

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

PROJECT 2.2 – ENHANCED ENERGY RECOVERY THROUGH OPTIMIZATION OF  
ANAEROBIC DIGESTION AND MICROTURBINES PROJECT

REPORT PREPARED BY: COMMONWEALTH ENERGY TEAM

February 2005

|                              |                              |
|------------------------------|------------------------------|
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**What we planned to accomplish this period:**

Testing of the Sonico ultrasound system will continue in February and the use of the IWe Tech system is expected to be completed in the same time frame. Also baseline data for the gas cleaning tasks at IEUA's Regional Plant Number 1 (RP-1) will continue to be summarized. Data from the first operating period for the ultrasound systems will continue to be reviewed and any comments on the *First Quarterly Report* will be incorporated. It is also anticipated that documents marking completion of the ultrasound installation task will be approved by the Commission and that Task will be officially completed.

The CE Team anticipates that the installation of the gas cleaning system will continue with emphasis on the biological scrubbing system so that its applicability to both Projects 2.2 and 3.1 will be addressed. Work will continue on the *Second Quarterly Report* which will include baseline data on the gas cleaning system, as well as operating information for the ultrasound systems being tested at Riverside. The data collection on the gas cleaning lags the data collection on the ultrasound systems by two to three months and the first and subsequent quarterly reports will reflect that fact.

**What we actually accomplished this period:**

Task 2.2.1 Process Selection:

- Work on this task is complete. The results have been incorporated into the design process and are being implemented into the project in the field.

Task 2.2.2 Site Selection and Test Plan:

- Work on this task is complete. The results have been incorporated into the design process and are being implemented into the project in the field.

Task 2.2.3.a. Design Gas Cleaning System:

- Efforts on this task were limited as the design activities were completed previously. Site conditions information was incorporated into the design of the gas cleaning systems. Design drawings showing the layout of the various gas cleaning elements (gas drying, H<sub>2</sub>S removal, and siloxane removal) were finalized with IEUA staff and used in efforts with the various vendors to ensure that the equipment was properly sized and ordered to meet the requirements. Data related to the size of the piping, electrical, instrumentation/control and other project elements incorporated into the design earlier were finalized and used in working with the equipment vendors to make sure the design was properly implemented.

Task 2.2.3b Design Ultrasound System:

- Design activities were completed on this task previously and the design documents were submitted to the Commission in June 2004. Efforts on this task were very limited with the only activity being the use of the results of this task to complete the “as-built” drawings prepared under Task 2.2.4.b.

Task 2.2.4a Install Gas Cleaning System:

- Using the gas cleaning system design under Task 2.2.3a, installation activities initiated in December continued into February. Design documents were used in delivering and installing the gas cleaning systems. Detailed planning for the installation, including coordination with IEUA and the contractor, was also undertaken. In general, gas cleaning activities associated moisture and siloxane removal were proceeding in advance of those related to biological scrubbing. Chillers began to be installed in February are expected to be completed in March. Efforts on the biological scrubbing are continuing in conjunction with technology work under Project 3.1 as the biological gas cleaning activity will be undertaken on gas produced by the manure digester. The linkage between Project 2.2 and Project 3.1 is important because the findings will be applicable to both wastewater plant and manure digesters, offering the potential for lower cost and more environmentally sensitive H<sub>2</sub>S removal. Final arrangements were made with the contractor so that installation of the biological scrubbing system could begin in March.

Task 2.2.4b Install Ultrasound System:

- Installation of the ultrasound systems was completed in August 2004, which allowed start-up testing to occur in August and September. Testing continued on the IWe Tech and Sonico systems, with efforts focusing on the Sonico system in February, due to the lack of reliability with the IWe Tech system.

Task 2.2.5.a First Quarter Data Collection and Analysis

- Baseline data at the City of Riverside's Treatment Plant for the ultrasound systems was collected from June 2004 until September 2004, when start-up testing began. For the gas cleaning project, baseline data collection activities began approximately two months later and continued into February. In both cases it was important to have data that described the performance of the existing systems prior to the start of the project to assess the effectiveness of the units. As part of this effort, close coordination with the City of Riverside and IEUA continued. The *First Quarterly Report* was used as a basis for the *Second Quarterly Report* that is being prepared under Task 2.2.5.b. The *First Quarterly Report* includes baseline data for the City of Riverside systems that will be used in the ultrasound testing. Baseline data at RP-1 was collected during the current period, but was not complete and not included in the *First Quarterly Report* review circulated within the CE Team.

