RECLAMATION Managing Water in the West

Final Technical Memorandum No. 3.0

Santa Margarita River Conjunctive Use Project





Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Final Technical Memorandum No. 3.0

Santa Margarita River Conjunctive Use Project

Diversion Water Quality Monitoring

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Prepared for:

Bureau of Reclamation Southern California Area Office



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DIVERSION WATER QUALITY MONITORING

This memorandum summarizes the results of a surface water quality data acquisition program in the Santa Margarita River Basin at Marine Corps Base Camp Pendleton (CPEN). Monitoring was conducted at three locations in the vicinity of Lake O'Neill (LON). Eight months of continuous data have been collected for temperature, dissolved oxygen, turbidity, pH, conductivity, and chlorophyll, with a sampling interval of 60 minutes, using the Extended Deployment System (EDS) 6600 from YSI Environmental. Monitored sites and monitoring periods are listed in table 1.

Figure 1 shows the locations of the monitoring sites.

Principles of operation of the EDS 6600 are detailed in Appendix A. The installation procedure was similar for each monitoring site and was designed to satisfy the following requirements:

- Full submersion of the instrument's sensors into the water.
- Protection of the instrument from physical damage.
- Maintenance of un-impeded flow conditions at the instrument's sensors.

A perforated 6-inch-diameter polyvinylchloride (PVC) pipe was installed at each site to protect the instrument. The water quality instrument housing was lowered into the pipe below the water surface. Figures 2, 3, and 4 are photographs of the installation of the EDS 6600 at the diversion ditch, boat rental dock, and lake outlet, respectively.

Table 1. Water Quality Monitoring Schedule

Location	Date	Temperature	Dissolved Oxygen	Hd	Turbidity	Specific Conductance	Chlorophyll
Diversion Ditch	3/1/06 - 5/31/06	✓	✓	✓	✓	\checkmark	
Diversion Ditch	8/1/06 - 9/13/06	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
LON, Boat Rental Dock, 3 feet below surface	9/13/06 – 10/4/06	✓	✓	✓	✓	✓	✓
LON, Outlet, lake floor	10/5/06 - 11/1/06	✓	✓	\checkmark	\checkmark	\checkmark	\checkmark
Diversion Ditch	11/2/06 – 12/31/06	✓	✓	✓	✓	✓	✓

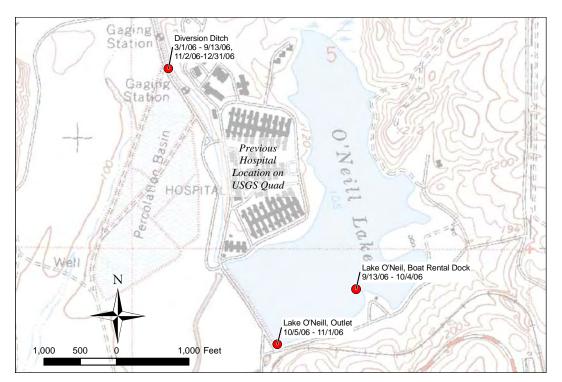


Figure 1. Monitoring Locations.



Figure 2. YSI Drawing of Suggested Installation (left). EDS 6600 Installation in Diversion Ditch by Stetson, March 1, 2006 (right).



Figure 3. EDS 6600 Installation at the Lake O'Neill Boat Rental Dock, September 13, 2006. Red arrow (left) shows monitoring location.



Figure 4. EDS 6600 Installation at the Lake O'Neill Outlet, October 5, 2006.

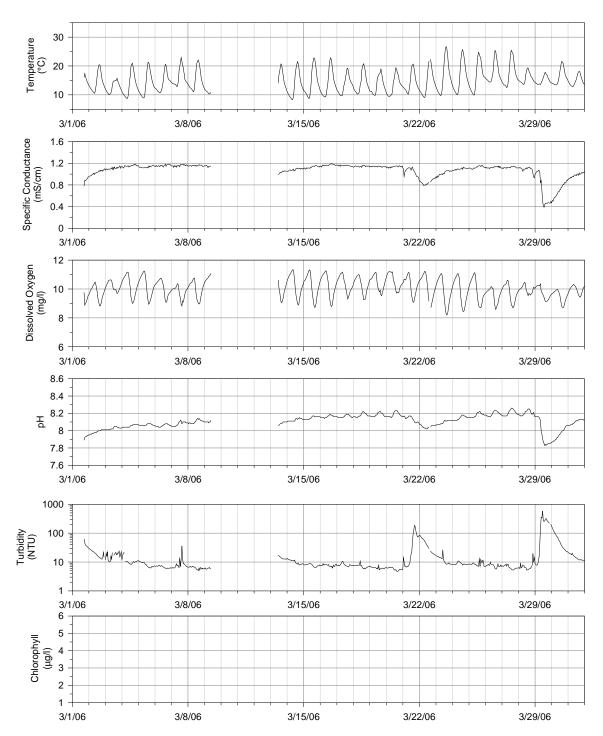
The EDS 6600 measures temperature, dissolved oxygen, pH, and turbidity directly. Total chlorophyll and total dissolved solids (TDS) are measured indirectly using fluorescence and specific conductance measurements, respectively. A linear relationship was assumed to convert between TDS and specific conductance and between total chlorophyll (A and B) and measured florescence. Grab samples were used to calibrate the relationship between the direct and indirect constituents. Water grab samples were collected by Stetson Engineers and sent to a California State certified analytical laboratory (Enviromatrix Analytical, Inc. in San Diego, California) for chlorophyll and TDS analysis. These laboratory results were correlated to the EDS 6600 field measurements: the laboratory measurement of chlorophyll was correlated to the simultaneous field measurement of fluorescence, and the laboratory measurement of TDS was correlated to the simultaneous field measurement of specific conductance. Once the relationship between the EDS 6600 and laboratory measurements was established, continuous records of chlorophyll and TDS were generated based on the continuous field measurements of fluorescence and specific conductance measurements, respectively.

Grab samples were taken at the beginning and end of every monitoring period for each site. Additional intermediate grab samples were collected and analyzed during extended monitoring periods to cross-check continuous data. Samples were also taken with the Dissolved Oxygen Sampler (#1962) from Hach Company. Laboratory analyses were performed for dissolved oxygen, turbidity, pH, conductivity, TDS, and chlorophyll. Laboratory reports for grab samples are presented in Appendix B.

