

Quarterly Programmatic Report

Component Project Title: **Aeration Technology Performance Evaluation**
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CALFED Project 01-N61- 05
Quarter Ending June 30, 2002

Deliverables

<u>Deliverable</u>	<u>Due</u>	<u>% Completed</u>	<u>Date Completed</u>
Task 1 Field Test Aerator			
1.1 Mass Balance method	8/31/02	100%	5/31/02
1.2 Off-gas method (Deleted)	8/31/02	0%	
1.3 Tracer gas method	8/31/02	35%	
Task 2 Evaluation of Performance			
2.1 Preliminary Evaluation	3/31/02	90%	
2.2 Complete Evaluation	8/31/02	0%	
Task 3 Review of Aeration Alternatives	8/31/02	95%	
Task 4 Comparison and Feasibility	8/31/02	30%	
Task 5 Preliminary 2001 Data Analysis	2/28/02	100%	3/31/02

Narrative

Overall Project

Task 1.2 was modified as recommended by the TAC to allow preliminary analysis of the 2001 data collected by the City and other directed projects. This analysis was performed and presented to the TAC. Many of the findings were incorporated into the City of Stockton monitoring report that was submitted to the TAC and CALFED. Modification of the Corps device to allow tracer gas injection and air-flow measurement has still not been accomplished. We are still hoping to obtain their cooperation and perform the tracer gas analysis of the device in August 2002. The project contract was extended to the end of August, 2002. The aeration project was presented at the external science peer review workshop in June. The final report will include changes as suggested by the peer review report. The report will support the next phase of full-scale installation and demonstration planned by the TMDL steering committee for summer 2003.

Task 1 Field Testing of Corps of Engineers Jet-Aeration Device

No additional testing of the Corps device has been accomplished. We are still planning to obtain cooperation for the tracer gas study in August 2002. Some repairs of the electrical supply wires for the aerator are needed, as a result of a ship collision with the dock and walkway. Testing may be possible in conjunction with these repairs.

Task 2 Evaluation of Jet-Aeration Device Performance

Work has proceeded on testing a prototype oxygen injection device that would match the depth constraints at the DWSC and would be located along the edge of the DWSC (under the Rough & Ready Island dock). This evaluation has measured the performance of an oxygen bubble device within a U-shaped pipe. The diameter of the U-pipe in the full scale device would be 1 m (3 feet) with a total depth at low tide of 25 feet. The oxygen bubbles from a diffuser located at the bottom of the riser tube create a flow of water. About 25% of the bubbles are dissolved in the water flow as the water moves around the U-shaped pipe. Some of the bubbles travel around the U with the water, but most rise to an exhaust spout at the top of the U-pipe. This oxygen gas could be pumped back into the diffuser to dissolve all of the oxygen supplied (75% recycle, 25% new oxygen supply). Good performance was measured with the 20-inch diameter test version. A flow of 3-4 cfs (velocity of 1.5-2.0 feet/sec) was induced by the oxygen bubbles at the highest flow rate tested (3-5 scfm) with a DO pickup of 6-8 mg/l. This is equivalent to a daily oxygen load of about 125 lb/day. The full-size devices would produce 500 lb/day, so about 20 of the full-size devices would be needed to supply the 10,000 lb/day needed in the DWSC during the summer. These initial results indicate that oxygen injection may be very feasible for the DWSC without any interference with ship traffic.

Task 3 Review of Alternative Aeration Technology Performance

The preliminary review of the major aeration technology for rivers and lakes has been completed for the peer review. Several methods appear to be economical and feasible. In cooperation with the Port of Stockton, we tested the performance of three oxygen devices: a ceramic diffuser, a porous tube diffuser rack, and a bubble U-tube that uses oxygen bubbles to produce a water flow into a horseshoe tube (described above). The final version of the evaluation report with recommendations for the most promising devices for pilot scale testing in the summer of 2003 will be completed at the end of this project (September 2002).

Task 4 Comparison and Feasibility of Aeration Alternatives for DWSC

Water temperature measurements at several depths at the Rough & Ready water quality station have been collected during this summer. This data indicates that diurnal stratification during the afternoon in the DWSC occurs on most days and may influence the near-surface algae photosynthesis and surface aeration, and may also isolate the surface layer from the majority of the DWSC. A description of this data and implications for aeration techniques will be included in the final report. The peer review comments and suggestions will also be included in the final report that will be available in September 2002.

Task 5 Preliminary Evaluation of 2001 Data

The results of the 2001 data analysis was presented to the TAC and is included in the City of Stockton sampling report. This task is complete.

Fiscal Quarterly Report

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Total Estimated Cost: \$125,000
 CALFED Funding: \$125,000
 Other Funding: \$0
 Completion Date: 8/31/02

	Quarterly Budget			Annual Budget		
	Budget	Accrued	Balance	Budget	Accrued	Balance
Task 1: Field Testing		\$7,801		\$36,640	\$27,427	\$9,213
Task 2: Evaluation of Corps Device		\$8,526		\$24,490	\$11,216	\$13,274
Task 3: Review Alternatives		\$11,510		\$24,435	\$23,260	\$1,175
Task 4: Compare Alternatives		\$6,442		\$24,435	\$7,242	\$17,193
Task 5: Year 2001 Data Analysis		\$0		\$15,000	\$14,971	\$29
Total Project		\$34,279		\$125,000	\$84,116	\$40,884

Estimated Expenses for Next Quarter: \$40,000
 July: \$20,000
 August: \$15,000
 September: \$5,000 (assumes 1-month extension)