the rationale for focusing on the selected technologies. This interim report will provide the basis for defining future co-digestion projects. Once the prioritization effort is finalized, this report will be completed and detailed test plans and designs for the planned co-digestion projects will be finalized.

- As reported in the previous monthly reports, as a result of discussions with Commission staff in March it was determined that CE Team efforts should focus on a limited number of technologies and projects in order to concentrate on those projects and technologies most aligned with Commonwealth's objectives and which would be most beneficial elsewhere in California. This included a Tier 1 Project on co-digestion, and a Tier 2 Project with biogas cleaning. As part of the focus on co-digestion, a technical review of co-digestion was completed and incorporated into the ongoing work on Task 3.1.1. This review summarizes technical issues associated with co-digestion and the relative merit of different feed stocks and digestion techniques in terms of which offer the most benefit for increased gas production and overall economic performance of the digester. It also reflects the joint efforts of the Commonwealth Team and IEUA staff in working with local suppliers of such material. This information will be included in the

- Final Report on Task 3.1.1 and will be incorporated in developing the final process recommendation, and for siting the various equipment used in the project.
- Co-digestion assessment 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 from the initial plan of constructing a new digester to a new 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 IEUA's RP-1 facility to handle the increase in gas production as a result of co-digestion implementation. 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.

*Task 3.1.3: Develop Bench Scale and Other Test Plans and Protocols*

- Efforts on this task were limited as information assembled in Task 3.1.1 on co-digestion was being analyzed. Preliminary plans for bench scale testing were formulated that would enable several mixes of feed stocks to be tested at the bench scale so that the full scale testing could be undertaken most effectively. For example, waste from cheese making operations in the region was identified as an important source and it is available in large quantities. It digests moderately easily and would increase gas generation. Waste oils from salad dressing production operations were also identified, but in smaller quantities. Such oils digest easily and would greatly increase biogas production. It would make sense to develop a blend of cheese and salad dressing production wastes that could be used with manure as part of co-digestion project. If such a blend is to be used, it would be appropriate to run a bench scale test of such a blend to determine if the co-digestion process worked as projected. These and other tests are being considered and will be finalized after the Task 3.1.1 efforts are completed and relevant feedback is considered. Finalization of the bench scale test plan is anticipated upon completion of the interim Task 3.1.1 report. The revised *Test Plans and Protocols Report* will focus on co-digestion and gas cleaning and will be consistent with feedback from the Commission on the Commonwealth Business Plan, prioritization report and the revised Project 3.1 *Implementation Plan*.

*Task 3.1.6: Conduct Economic and Environmental Assessment*

- Work continued on Task 3.1.6. Additional updating of 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. Additional work on this task included minor revision of the *Monitoring, Reporting and Verification*

*Protocol* for quantifying the environmental benefits of the centralized digestion projects, which was distributed earlier.

- The preliminary draft report of the *Monitoring, Reporting and Verification Protocol* was circulated within the team for review. Comments were collected and information generated as a part of this evaluation were assembled and used in presentation at the digester summit at IEUA's headquarters in Chino California. This included information on environmental emissions, both before and after a digester project. The Task 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 these benefits. Particularly relevant are findings related to the new SCQAMD 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 South Coast Air Quality Management District. Extensive coordination with the SCAQMD was undertaken in order to insure that the findings of this task would be consistent with the District's pending rules related to emissions from dairy operations.

#### **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 program that meets the Commonwealth Business Plan and overall PIER Program objectives. The plan was updated to reflect the results of the co-digestion analysis and the review of potential suppliers. It also incorporates input of the host facility, including plans for work in fiscal year 2005. The revised plan being developed will allow for implementation of the co-digestion projects involving three test conditions. This is to be accomplished within the same time period as shown in the existing Commonwealth contract Exhibit B.

#### **Significant problems or changes:**

It continues to be clear that a key element on 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 projects. The CE Team continues to work with IEUA and is seeking 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 under Task 3.1.6 and is being addressed earlier in the program timeframe 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 prioritization report being developed in Task 1.1.10. These topics were also an important part of the focus of activities in the Digester Summit held at IEUA’s Headquarters in late June.

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 August will include the submission of the Task 3.1.1 *Interim Report* and completion of the Task 3.1.1 Draft Report for internal review. In addition, efforts will continue with IEUA staff in working with potential suppliers of feed stocks for co-digestion projects and in formulating co-digestion mixtures and digestion options. The European experience in this area will be considered drawing on NIRAS’ expertise. NIRAS will also support efforts in gas cleaning, as European experience in this area exceeds that in the US. Efforts will also continue in identifying infrastructure improvements needed at the RP-1 facility to accommodate the additional gas produced through this program. Under Task 3.1.6, additional input is being gathered from the South Coast AQMD to make sure the environmental benefits work properly reflects the new rules the District is implementing. In addition, the final report for this task will be circulated within the team for internal review so that it can be submitted to the Commission in September.