Data processing included the removal of data "noise" (random spikes), as well as data collected when the EDS 6600 was not submerged in water. Spikes in turbidity and chlorophyll data can be caused by temporary soiling of the optical sensors. Single data points were identified as noise and removed when their values were unusually high and had no correlation to previous and successive readings for the same parameter. A linear "fouling" drift correction was applied to the turbidity and chlorophyll data recorded by the EDS 6600, by comparison with laboratory measurements. All data presented in graphs and tables of this technical memorandum, as well as the electronically submitted data, have undergone the processing steps that are listed above.

Hourly data are presented by month in figures 5 through 13 and are delivered in electronic format. In addition, daily minimum and maximum values for each parameter are presented in tables 2 through 22. Results of laboratory analyses for grab samples are summarized in tables 23 through 25.

Graphs, Hourly Data



Note: Instrument was removed from March 9, 2006 to March 13, 2006 for maintenance work on Ditch

Figure 5. Diversion Ditch, March 2006, Hourly Surface Water Data.

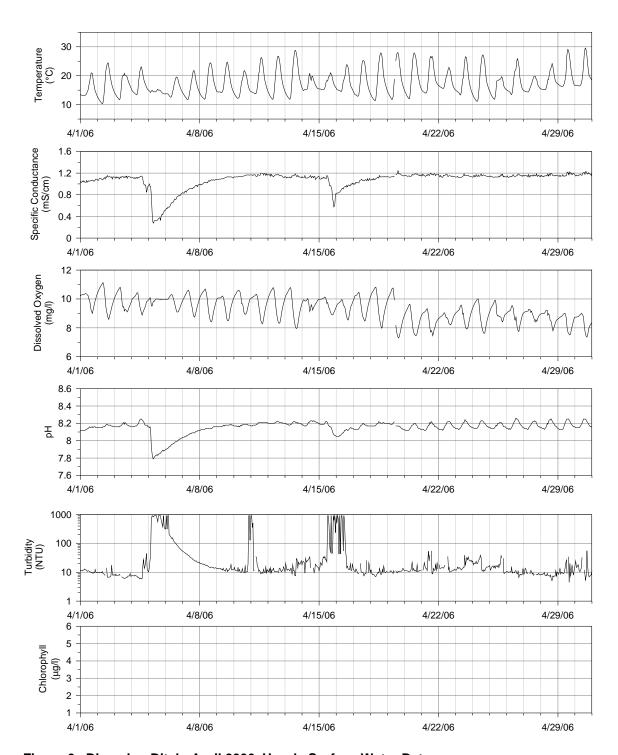


Figure 6. Diversion Ditch, April 2006, Hourly Surface Water Data.

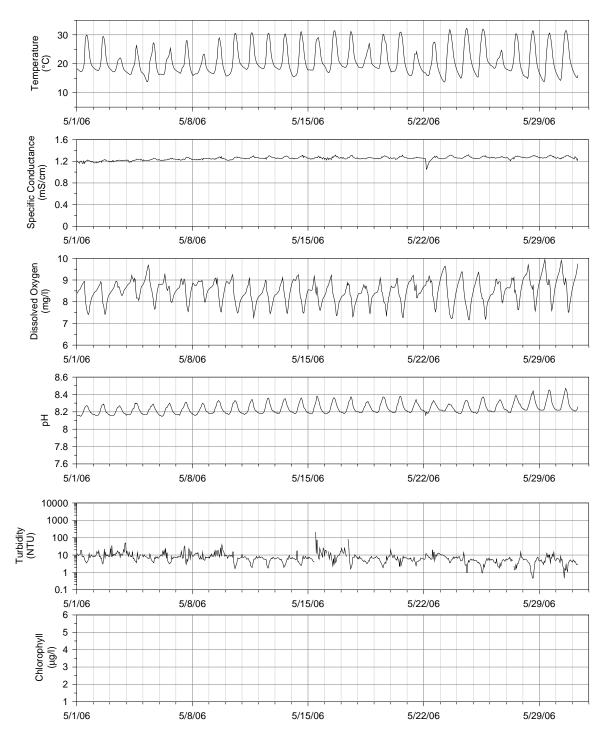


Figure 7. Diversion Ditch, May 2006, Hourly Surface Water Data.

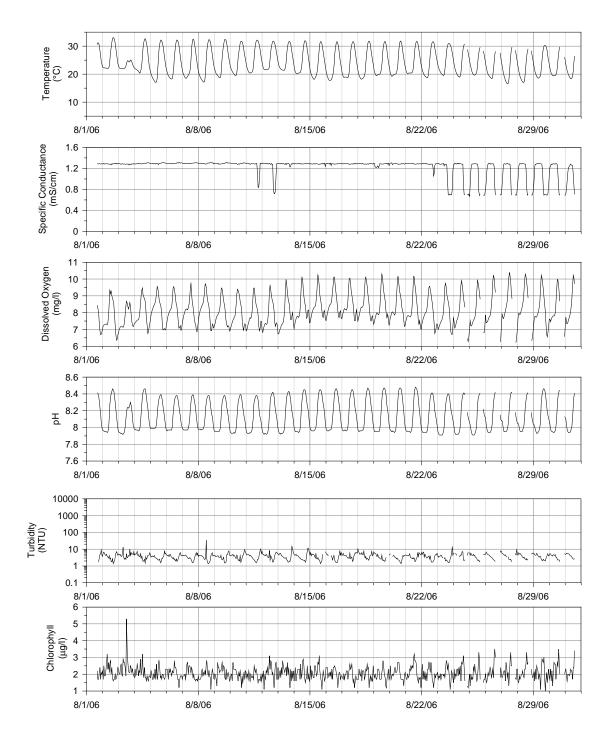
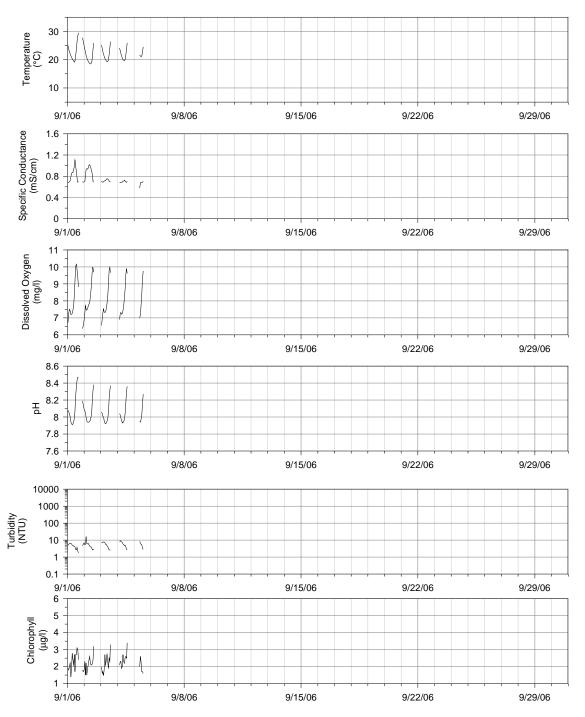


Figure 8. Diversion Ditch, August 2006, Hourly Surface Water Data.



