

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

PROJECT 3.1 – DAIRY WASTE TO ENERGY PROJECT

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

December 2004

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What we planned to accomplish this period:

Activities planned for December included completion of the draft *Project 3.1 Tactical Marketing Plan: Bringing Co-digestion and New Biogas Electric Power to Market in California*. Coordination meetings involving Commonwealth and IEUA also were to continue. On Task 3.1.1, the *Draft Process Recommendation Report* was planned to be submitted to the Commission. Efforts to finalize the internal draft of the Task 3.1.1.b report were also planned to be completed by the team so that it could be submitted once the comments were received on the draft.

On Task 3.1.2, *Site Selection* activities were to continue as were efforts related to the *Tactical Marketing Plan*. Under Task 3.1.3 the *Bench Scale Tests* were to continue at the Orange County Sanitation District laboratory. Further coordination was anticipated with IEUA staff regarding these tests, the results of which were to be used 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) were to be completed and the CE Team anticipated distributing them to the peer technical team reviewers upon receipt of approval to do so by the Commission's Contract Manager.

What we actually accomplished this period:

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

- Efforts were completed on finalizing the *Draft Process Recommendation Report* under Task 3.1.1a (3). This report, which expanded on the *Interim Report*, submitted in August, incorporated responses to comments on the internal draft of this report, which was modified earlier 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 report was completed in December and is ready for final modification and submittal to the Commission staff and the *Technical Advisory Committee* which is expected to occur in early January.

- 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 January or February 2005, all work on Task 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 finalizing the selection of 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 to follow up on discussions held with Commission Staff on October 15th to review the *Project Implementation Plan* and future research and demonstration activities planned on Project 3.1. 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. Efforts to develop this *Tactical Marketing Plan* to bring power developed from biogas produced through co-digestion of manure and food waste was a key result of this meeting and was consistent with earlier findings which concluded that co-digestion offers 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 an existing Task of Project 3.1, the Project Lead selected Task 3.1.2.b for this purpose. In December, work was undertaken and discussions were held involving members of the CE Team and the host, Inland Empire Utilities Agency (IEUA). The draft *Tactical Marketing Plan* was completed in December and it is anticipated that it would be submitted in January after receipt of any guidance or comments from the Commission or any CE Team Members.
- As noted previously, co-digestion efforts were focused in two key areas. First, available co-digestion suppliers were further screened and a preliminary assessment of the key parameters for these supplies developed earlier and reviewed with team members was further refined. This was necessary so that initial consultation with suppliers could be planned and undertaken most efficiently. Secondly, an evaluation of the host (RP-1) facility's ability to handle the increased gas production was also 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 December and was being undertaken in a manner consistent with the concepts addressed in the *Tactical Marketing Plan*.

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 initial draft of the *Test Plan and Protocols* prepared last year was revised previously 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 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. The initial draft of the *Test Plan* also included a draft of the full scale test plan for the pilot co-digestion project. 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 (OCS D) for the initial bench scale testing. The result of the involvement of the OCS D laboratory in this activity will be a recognized high quality laboratory which will improve the transfer of results from the program to other co-digestion demonstration applications. Efforts in December included collecting and analyzing samples to be used in the co-digestion bench scale testing being conducted at the Orange County Sanitation facilities. The results of this bench scale testing will be considered in refining the full scale pilot plant testing program discussed previously.
- 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 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

- Limited work was conducted in December. 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 projects being evaluated.. The draft 3.1.6 report that was finalized in November, not only defined 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 developed under this task were 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 were consistent with the District's pending rules related to emissions from dairy operations.
- The findings of this environmental benefit work, Tasks 3.1.6(0) through Task 3.1.6(5) were assembled into a summary report, which was prepared for distribution to the Task 3.1.6 technical peer review group and sent to the Commission for review in early November. After feedback was received from the Commission suggesting that separate deliverables be presented for each of the tasks completed, the report was revised so that each separate topical area was addressed in an individual appendix. Thus each topic was addressed in a stand alone deliverable, which were compiled at the end of the summary report. This approach was proposed to the Commission in November and was planned to be used in the distribution to the peer review group for Project 3.1 once comments on the revised approach were received from Commission staff

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 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 and will be submitted to the Commission in January.

