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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What we planned to accomplish this period:

Activities in March were to focus on responding to comments made at the kick-off meeting related to accelerating analysis of economic and environmental aspects of various plug flow and complete-mixed digestion technologies. A proposed approach will be developed to modify the schedule of Project 3.1 activities so that some of these comparative assessment activities can be completed early in Project 3.1 and then subsequently used in the development of recommended projects later in the Program.

This will also involve further analysis of technologies used in Europe and North America and on the work of NIRAS, which is scheduled to be completed in March or early April. It should also be noted, that the findings related to which projects should be recommended in prioritization d Project 1.1 final reports will influence how work on this project proceeds. Therefore in March, efforts will be undertaken to define an approach, which facilitates incorporation of the results of the comparative analysis of technologies (plug flow versus completed-mixed) and the Mini-Grid baseline analysis into the process and site selection activities. It is anticipated that the schedule for Project 3.1 will be adjusted so that the relevant Project 1.1 tasks and the comparative analysis described above will be fully incorporated.

What we actually accomplished this period:

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

- Initial efforts on this task are focusing on assessing the different technologies to capture the energy value of the manure and most effectively convert it to energy. This includes European and North American technologies. It also involves using information collected during preparation of the Project 1.1 inventory reports, as well as information from various vendors and other organizations involved in the animal waste generation projects.

- NIRAS, a Danish firm with expertise in biogas energy, assembled information useful in this task and gave two presentations in California in February on this subject. Follow up communications continued with them through March. Key results of the NIRAS work included recommending work in three areas:
  - Greater analysis of co-digestion as a means to increase gas production and improve the overall economics of Regional Project. Regional Projects in Denmark are comparable to dairy cluster projects in the United States.
  - Evaluation of complete-mix, as compared to plug flow, digesters. European regional plants are all complete-mix facilities.
  - Conduct a more thorough look at biological, as opposed to chemical processes for gas and waste water streams from manure to energy projects whenever possible. Trends in Europe support work in all these areas.
- Efforts were also initiated to develop protocols for testing different processes for optimizing biogas performances at existing dairy cluster projects at RP-1 and RP-5. These protocols will enable bench and pilot scale tests to occur during design activities to help ensure focused and successful projects.
- A summary for the kickoff meeting for Project 3.1 conducted on February 28 was prepared. The work scope elements as well as an overview of the findings of the Planning and Analysis Project that affected Project 3.1 were summarized.
- Also as a result of discussions held during the meeting, a comparative evaluation of plug flow and complete mix digestion systems was initiated. This evaluation is focusing on farm and dairy cluster projects. Both European and North American technologies are being considered. Particular emphasis in this analysis is being placed on the economic and environmental analysis of these systems with the intent of helping to guide the Commonwealth Program towards pilot projects that will be most advantageous from a technical, economic and environmental viewpoint. This effort is scheduled to result in a technical memorandum to be prepared in April and May and presented to the Commission in late May.

How we are doing compared to our plan:

Work is proceeding as anticipated.

Significant problems or changes:

It has become clear that a key element of the early project comparative assessment effort is to portray the environmental and economic benefits of the dairy waste to energy projects. This is particularly true for diary cluster projects, which may offer the best potential for achieving environmental benefits of a range of dairy digestion projects. The technical memorandum being prepared to compare complete-mix and plug flow projects will be important in addressing these considerations. The Commonwealth Team plans to consult with US EPA

and a number of State agencies to address this issue. The initial findings of this work will be presented to the Commission and their feedback will help set the objectives for the entire dairy waste to energy project.

There are no significant fiscal problems to report on during this period and work is proceeding within budget. Progress and expenditures will result in project being completed on time and within budget.

What we expect to accomplish during the next period:

Activities in April will focus on preparing the technical memorandum comparing the existing digesters at RP-1 and RP-5 to other plug flow and complete-mix digestion projects. Digestion projects on-farm and for dairy clusters in Europe and North America will be undertaken.

Other activities in Project 3.1 will include further development of the testing protocols that will implement some of the suggested projects identified in Project 1.1. This will include co-digestion, improved pretreatment and several other type projects. It should be noted, that the findings related to which projects should be recommended in the prioritization effort and Project 1.1 final reports will influence how work on this project proceeds. Therefore in April, efforts will be undertaken to define an approach, which facilitates incorporation of the results of the comparative analysis of technologies (plug flow v. complete-mix) and the Mini-Grid analysis into the process and site selection activities. It is anticipated that the schedule for Project 3.1 will be adjusted so that the results of Project 1.1 and the comparative analysis described above will be fully incorporated.