Note: No flow in Diversion Ditch after September 5, 2006. Instrument was moved to Lake O'Neill boat dock on September 13, 2006.

Figure 9. Diversion Ditch, September 2006, Hourly Surface Water Data.

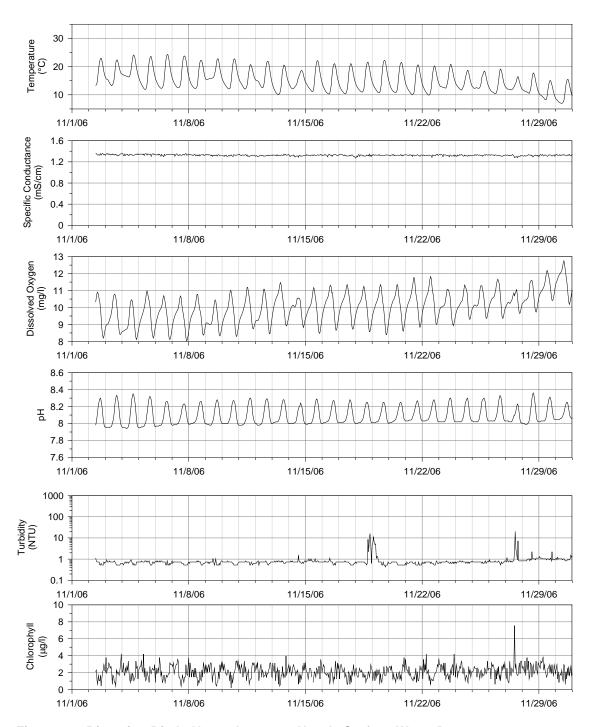


Figure 10. Diversion Ditch, November 2006, Hourly Surface Water Data.

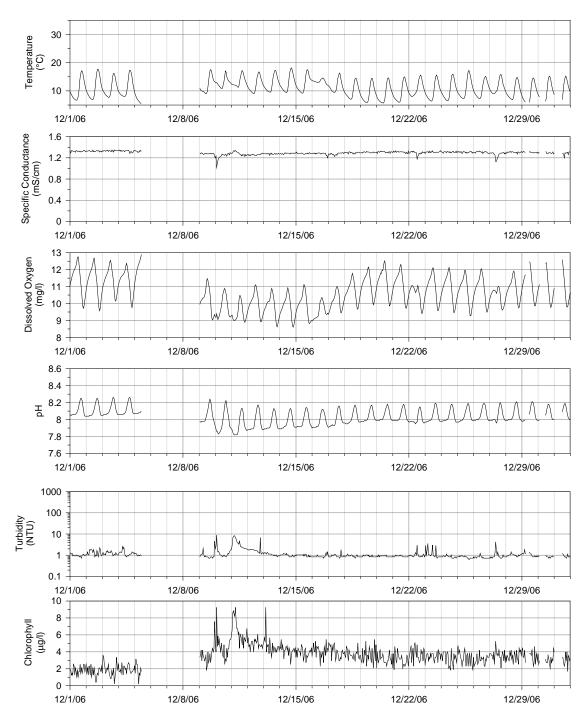
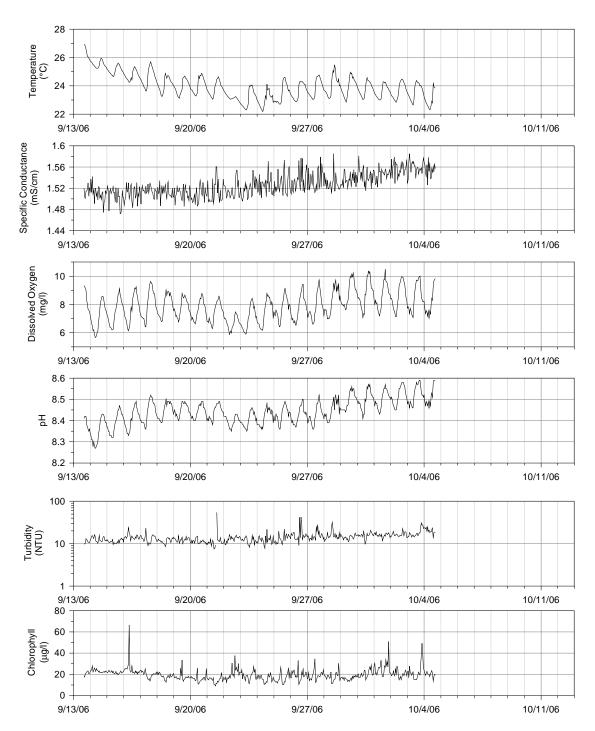
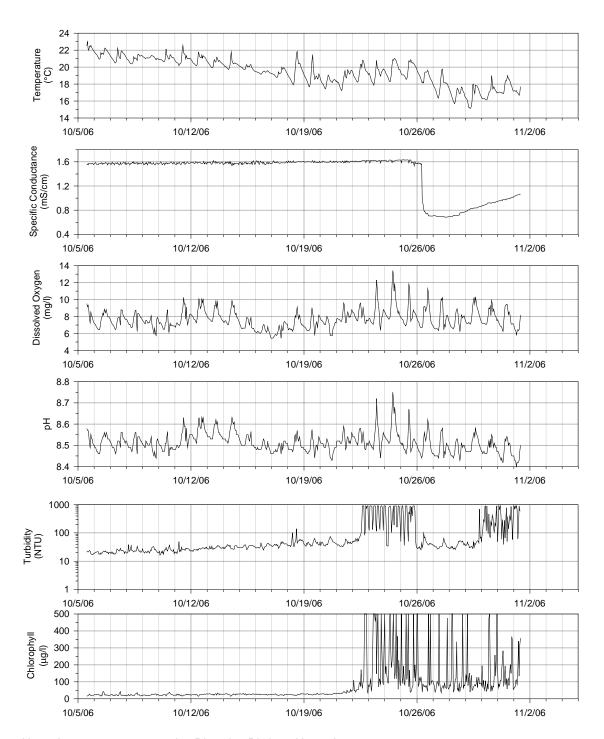


Figure 11. Diversion Ditch, December 2006, Hourly Surface Water Data.



