

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

PROJECT 3.1 – DAIRY WASTE TO ENERGY PROJECT

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

April 2005

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What we planned to accomplish this period:

Activities planned for April included obtaining Commission comments on the draft and finalizing the Project 3.1 *Tactical Marketing Plan: Bringing Co-digestion and New Biogas Electric Power to Market in California*. A meeting will be held with Commission staff, representatives of IEUA, and the Commonwealth Team to go over comments on the *Tactical Marketing Plan* and its relationship to the proposed co-digestion efforts. On-going coordination meetings involving the CE Team and IEUA will continue and it is expected that comments will be received on the *Draft Process Recommendation Report* submitted to the Commission in January. The internal draft of the Task 3.1.1.b report should also be completed by the team so that it can be submitted.

On Task 3.1.2, *Site Selection* activities were to continue with a complete draft anticipated to be completed in April. This was expected to include finalization of the efforts to site all the co-digestion, power generation and associated infrastructure for the project. An outline and initial drafts of the *Site Selection Report* will be prepared and circulated within the project team for comments. Also under Task 3.1.2, comments received on the draft *Tactical Marketing Plan* submitted to the Commission in January were anticipated to be received and the report will be finalized.

Under Task 3.1.3, the *Bench Scale Tests* were to continue and completed once all analytical results are received and analyzed. Further coordination is anticipated with IEUA staff regarding the use of the bench scale test results in the design of the co-digestion systems. The *Draft Task Reports* for Tasks 3.1.6(0) through 3.1.6(5) was completed and the CE Team anticipates receiving comments from the peer technical review team and finalizing the report in April so that it can be submitted in May.

What we actually accomplished this period:

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

- The *Draft Process Recommendation Report*, which expanded on the *Interim Report*, was completed in December 2004 and submitted to the Commission staff and the *Technical Advisory Committee* in January.
- Additional work activity was undertaken related to the *Final Process Recommendation Report* under Task 3.1.1.b and centers on activities related to the Project's primary focus: co-digestion and gas cleaning. Once the Task 3.1.1.b report is submitted, currently estimated to be in May or June 2005, all work on Task 3.1.1 will be completed. Information related to the co-digestion system, including the preliminary results on the bench scale testing, was considered in February as part of the effort to finalize the *Process Recommendation Report*.

Task 3.1.2: Site Selection and Tactical Marketing Plan

- Efforts on this task focused on finalizing the selection of the optimal sites for each component of the co-digestion system to be installed at the IEUA RP-1. Most of the work on the materials handling systems, the gas distribution system, and the associated infrastructures was completed earlier. Efforts in April involved finalizing the report describing the siting of the proposed power generation system. This involved coordinating with Ingersoll-Rand, whose 250 kW microturbine is well suited for the co-digestion project at RP-1 as well as other potential co-digestion opportunities.
- A key activity related to all Project 3.1 tasks, was to follow up on discussions held with Commission Staff in October 2004, reviewing the *Project Implementation Plan* and future research and demonstration activities planned on Project 3.1. A key outcome of the October meeting was the need to develop a plan to bring to market the technologies that are being developed under this Project. Efforts to develop a *Tactical Marketing Plan* were consistent with earlier findings which concluded that co-digestion has the most potential to improve dairy waste to energy project economics in California. It was determined that the 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 Task 3.1.2.b. In December 2004, work was undertaken and discussions were held involving members of the CE Team and IEUA. The draft *Tactical Marketing Plan* was submitted to the Commission in January 2005. In late January and in February, the concepts presented in the *Draft Tactical Marketing Plan* were further improved in order to develop the demonstration project at RP-1. This information was used to identify completion options for Project 3.1.
- Also in April, a meeting was held at the Commission's offices to review the *Tactical Marketing Plan* and discuss options for completing Project 3.1. The meeting included attendees from the Commonwealth Team, IEUA, and the

Commission. The key outcome was identifying the need to further evaluate the relative location of dairies, food processing plants, and sewage treatment plants that had unused digester capacity. The Commonwealth Team developed an approach for completing this work and initiated preparation of an addendum to the *Tactical Marketing Plan* to complete a location and proximity analysis. Data on dairies and food processing facilities was collected and GIS analysis activities were initiated.