Task 2.2.5.b Second Quarterly Data Collection and Analysis

- In February, data collection during the ultrasound system operational phase continued. As noted previously, start-up activities occurred during September and some of the problems continued in the initial operation from October through December for the IWe Tech units. Both vendors, IWe Tech and Sonico, provided technical support during this period so that the units would operate satisfactorily. Overall, the service provided on the Sonico units improved their performance substantially and they were running well during November and December. The IWe Tech system continued to have performance issues and was down a substantial portion of the time and not performing as well as planned. The poor operating performance of the IWe Tech continued in January and it was determined that the unit could not operate reliably. Contacts were made with the vendor and it was concluded that additional efforts to improve performance were not warranted and that further operating testing was not warranted. Its operation was curtailed in February and plans initiated to remove the IWe Tech unit so that remaining test efforts can focus on the Sonico unit. On the gas cleaning project, baseline data collection continued and the CE Team worked closely with IEUA host facility staff to coordinate data collection activity with operations. This activity was expected to continue throughout the quarterly data collection efforts. As noted previously, baseline data collected indicated an unusually large presence of siloxane during the baseline period and the levels and source of siloxane during this period were investigated so that the testing could be conducted according to the test plan objectives.

Task 2.2.6 Coordinate with RPAC

- Meetings were held with the Project Technical Advisory Committee early in the project and prior to a decision to proceed with the installation and testing phase. In addition, documents were sent to the Technical Advisory committee for their

comments. All input from the Advisory Committee was used in planning and implementing the project.

**How we are doing compared to our plan:**

As reported previously, the redirection of our approach (two ultrasound technologies, instead of one ultrasound and one thermal hydrolysis technology) will make the project findings more relevant to the State of California, but required additional consultation and planning with the technology vendors. This modified focus delayed completion of the *Site Selection and Test Plan Report*. However, the findings produced will clearly document how the use of ultrasound technology can help increase gas production as well as improve the treatment process.

As part of the ongoing coordination with the technology vendors, the CE Team sought to streamline the site selection and design tasks by involving the vendors in the project planning. This allowed efforts to focus on project implementation, rather than evaluation and design activities. However, these additional processes/steps delayed the finalization of the *Site Selection and Test Plan Report*. These challenges have been largely overcome, and the testing program was initiated in the second half of 2004. This will enable all testing to be completed by the end of the third quarter of 2005 with the results incorporated into the final report, which will be drafted by the end of 2005.

**Significant problems or changes:**

As noted above and in the previous monthly progress reports, operational issues arose with both the Sonico and IWe Tech units. In the case of the Sonico unit, these issues were addressed and the unit is performing satisfactorily. The IWe Tech unit continued to be down a large portion of the time and did not perform as anticipated. Additional consultation with the vendor occurred, and plans were made to complete the testing earlier than scheduled and remove the unit. The preliminary results of the testing suggest that future ultrasound applications should use the Sonico system, with its smaller sonic horns than the larger units on the IWe Tech units.

On the gas cleaning project, installation of the gas drying and siloxane removal systems continued ahead of those associated with the biological scrubbing. Consultation with the contractor who will be installing the biological scrubber will continue in February so that a more accurate determination of the cost of installing the system can be made and so that a determination of the relative application of these efforts to Project 2.2 and Project 3.1 can be determined.

**What we expect to accomplish during the next period:**

Testing of the Sonico ultrasound system will continue in March and the IWe Tech system is expected to be removed. Baseline data for the gas cleaning tasks at IEUA will be summarized and included in the *Second Quarterly Report*. Data from the first operating period for the ultrasound systems will continue to be reviewed and any comments on the *First Quarterly Report* will be incorporated so that the task can be completed. It is also anticipated that documents marking completion of the ultrasound installation task will be approved by the Commission and that the task will be officially completed.

The CE Team anticipates that the installation of the gas cleaning system will continue with emphasis on the biological scrubbing system so that its applicability to both Projects 2.2 and 3.1 will be addressed. It is anticipated that the installation of the gas drying and siloxane removal systems will be completed in March and that installation activities on the biological scrubbing system will continue. Work will continue on the *Second Quarterly Report* which will include baseline data on the gas cleaning system, as well as operating information for the ultrasound systems being tested at Riverside. The data collection on the gas cleaning lags the data collection on the ultrasound systems by two to three months and the first and subsequent quarterly reports will reflect that fact.

**Status of Milestones and Deliverables:**

Table 1 below summarizes the status of Project 2.2 task deliverables as of the end of the current reporting period.