Note: Instrument was moved to Lake O'Neill outlet on October 4, 2006.

Figure 12. Lake O'Neill Boat Rental Dock, September 13 – October 5, 2006, Hourly Surface Water Data.



Note: Instrument was moved to Diversion Ditch on November 1, 2006.

Figure 13. Lake O'Neill Outlet, October 5 – November 1, 2006, Hourly Surface Water Data.

Tables, Daily Minimum and Maximum Values

Table 2. Diversion Ditch, Daily Data Calendar Year 2006
Temperature, Degrees Celsius (°C)

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day				l .		l		l				
	Jani	uary	Febr		Ma		Ap			ay	Ju	ne
1					17.3	13.7	21.0	13.1	29.9	17.2		
2					20.5	10.5	24.5	10.3	29.4	17.6		
3					15.7	10.1	20.8	11.7	22.0	17.2		
4					21.0	8.8	23.1	13.4	26.3	16.2		
5					21.2	9.0	15.3	13.6	27.3	13.7		
6					20.5	10.7	19.6	12.5	25.4	16.2		
7					22.9	12.8	21.7	11.7	28.0	16.7		
8					22.0	11.1	24.5	11.9	23.3	15.9		
9					12.0	10.3	24.7	14.2	28.9	16.5		
10							21.7	12.2	30.5	15.7		
11							26.2	13.7	30.7	18.1		
12							26.7	11.8	30.5	18.2		
13					20.7	11.8	28.7	11.9	30.3	17.3		
14					21.5	8.4	20.8	14.9	31.1	15.5		
15					22.8	8.8	21.0	15.2	29.1	17.8		
16					22.8	9.3	23.8	14.5	31.4	16.9		
17					19.2	9.7	25.2	12.9	31.1	18.7		
18					20.7	10.3	27.9	11.3	27.0	18.6		
19					18.9	9.9	28.0	11.7	30.2	18.3		
20					19.4	9.5	27.9	12.0	31.0	17.2		
21					20.7	10.3	26.6	14.0	24.2	15.9		
22					22.4	9.1	22.8	15.3	27.5	15.9		
23					26.7	9.8	26.6	13.3	31.8	13.7		
24					25.6	10.1	27.2	11.1	32.2	15.0		
25					24.8	9.9	19.6	11.9	32.0	15.4		
26					25.4	14.4	25.9	13.4	24.7	18.3		
27					25.4	12.5	19.8	14.4	30.4	17.2		
28					19.3	13.6	24.2	15.1	31.4	14.9		
29					17.8	13.6	29.0	16.2	30.6	13.8		
30					21.6	13.4	29.6	16.4	31.5	14.3		
31					18.2	12.8			18.3	15.2		
Month					26.7	8.4	29.6	10.3	32.2	13.7		

Table 2. Diversion Ditch, Daily Data (continued) Calendar Year 2006 Temperature, °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1			31.2	23.5	29.5	19.2					17.1	6.7
2			33.1	22.1	25.9	18.5			23.0	13.2	17.7	6.9
3			25.0	22.0	26.5	19.3			22.4	13.2	16.3	7.7
4			32.7	20.4	26.0	19.7			24.1	16.3	17.3	8.0
5			32.2	17.0	24.6	21.1			23.6	11.9	9.6	5.6
6			32.2	18.2					24.3	12.3		
7			32.5	18.5					23.8	12.5		
8			32.3	17.2					22.3	12.2		
9			32.4	18.8					22.8	15.4	17.6	8.9
10			31.8	19.5					22.7	12.1	17.1	10.8
11			32.2	20.4					20.7	12.0	17.2	11.3
12			31.8	21.6					21.9	12.5	16.8	9.0
13			31.7	21.4					20.5	10.2	17.3	9.6
14			31.9	20.1					18.7	12.1	18.2	9.4
15			31.7	18.2					22.1	11.1	17.5	9.2
16			31.6	17.7					21.0	10.4	14.6	12.0
17			31.7	18.8					21.0	10.4	16.3	9.5
18			31.8	18.2					21.6	11.0	14.5	7.1
19			31.6	19.4					22.2	10.7	14.5	5.9
20			31.8	19.3					21.5	10.8	14.7	5.7
21			31.7	20.2					20.6	10.1	15.0	6.0
22			31.6	18.8					20.2	9.9	15.6	8.0
23			31.0	19.5					20.8	12.4	15.6	6.4
24			30.6	18.9					18.7	11.7	16.0	6.5
25			29.6	19.7					18.4	12.3	17.2	7.3
26			28.2	18.5					19.2	10.4	15.1	7.3
27			29.7	16.6					16.5	11.8	15.8	8.9
28			29.1	17.0					17.8	10.5	14.8	6.9
29			30.2	18.6					15.0	8.2	14.6	6.0
30			29.8	19.4					15.5	7.0	15.2	6.3
31			26.5	18.3							15.3	6.9
Month			33.1	16.6	29.5	18.5			24.3	7.0	18.2	5.6

Table 3. Diversion Ditch, Daily Data Calendar Year 2006 Dissolved Oxygen, milligrams per liter (mg/L)