Status of Milestones and Deliverables:

Table 1 below 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

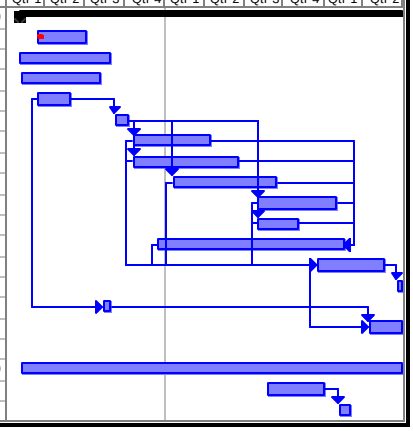
Task No.	Description	Start Date		Due Date		Status (%)
		Planned	Actual	Planned	Actual	
3.1.1a (1)	Assess, Evaluate, and Select Animal Waste to Energy Technology	03/17/03		05/16/03		20%
3.1.1a (2)	Assess, Evaluate, and Select Animal Waste to Energy Technology	02/05/03		07/25/03		
3.1.1a (3)	Assess, Evaluate, and Select Animal Waste to Energy Technology	02/05/03		08/11/03		
3.1.1.b	Assess Evaluate, and Select Animal Waste to Energy Technology	02/05/03		09/01/03		
3.1.2	Site Selection	02/05/03		09/01/03		
	Critical Project Review Meeting	09/11/03		10/11/03		
3.1.3a	Prepare Pilot Plant Final Design & Dairy Waste to Energy Project Test Plan	03/17/03		05/29/03		
3.1.7.a	Prepare Final Report Outline for Project 3.1	08/12/03		09/02/03		
3.1.8	Coordinate with Renewables Project Advisory Committee	02/05/03		01/07/06		

Explanation of any Difference(s) in Schedule

Work in proceeding as anticipated, however, it is possible that Task 3.1.1's deliverable date may be revised.

Overall Schedule for Project 3.1:

Task Name	Duration	Start Date	End Date	Cost
Project 3.1 - Dairy Waste to Energy	**765 days**	**Mon 2/3/03**	**Fri 1/6/06**	**$0.00**
Task 3.1.1.a - Assess, Evaluate, and Select Animal Waste to En	81 days	Mon 3/17/03	Mon 7/7/03	$240,705.50
Task 3.1.1.b - Assess, Evaluate, and Select Animal Waste to En	151 days	Mon 2/3/03	Mon 9/1/03	$240,705.50
Task 3.1.2 - Site Selection	131 days	Wed 2/5/03	Wed 8/6/03	$171,240.00
Task 3.1.3 - Prepare Pilot Plant Final Design & Dairy Waste to Er	54 days	Mon 3/17/03	Thu 5/29/03	$301,177.00
Critical Project Review Meeting (Optional)	22 days	Thu 9/11/03	Fri 10/10/03	$16,960.00
Task 3.1.4(a)1 - Construct Pilot Plant(s)	130 days	Mon 10/20/03	Fri 4/16/04	$200,000.00
Task 3.1.4(a)2 - Construct Pilot Plant(s)	174 days	Mon 10/20/03	Fri 6/18/04	$200,000.00
Task 3.1.4(a)3 - Construct Pilot Plant(s)	173 days	Mon 1/19/04	Thu 9/16/04	$198,466.00
Task 3.1.4(b) - Construct Pilot Plant(s)	130 days	Tue 8/3/04	Mon 1/31/05	$300,000.00
Task 3.1.4(c) - Construct Pilot Plant(s)	66 days	Tue 8/3/04	Tue 11/2/04	$100,000.00
Task 3.1.5 - Operate and Test Pilot Plant(s)	306 days	Thu 12/18/03	Thu 2/17/05	$587,358.00
Task 3.1.6.a - Conduct Economic and Environmental Assessment	111 days	Fri 12/17/04	Fri 5/20/05	$320,754.00
Task 3.1.6.b - Conduct Economic and Environmental Assessment	21 days	Mon 6/20/05	Tue 7/19/05	$80,189.00
Task 3.1.7.a - Prepare Final Report Outline for Project 3.1	16 days	Tue 8/12/03	Tue 9/2/03	$20,007.00
Task 3.1.7.b - Prepare Draft Report for Project 3.1	156 days	Fri 4/15/05	Fri 11/18/05	$150,052.00
Task 3.1.7.c - Prepare Final Report for Project 3.1	22 days	Mon 11/21/05	Tue 12/20/05	$30,010.00
Task 3.1.8 - Coordinate with RPAC	763 days	Wed 2/5/03	Fri 1/6/06	$0.00
Task 3.1.9.a - Evaluate Project 3.1: Draft Evaluation Report	96 days	Mon 8/23/04	Mon 1/3/05	$80,065.00
Task 3.1.9.b - Evaluate Project 3.1: Final Evaluation Report	22 days	Thu 2/3/05	Fri 3/4/05	$20,016.00



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	$240,706	$0	OT
3.1.1.b	$240,706	$0	OT
3.1.2	$171,240	$0	OT
3.1.3	$301,177	$0	OT
3.1.7.a	$20,007	$0	OT
3.1.8	$0	$0	OT

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