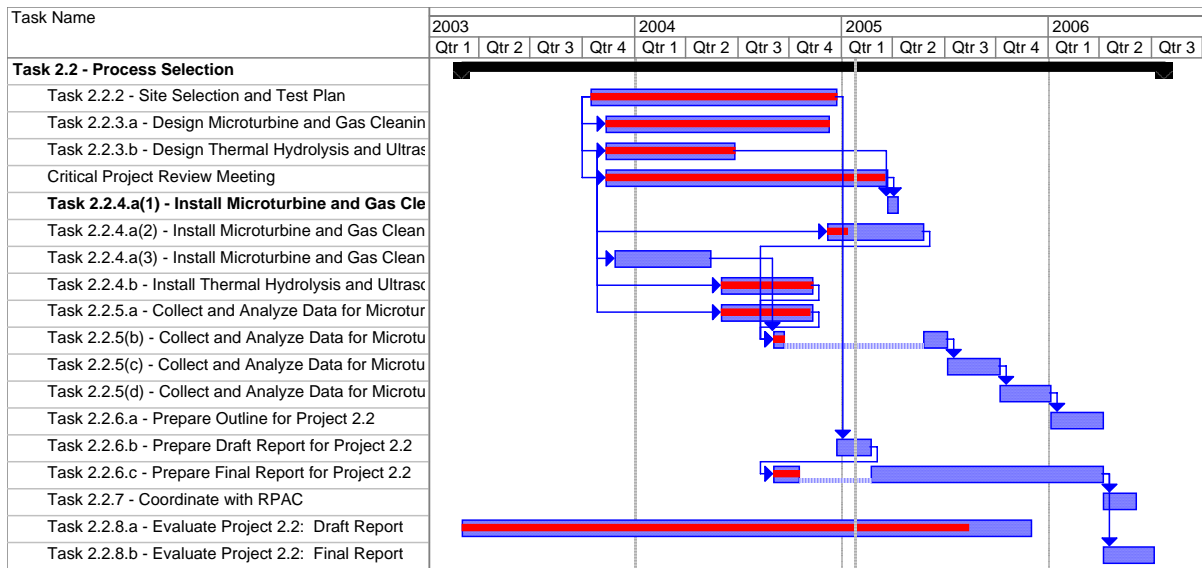
**Table 1: Summary of Project Status and Deliverables – Project 2.2**

| Task No. | Description                  | Start Date |          | Due Date |          | Status (%) |
|----------|------------------------------|------------|----------|----------|----------|------------|
|          |                              | Planned    | Actual   | Planned  | Actual   |            |
| 2.2.1    | Process Selection            | 01/24/02   | 01/24/03 | 09/04/03 | 11/10/03 | 100%       |
| 2.2.2    | Site Selection and Test Plan | 02/15/02   | 10/15/03 | 10/26/03 | 3/31/04  | 100%       |
| 2.2.3.a  | Design Gas Cleaning System   | 02/15/02   | 11/10/03 | 11/24/03 | 11/12/04 | 100%       |
| 2.2.3.b  | Design Ultrasound Systems    | 02/15/02   | 11/10/03 | 11/24/03 | 6/23/04  | 100%       |
| 2.2.4.a  | Install Gas Cleaning System  | 12/5/03    | 12/4/04  | 5/21/04  |          | 40%        |
| 2.2.4.b  | Install Ultrasound System    | 12/5/03    | 6/1/04   | 5/21/04  | 11/09/04 | 100%       |
| 2.2.5.a  | First Quarterly Report       | 6/20/04    | 6/1/04   | 8/20/04  |          | 95%        |
| 2.2.6.b  | Second Quarterly Report      | 8/20/03    | 9/1/04   | 11/19/04 |          | 70%        |
| 2.2.7    | Coordinate with RPAC         | 01/24/02   | 2/1/03   | 01/16/06 |          | 95%        |

**Explanation of any Difference(s) in Schedule:**

Task 2.2.2 – Site Selection and Test Plan – The findings of the *Process Selection Report* identified the technologies that are being used at the Riverside plant for enhanced anaerobic digestion and at RP-1 for gas cleaning. As noted previously, additional coordination activities with vendors has been required. Efforts were undertaken to streamline the site selection and test plan and design processes by conducting more detailed coordination with the vendors on their technologies. This approach shortened the time needed to secure the long lead-time equipment items and execute the project most efficiently.

**Overall Schedule for Project 2.2:**



**Overview of Fiscal Status:**

Table 2 below summarizes the fiscal status of Project 2.2 by task as of the end of the current reporting period.

**Table 2: Fiscal Status by Task – Project 2.2**

| <b>Task Number</b> | <b>Budget</b> | <b>Invoiced<sup>1</sup><br/>To-Date</b> | <b>Fiscal Status *</b> |
|--------------------|---------------|---|------------------------|
| 2.2.1              | \$236,563     | \$236,563                               | OT                     |
| 2.2.2              | \$182,543     | \$182,543                               | OT                     |
| 2.2.3.a            | \$242,995     | \$                                      | OT                     |
| 2.2.3.b            | \$215,842     | \$215,842                               | OT                     |
| 2.2.4.b            | \$229,585     | \$0                                     | OT                     |
| 2.2.5.a            | \$87,073      | \$0                                     | OT                     |
| 2.2.5.b            | \$87,073      | \$0                                     | OT                     |
| 2.2.7              | \$22,557      | \$0                                     | OT                     |

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

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<sup>1</sup> Invoice to-Date refers to amount invoiced prior to 10% retention withheld.