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Janı	uary	Febr	uary	Ма	rch	Αp	oril		ay	Ju	ne
1					9.8	8.9	10.4	9.0	8.9	7.4		
2					10.5	8.8	11.1	8.6	8.9	7.4		
3					10.6	9.7	10.8	9.1	9.0	8.3		
4					11.2	9.0	10.4	8.9	9.2	8.1		
5					11.3	9.0	10.1	9.5	9.7	7.7		
6					10.8	9.1	10.3	9.1	9.3	8.0		
7					10.4	8.8	10.6	8.8	9.1	7.6		
8					10.8	9.0	10.7	8.4	9.0	8.0		
9					11.1	10.5	10.2	8.5	9.1	7.5		
10							10.6	8.9	9.3	7.5		
11							10.3	8.3	9.1	7.3		
12							10.8	8.3	9.0	7.5		
13					10.6	9.1	10.8	8.0	9.1	7.5		
14					11.4	8.9	10.0	9.1	9.2	7.5		
15					11.3	8.7	10.1	8.9	9.2	7.6		
16					11.3	8.8	10.0	8.5	9.2	7.4		
17					11.2	9.3	10.5	8.5	8.9	7.3		
18					11.0	9.3	10.8	8.0	8.8	7.5		
19					11.2	9.6	10.8	7.3	9.1	7.4		
20					11.2	9.7	9.6	7.5	9.1	7.3		
21					11.2	9.1	9.3	7.5	9.2	8.2		
22					11.2	8.7	9.1	8.2	9.2	7.5		
23					11.1	8.2	9.6	7.9	9.6	7.2		
24					11.1	8.4	10.0	7.6	9.4	7.2		
25					11.1	8.7	9.9	8.4	9.4	7.2		
200					40.0	0.0	0.5	77	0.0	0.0		
26					10.2	8.6	9.5	7.7	9.0	8.0		
27					10.6	8.7	9.3	8.4	9.1	7.6		
28					10.5	9.5	9.2	7.8	9.7	7.6		
29					10.4	9.2	9.0	7.5	9.9	7.6		
30					10.0	8.7	9.0	7.4	9.9	7.5		
31					10.3	9.5			9.8	8.6		
Month					11.4	8.2	11.1	7.3	9.9	7.2		

Table 3. Diversion Ditch, Daily Data (continued) Calendar Year 2006
Dissolved Oxygen, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1					9.8	8.9					12.8	9.7
2					10.5	8.8			10.9	8.2	12.7	9.6
3					10.6	9.7			10.8	8.4	12.6	10.2
4					11.2	9.0			10.5	8.1	12.4	9.8
5					11.3	9.0			11.0	8.2	12.9	11.1
6									10.7	8.1		
7									10.7	8.0		
8									10.8	8.4		
9									10.5	8.3	11.5	9.0
10									11.0	8.3	10.9	9.1
11									11.2	8.7	10.5	8.9
12									11.1	8.5	11.1	8.9
13									11.5	8.9	10.9	8.6
14									10.6	8.8	10.9	8.6
15									11.2	8.5	11.1	8.8
16									11.3	8.7	10.4	9.0
17									11.4	8.7	11.0	9.4
18									11.3	8.6	11.8	9.7
19									11.4	8.4	12.2	9.9
20									11.4	8.6	12.5	9.9
0.4									44.0		40.0	0.7
21									11.8	8.8	12.3	9.7
22									11.8	9.0	11.1	9.4
23									11.1	8.9	12.1	9.6
24									11.3	9.3	12.1	9.5
25									11.3	9.4	12.0	9.3
26									11.7	9.4	12.1	9.5
20 27									11.7	9.4	11.0	9.6
2 <i>1</i> 28									11.6	9.7	11.0	9.6
26 29									12.2	10.4	12.5	9.7
30									12.2	10.4	12.3	9.8
30 31									12.0	10.2	12.4	9.8
31											12.0	9.0
Month									12.8	8.0	12.9	8.6
	1	1	1		1							

Table 4. Diversion Ditch, Daily Data Calendar Year 2006 pH, Standard Units

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Janı	uary	Febr	uary	Ма	rch	Αp	oril	M	ay	Ju	ne
1					8.0	7.9	8.2	8.1	8.3	8.2		
2					8.0	8.0	8.2	8.2	8.3	8.2		
3					8.1	8.0	8.2	8.2	8.3	8.2		
4					8.1	8.0	8.3	8.2	8.3	8.2		
5					8.1	8.1	8.2	7.8	8.3	8.2		
6					8.1	8.0	8.0	7.9	8.3	8.2		
7					8.1	8.1	8.1	8.0	8.3	8.2		
8					8.1	8.1	8.2	8.1	8.3	8.2		
9					8.1	8.1	8.2	8.2	8.3	8.2		
10							8.2	8.2	8.3	8.2		
11							8.2	8.2	8.3	8.2		
12							8.2	8.2	8.4	8.2		
13					8.1	8.1	8.2	8.2	8.4	8.2		
14					8.2	8.1	8.2	8.2	8.4	8.2		
15					8.2	8.1	8.2	8.1	8.4	8.2		
16					8.2	8.1	8.2	8.1	8.4	8.2		
17					8.2	8.2	8.2	8.1	8.4	8.2		
18					8.2	8.2	8.2	8.2	8.3	8.2		
19					8.2	8.2	8.2	8.1	8.4	8.2		
20					8.2	8.2	8.2	8.1	8.4	8.2		
21					8.2	8.1	8.2	8.1	8.3	8.2		
22					8.1	8.0	8.2	8.1	8.3	8.2		
23					8.1	8.1	8.2	8.1	8.3	8.2		
24					8.2	8.1	8.2	8.1	8.3	8.2		
25					8.2	8.2	8.2	8.1	8.4	8.2		
26					8.2	8.2	8.3	8.1	8.3	8.2		
27					8.3	8.2	8.2	8.1	8.4	8.2		
28					8.3	8.2	8.3	8.1	8.4	8.2		
29					8.2	7.8	8.3	8.1	8.5	8.2		
30					8.1	7.9	8.3	8.2	8.5	8.2		
31					8.1	8.1			8.3	8.2		
Month					8.3	7.8	8.3	7.8	8.5	8.2		

Table 4. Diversion Ditch, Daily Data (continued) Calendar Year 2006 pH, Standard Units