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.

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 January include submitting and obtaining Commission comments on the draft Project 3.1 *Tactical Marketing Plan: Bringing Co-digestion and New Biogas Electric Power to Market in California*. On-going coordination meetings involving the CE Team and IEUA will continue and the *Draft Process Recommendation Report* will 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. Under Task 3.1.3 the *Bench Scale Tests* will continue at the Orange County Sanitation District laboratory with expected completion scheduled for January. 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 in early January and receiving comments from the reviewers and Commission staff by the end of that month.

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 | 01/24/02 | | 12/20/03 | | 75% |
| | b) Tactical Marketing Plan | 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 | | 70% |
| 3.1.3c | Design Memorandum and Draft and Final Test Plans | 11/20/03 | 9/16/04 | 4/8/2004 | | 25% |
| 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

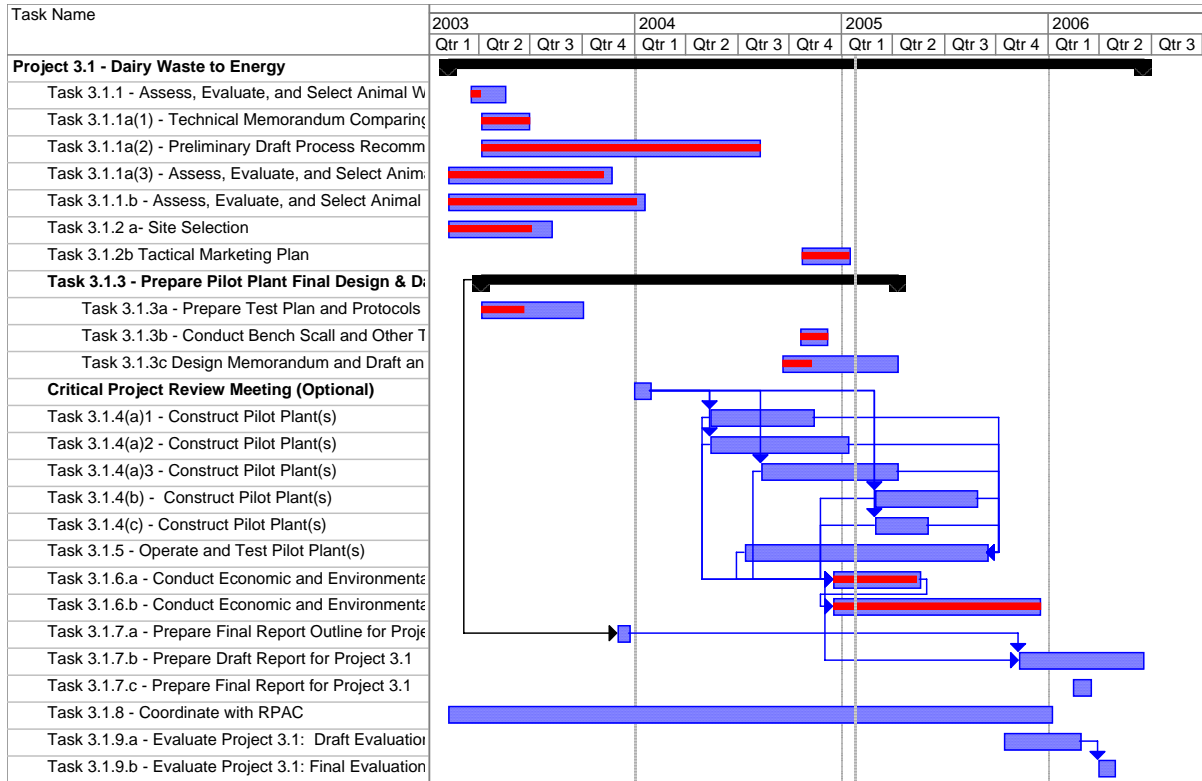
The following discussion provides the explanation for the reported changes in the schedule at the project task/deliverable level.

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)