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

- Efforts on this task 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 bench scale tests would be undertaken in a stepwise manner in order to optimize the full scale test phase of the co-digestion effort. A draft of the Task 3.1.3.a *Test Plan and Protocol* was prepared and reviewed in October and distributed to the Commission staff at the October 15th meeting and included a draft of the full-scale test plan for the pilot co-digestion project. The initial bench scale testing will take place at the Orange County Sanitation District (OCSD) because it is a recognized, high-quality laboratory, and this will improve the transfer of results from the program to other co-digestion demonstration applications. In April, the analysis of the food waste providers' samples was reviewed.
- Other activities associated with the *Bench Scale Testing* included collection of samples from the food waste providers supplying the various wastes to be tested and other coordination activities with them. Work on the *Final Design and Test Plan* included efforts to integrate the bench scale testing with the *Final Design*. The proposed *Test Plan* will enable the *Bench Scale Testing* to be used to refine and update the full-scale testing plan. This will allow the design to reflect the ongoing bench scale work that has been completed. Another key activity of this task was quantifying the amount of biogas that could be expected during the testing program as a result of the different food wastes. This information is needed to size the proposed power project.

Task 3.1.6: Conduct Economic and Environmental Assessment

- Limited work was conducted in April. The effort to update the baseline analysis was completed previously as it was determined 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 project. The draft 3.1.6 report that was finalized in November defined the environmental benefits in accordance with the scope of this project and will enable those benefits to be documented. Particularly relevant are findings related to the new South Coast Air Quality Management District (SCAQMD) rules that will affect dairy operations.
- Air emissions estimates developed under this task were considered in light of the ongoing regulatory activity of the SCAQMD. Extensive coordination with

- SCAQMD staff was undertaken to ensure that the emissions will meet or exceed the District's pending rules.
- The findings of this environmental benefit work were assembled into a summary report, which was distributed to the Task 3.1.6 technical peer review group and Energy Commission staff for review in January. The review draft was revised so that each separate topic was addressed in an individual appendix and has a stand-alone deliverable. Few comments on the review draft were received from the Task's peer review group in April. It is anticipated that all comments will be received by early May, and that the report would be finalized shortly thereafter.
 - Preliminary efforts continued in April to follow-up on the environmental benefits work described above. This will focus on the relationship between ammonia and PM10 and will not be undertaken until authorized, but the planning for these studies will consider, in particular, work that the Commonwealth team subcontractors are undertaking. A draft work plan for this effort, identified as Task 3.1.6.C was prepared and circulated within the project team.

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 2004 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 was further enhanced by development of the *Tactical Marketing Plan*, which outlines 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* was completed in December 2004 and was submitted to the Commission in January.

Preliminary work on the co-digestion projects is being initiated so that the projects can begin as soon as the Commission's feedback is received. This will result in co-digestion and gas cleaning projects starting in May or June 2005 and being completed over a six to nine month testing period. The final reports will be completed in late 2005 and early 2006.

Significant problems or changes:

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 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*.

There are no significant fiscal problems to report during this period and work is proceeding within budget. Progress and expenditures will result in the 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 May include obtaining Commission comments on the draft *Project 3.1 Tactical Marketing Plan* and completing the addendum containing the location and proximity analysis of dairies, food processing plants, and wastewater treatment plants. Once comments are received on the *Draft Tactical Marketing Plan* and the addendum, the report will be finalized. It is also anticipated that the environmental benefits final report, Tasks 3.1.6(0) through 3.1.6(6), will be submitted. Additionally, all activities related to the analysis of dairy waste technologies and process selection (Task 3.1.1) and the test plan and design (Task 3.1.3) are planned to be completed with submission of the deliverables expected once comments on the *Tactical Marketing Plan* are incorporated. Coordination meetings involving the CE Team and IEUA are expected to continue in May.

On Task 3.1.2, *Site Selection* activities were to continue with a complete draft anticipated to be completed in May. This was expected to include finalization of the efforts to site all the co-digestion, power generation, and associated infrastructure for the project. Comments received on the draft *Tactical Marketing Plan* submitted to the Commission in January were anticipated to be received and the report will be finalized. Supplemental information for the addendum to the *Tactical Marketing Plan* will be incorporated in May.

Under Task 3.1.3, the *Bench Scale Tests* were to continue and completed once all analytical results are received and analyzed. Further coordination is anticipated with IEUA staff regarding the use of the bench scale test results in the design of the co-digestion systems. The *Draft Task Reports* for Tasks 3.1.6(0) through 3.1.6(5) was completed and the CE Team anticipates receiving comments from the peer technical review team and finalizing the report so that it can be submitted in May.