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1			8.4	8.0	8.5	7.9					8.3	8.0
2			8.5	7.9	8.4	7.9			8.3	8.0	8.3	8.0
3			8.3	7.9	8.4	7.9			8.3	8.0	8.3	8.1
4			8.5	8.0	8.4	7.9			8.4	7.9	8.3	8.1
5			8.4	8.0	8.3	7.9			8.3	8.0	8.1	8.1
6			8.4	8.0					8.3	8.0		
7			8.4	8.0					8.2	8.0		
8			8.4	8.0					8.3	8.0		
9			8.4	8.0					8.3	8.0	8.2	8.0
10			8.4	7.9					8.3	8.0	8.2	7.8
11			8.4	7.9					8.3	8.0	8.1	7.8
12			8.4	7.9					8.3	8.0	8.2	7.9
13			8.4	7.9					8.3	8.0	8.1	7.9
14			8.5	7.9					8.2	8.0	8.1	7.9
15			8.5	8.0					8.3	8.0	8.1	7.9
16			8.5	8.0					8.3	8.0	8.1	7.9
17			8.5	8.0					8.3	8.0	8.2	7.9
18			8.5	8.0					8.3	8.0	8.2	8.0
19			8.5	8.0					8.3	8.0	8.2	8.0
20			8.5	7.9					8.3	8.0	8.2	8.0
21			8.5	7.9					8.3	8.0	8.2	8.0
22			8.4	7.9					8.3	8.0	8.2	8.0
23			8.4	7.9					8.3	8.0	8.2	8.0
24			8.4	7.9					8.3	8.0	8.2	8.0
25			8.4	7.9					8.3	8.0	8.2	8.0
26			8.4	7.9					8.3	8.0	8.2	8.0
27			8.4	8.0					8.2	8.0	8.2	8.0
28			8.4	8.0					8.4	8.0	8.2	8.0
29			8.5	7.9					8.3	8.0	8.2	8.0
30			8.4	7.9					8.3	8.1	8.2	8.0
31			8.4	7.9							8.2	8.0
Month			8.5	7.9	8.5	7.9			8.4	7.9	8.3	7.8

Table 5. Diversion Ditch, Daily Data Calendar Year 2006 Turbidity, Nephelometric Turbidity Units (NTU)

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Janı	uary	Febr	uary	Ма	rch	Ap	ril	Ma	ay	Ju	ne
1					63	31	13	9	19	4		
2					30	13	18	7	22	3		
3					24	10	9	6	50	7		
4					22	8	44	6	17	4		
5					11	6	>900	10	11	4		
6					8	6	>900	57	24	3		
7					37	6	54	22	33	3		
8					7	5	21	14	14	5		
9					7	6	18	11	37	7		
10							>900	10	16	2		
11							>900	9	11	2		
12							15	10	8	2		
13					18	13	30	8	10	2		
14					13	8	34	9	18	3		
15					9	7	>900	11	217	4		
16					9	6	>900	12	19	2		
17					11	7	26	8	83	2		
18					11	6	16	7	8	3		
19					8	5	14	9	9	2		
20					7	5	22	10	20	2		
21					185	6	56	9	7	2		
22					86	18	35	10	20	5		
23					26	8	39	12	11	4		
24					11	8	39	11	14	1		
25					13	7	37	9	7	1		
26					10	6	15	7	6	2		
27					9	5	14	8	15	1		
28					20	5	11	5	8	1		
29					584	8	35	5	14	3		
30					179	23	55	5	9	0.5		
31					22	12			5	3		
Month					584	5	>900	5	217	0.5		

Table 5. Diversion Ditch, Daily Data (continued) Calendar Year 2006 Turbidity, NTU

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1			9	2	7	2					1	1
2			7	1	16	3			1	1	2	1
3			13	3	8	3			1	1	2	1
4			7	2	9	3			1	1	3	1
5			8	2	9	3			1	1	1	1
6			6	2					1	1		
7			6	2					1	1		
8			35	1					1	1		
9			8	2					1	1	5	1
10			10	2					1	1	9	1
11			10	2					1	1	8	2
12			8	2					1	1	7	1
13			14	2					1	1	1	1
14			12	2					1	1	1	1
15			8	1					1	1	1	1
16			8	2					1	1	1	1
17			6	2					1	1	2	1
18			10	2					15	1	1	1
19			7	2					11	0	1	1
20			5	1					1	1	1	1
21			6	2					1	1	1	1
22			7	2					1	1	3	1
23			14	2					1	1	4	1
24			7	2					1	1	1	1
25			6	2					1	1	1	1
26			8	2					1	1	1	1
27			9	2					20	1	4	1
28			6	2					2	1	1	1
29			6	2					2	1	2	1
30			6	2					2	1	1	1
31			6	3							1	1
Month			35	1	16	2			20	0.4	9	1

Table 6. Diversion Ditch, Daily Data Calendar Year 2006 Specific Conductance, Microsiemens per Centimeter (μS/cm) at 25 °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Janu	ıary	Febr	uary	Ма	rch	Ap	ril	M	ay	Ju	ne
1					945	779	1,090	1,025	1,225	1,154		
2					1,097	951	1,153	1,061	1,231	1,166		
3					1,152	1,072	1,143	1,090	1,223	1,185		
4					1,182	1,110	1,146	851	1,241	1,180		
5					1,163	1,113	999	277	1,259	1,202		
6					1,184	1,130	827	515	1,258	1,211		
7					1,182	1,124	988	829	1,274	1,219		
8					1,174	1,140	1,082	979	1,257	1,224		
9					1,161	1,120	1,131	1,075	1,284	1,235		
10							1,165	1,125	1,278	1,217		
11							1,198	1,134	1,300	1,243		
12							1,178	1,118	1,301	1,237		
13					1,059	988	1,182	1,108	1,298	1,245		
14					1,110	1,051	1,153	1,082	1,308	1,243		
15					1,159	1,088	1,151	574	1,294	1,235		
16					1,192	1,131	1,013	814	1,315	1,221		
17					1,169	1,140	1,099	989	1,310	1,238		
18					1,162	1,125	1,155	1,069	1,271	1,242		
19					1,148	1,124	1,241	1,123	1,303	1,241		
20					1,154	1,108	1,188	1,135	1,314	1,236		
21					1,130	926	1,201	1,139	1,277	1,246		
22					926	790	1,181	1,124	1,296	1,053		
23					1,064	934	1,185	1,117	1,315	1,243		
24					1,125	1,062	1,184	1,125	1,320	1,251		
25					1,165	1,084	1,177	1,123	1,302	1,246		
26					1,147	1,100	1,201	1,119	1,286	1,256		
27					1,145	1,103	1,181	1,127	1,298	1,209		
28					1,129	930	1,185	1,132	1,307	1,259		
29					1,071	388	1,184	1,138	1,314	1,257		
30					883	469	1,177	1,146	1,305	1,243		
31					1,033	907			1,285	1,212		
Month					1,192	388	1,241	277	1,320	1,053		