**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	DR: 06/27/03	95%
3.1.1a (2)	Preliminary Draft Process Recommendation Report	01/24/02	04/04/03	10/25/03		95%

**Table 1: Summary of Project Status and Deliverables – Project 3.1 (continued)**

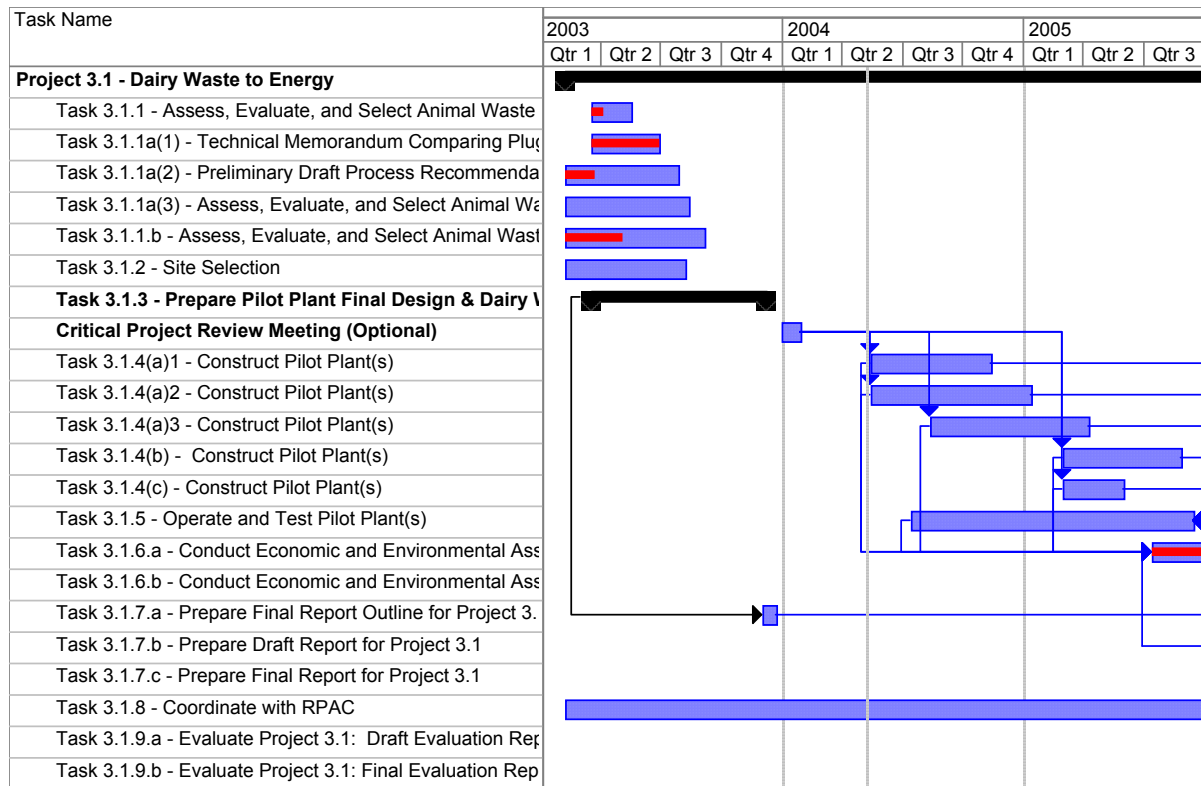
Task No.	Description	Start Date		Due Date		Status (%)
3.1.1a (3)	Draft Processes Recommendations Report	01/24/02		11/18/03		85%
3.1.1.b	Assess Evaluate, and Select Animal Waste to Energy Technology	01/24/02		01/17/04		55%
3.1.2	Site Selection	01/24/02		12/20/03		
3.1.3a	Test Plan and Protocols	03/25/02	04/04/03	09/10/03		90%
3.1.6a	Conduct Economic and Environmental Assessment – Environmental Benefits Task	07/12/05	12/04	12/13/05		90%
3.1.8	Coordinate with RPAC	01/24/02		05/12/06		

*Explanation of any Difference(s) in Schedule*

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

*Task 3.1.3.a – Test Plan and Protocols* – The initial Test Plan and Protocols Report was originally based on plans to conduct tests at RP-5. Due to comments received from the Commission, no PIER projects are planned at RP-5. The Test Plan and Protocol Report have been revised to reflect that situation. In addition, the report will be revised to be consistent with the Commission Test Plan guidelines and the revised to reflect the results of the discussions held with Commission staff in March and the prioritization effort which identified co-digestion and gas cleaning as the primary focus of Project 3.1. The revised plan for Project 3.1 will be finalized once the prioritization effort is complete and when implemented, will provide a sound platform for future centralized dairy projects. The overall schedule for Project 3.1 will be revised once the revised prioritization report and *Implementation Plan* is approved.

**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	\$0	OT
3.1.1 a (2)	\$72,000	\$0	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
3.1.6a	\$320,754	\$0	OT

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