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 | | 95% |
| 3.1.2a & b | a) Site Selection and b) Tactical Marketing Plan | 01/24/02 | | 12/20/03 | | 90% |
| | | 10/20/04 | 10/18/04 | 1/15/04 | | 95% |
| 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 | | 95% |
| 3.1.3c | Design Memorandum and Draft and Final Test Plans | 11/20/03 | 9/16/04 | 4/8/2004 | | 90% |
| 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% |

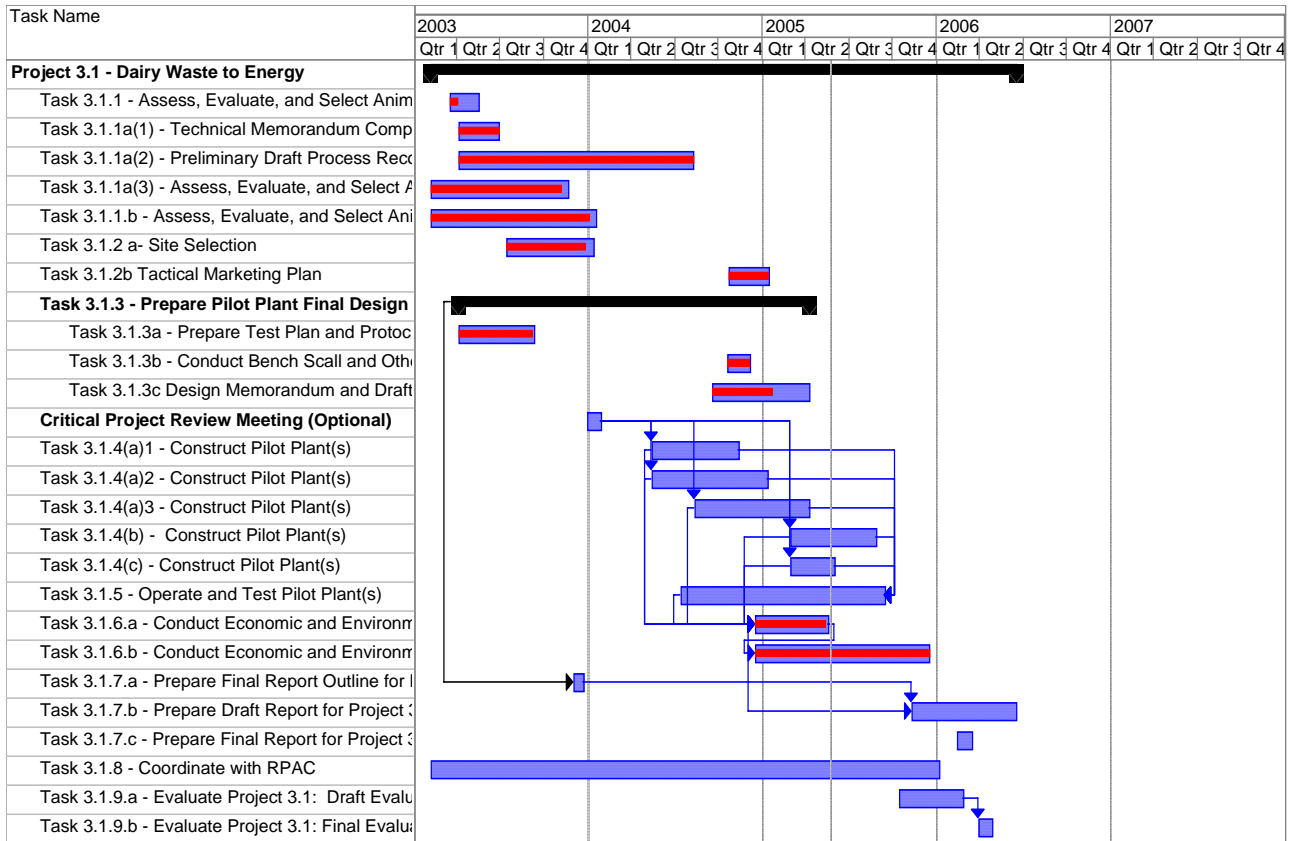
Explanation of any Difference(s) in Schedule

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 June 2005, enabling the deliverable under the task 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 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 incorporate 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)