Table 6. Diversion Ditch, Daily Data (continued) Calendar Year 2006 Specific Conductance, (μS/cm) at 25 °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1			1,294	1,281	1,101	685					1,343	1,290
2			1,301	1,269	1,017	689			1,361	1,321	1,347	1,309
3			1,293	1,267	755	687			1,358	1,310	1,346	1,308
4			1,309	1,281	727	676			1,358	1,314	1,348	1,281
5			1,312	1,272	703	576			1,353	1,303	1,341	1,303
6			1,294	1,286					1,345	1,296		
7			1,301	1,287					1,357	1,306		
8			1,293	1,283					1,342	1,308		
9			1,309	1,276					1,339	1,302	1,294	1,230
10			1,312	1,275					1,336	1,299	1,298	1,017
11			1,300	837					1,346	1,297	1,339	1,226
12			1,303	716					1,327	1,300	1,291	1,238
13			1,297	1,225					1,343	1,312	1,287	1,248
14			1,296	1,283					1,337	1,285	1,296	1,261
15			1,299	1,236					1,341	1,313	1,309	1,265
40			4 200	4 054					4 0 4 0	4 202	4 204	4 200
16			1,299	1,254					1,343	1,293	1,294	1,200
17			1,298	1,275					1,338	1,292	1,299	1,225
18 19			1,299 1,299	1,279 1,214					1,346 1,337	1,269 1,316	1,313 1,318	1,270 1,289
20			1,304	1,214					1,337	1,309	1,316	1,209
20			1,304	1,211					1,337	1,309	1,321	1,270
21			1,299	1,280					1,334	1,302	1,332	1,278
22			1,302	1,055					1,343	1,285	1,327	1,177
23			1,293	695					1,338	1,293	1,336	1,283
24			1,300	700					1,337	1,299	1,326	1,284
25			1,289	670					1,339	1,306	1,323	1,282
26			1,298	691					1,335	1,306	1,330	1,278
27			1,299	684					1,337	1,278	1,303	1,131
28			1,295	690					1,335	1,291	1,320	1,270
29			1,294	690					1,337	1,304	1,321	1,293
30			1,290	689					1,344	1,311	1,314	1,272
31			1,281	686							1,314	1,201
M 41			4 040	070	4 404	F70			4 004	4 000	4 0 4 0	4.047
Month			1,312	670	1,101	576			1,361	1,269	1,348	1,017

Table 7. Diversion Ditch, Daily Data Calendar Year 2006 Chlorophyll, Total (A+B), micrograms per liter (µg/L)

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju		Aug			mber		ober		mber	Dece	L
1			2.4	1.7	3.1	1.4					2.5	1.1
2			3.2	1.6	3.2	1.5			2.9	0.4	2.5	0.4
3			5.3	1.9	3.3	1.5			4.2	0.4	3.6	0.2
4			3.2	1.6	3.4	1.9			3.4	0.8	2.7	1.3
5			2.8	1.7	2.6	1.6			4.2	0.8	3.2	0.2
6			2.8	1.2					3.8	0.8		
7			2.7	1.6					3.6	0.4		
8			2.8	1.1					3.8	0.4		
9			2.7	1.3					3.2	0.4	7.6	1.9
10			2.7	1.2					3.4	0.2	9.2	2.5
									0	0.2	0.2	2.0
11			2.5	1.5					3.4	0.6	9.2	4.4
12			3.1	1.1					3.2	1.1	6.1	4.0
13			2.8	1.2					4.0	0.4	9.2	3.4
14			2.9	1.5					3.2	0.6	5.5	2.5
15			3.1	1.1					3.6	0.8	4.8	2.7
16			2.5	1.2					3.4	0.6	5.5	2.3
17			2.6	1.2					2.9	0.6	5.0	2.9
18			2.6	1.2					2.9	0.8	5.0	2.9
19			2.8	1.2					2.7	0.6	5.5	2.1
20			2.7	1.3					3.8	8.0	4.2	2.1
21			3.2	1.2					3.6	0.8	4.6	1.9
22			2.7	1.2					4.2	0.6	5.0	2.3
23			2.8	1.1					4.2	0.8	4.2	2.5
24			3.1	1.2					3.4	0.8	4.4	1.9
25			3.3	1.3					3.4	1.3	4.6	1.9
26			3.5	1.5					3.2	0.6	4.2	2.3
27			3.3	1.3					7.6	0.8	5.3	2.1
28			3.3	1.5					3.8	1.3	4.4	2.5
29			3.0	1.0					3.8	1.5	4.6	2.3
30			3.5	1.3					2.9	0.6	4.4	2.1
31			3.4	1.6							4.0	1.7
Month			5.3	1.0	3.4	1.4			7.6	0.2	9.2	0.2

Table 8. Diversion Ditch, Daily Data Calendar Year 2006 Total Dissolved Solids, mg/L

-	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Janı			uary		rch	Ap		M		Ju	L
1					601	496	693	652	779	734		
2					698	605	734	675	783	742		
3					733	682	727	693	778	754		
4					752	706	729	541	789	751		
5					740	708	636	176	801	765		
6					753	719	526	328	800	770		
7					752	715	629	527	811	776		
8					747	725	688	623	800	779		
9					739	713	720	684	817	786		
10							741	716	813	774		
11							762	721	827	791		
12							749	711	828	787		
13					674	629	752	705	826	792		
14					706	669	734	688	832	791		
15					737	692	732	365	823	786		
16					758	720	644	518	837	777		
17					744	725	699	629	833	788		
18					739	716	735	680	809	790		
19					730	715	790	714	829	790		
20					734	705	755	722	836	786		
21					719	589	764	725	813	793		
22					589	503	751	715	824	670		
23					677	594	754	711	837	791		
24					716	676	753	716	840	796		
25					741	690	749	714	829	792		
26					720	700	751	710	010	700		
					730	700	754 754	712	818	799		
27					728	702	754	717	826	769		
28					718	592	760 777	720	832	801		
29 30					681	247	777 791	724	836	800 701		
30 31					562 657	298 577	781	729	830	791 771		
31					657	577			818	771		
Month					758	247	790	176	840	670		
	•	•	•			•	•		•			

Table 8. Diversion Ditch, Daily Data (continued) Calendar Year 2006 Total Dissolved Solids, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just		mber		ober	Nove	mber	Dece	mber
1			823	815	700	436					854	821
2			828	807	647	438			866	840	857	833
3			823	806	480	437			864	833	856	832
4			833	815	463	430			864	836	858	815
5			835	809	447	366			861	829	853	829
6			837	818					856	825		
7			833	819					863	831		
8			836	816					854	832		
9			837	812					852	828	823	783
10			831	811					850	826	826	647
11			827	533					856	825	852	780
12			829	456					844	827	821	788
13			825	779					854	835	819	794
14			825	816					851	818	825	802
15			826	786					853	835	833	805
16			826	798					854	823	823	763
17			826	811					851	822	826	779
18			826	814					856	807	835	808
19			826	772					851	837	838	820
20			830	809					851	833	844	813
21			826	814					849	828	847	813
22			828	671					854	818	844	749
23			823	442					851	823	850	816
24			827	445					851	826	844	817
25			820	426					852	831	842	816
26			826	440					849	831	846	813
27			826	435					851	813	829	720
28			824	439					849	821	840	808
29			823	439					851	830	840	823
30			821	438					855	834	836	809
31			815	436							836	764
Month			837	426	700	366			866	807	858	647

Table 9. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006 Temperature, °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1							24.3	23.0				
2							24.5	22.8				
3							24.4	22.7				
4							24.2	22.3				
5												
6												
7												
8												
9												
10												
11												
12												
13					26.9	25.8						
14					26.0	25.2						
15					25.6	24.7						
16					25.4	24.2						
17					25.7	23.6						
18					24.9	23.3						
19					24.7	23.1						
20					24.9	23.3						
21					24.6	23.1						
22					23.7	22.8						
23					24.1	22.3						
24					24.1	22.2						
25					24.6	22.7						
26					24.3	22.9						
27					24.8	23.0						
28					25.5	23.1						
29					25.0	22.9						
30					24.6	23.0						
31												
Month					26.9	22.2	24.5	22.3				

Table 10. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006 Dissolved Oxygen, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1							10.5	7.2				
2							10.0	7.1				
3							10.0	7.1				
4							9.8	7.1				
5												
6												
7												
8												
9												
10												
11												
12												
13					9.3	7.5						
14					8.6	5.7						
15					9.1	6.2						
40					0.0	0.4						
16					9.3	6.1						
17					9.6	6.4						
18					9.0	6.8						
19 20					8.8 8.8	6.8 6.6						
20					0.0	0.0						
21					8.6	6.3						
22					7.5	5.9						
23					8.4	5.9						
24					8.8	6.2						
25					9.1	6.4						
					0	0						
26					9.4	6.5						
27					9.7	6.6						
28					9.7	7.0						
29					10.2	7.6						
30					10.4	7.1						
31												
Month					10.4	5.7	10.5	7.1				

Table 11. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006 pH, Standard Units

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ber	Nove	mber	Dece	mber
1							8.6	8.4				
2							8.6	8.5				
3							8.6	8.5				
4							8.6	8.5				
5												
6												
7												
8												
9												
10												
11												
12												
13					8.4	8.4						
14					8.4	8.3						
15					8.5	8.3						
16					8.5	8.3						
17					8.5	8.4						
18					8.5	8.4						
19					8.5	8.4						
20					8.5	8.4						
21					8.5	8.4						
22					8.4	8.4						
23					8.5	8.4						
24					8.5	8.4						
25					8.5	8.4						
26					8.5	8.4						
27					8.5	8.4						
28					8.5	8.4						
29					8.6	8.4						
30					8.6	8.4						
31												
Month					8.6	8.3	8.6	8.4				

Table 12. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006 Turbidity, NTU

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1							19	12				
2							23	14				
3							31	14				
4							25	13				
5												
6												
7												
8												
9												
10												
11												
12												
13					13	10						
14					16	10						
15					13	10						
16					24	11						
17					23	9						
18					14	9						
19					15	10						
20					15	10						
21					54	8						
22					16	9						
23					16	8						
24					22	8						
25					22	9						
26					42	9						
27					28	12						
28					32	11						
29					18	11						
30					21	10						
31												
Month					54	8	31	12				

Table 13. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006
Specific Conductance, (μS/cm) at 25 °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1							1,568	1,522				
2							1,579	1,529				
3							1,585	1,530				
4							1,578	1,526				
5												
6												
7												
8												
9												
10												
11												
12												
13					1,530	1,501						
14					1,542	1,474						
15					1,524	1,472						
16					1,531	1,483						
17					1,529	1,490						
18					1,534	1,487						
19					1,528	1,486						
20					1,535	1,487						
•					. = 0.4							
21					1,561	1,491						
22					1,554	1,500						
23					1,554	1,496						
24					1,571	1,502						
25					1,573	1,505						
200					4 577	4 500						
26 27					1,577	1,509						
27					1,579	1,512						
28					1,585	1,512						
29 30					1,556	1,520						
30 31					1,581	1,515						
31												
Month					1,585	1,472	1,585	1,522				

Table 14. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006 Chlorophyll, Total (A+B), µg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1							50.9	17.7				
2							27.5	14.7				
3							49.1	14.9				
4							24.2	13.6				
5												
6												
7												
8												
9												
10												
11												
12												
13					23.1	17.4						
14					28.0	21.5						
15					23.8	19.5						
16					66.3	20.2						
17					25.2	13.8						
18					22.3	12.6						
19					33.4	13.4						
20					25.7	10.8						
21					21.1	9.0						
22					37.7	12.5						
23					27.4	11.3						
24					21.5	10.3						
25					26.5	10.2						
26					33.1	10.7						
27					34.6	12.3						
28					30.3	11.0						
29					19.2	13.1						
30					28.8	14.6						
31												
Month					66.3	9.0	50.9	13.6				

Table 15. Lake O'Neill, Boat Rental Dock, Daily Data Calendar Year 2006
Total Dissolved Solids, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ber	Nove	mber	Dece	mber
1							1,016	986				
2							1,023	991				
3							1,027	992				
4							1,023	989				
5												
6												
7												
8												
9												
10												
11												
12												
13					992	973						
14					999	955						
15					988	954						
16					992	961						
17					991	966						
18					994	964						
19					990	963						
20					995	964						
•												
21					1,012	966						
22					1,007	972						
23					1,007	970						
24					1,018	973						
25					1,019	975						
26					1 000	070						
26 27					1,022	978						
					1,023	980						
28 29					1,027 1,008	980 985						
29 30												
30 31					1,025	982						
31												
Month					1,027	954	1,027	986				

Table 16. Lake O'Neill, Outlet, Daily Data Calendar Year 2006
Temperature, °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	ust	Septe	mber	Octo	ber	Nove	mber	Dece	mber
1									17.7	16.7		
2												
3												
4												
5							23.0	22.0				
6							22.3	20.9				
7							22.2	20.5				
8							21.5	20.4				
9							21.4	20.9				
10							22.2	20.7				
11							22.6	20.2				
12							21.8	20.2				
13							21.2	19.9				
14							21.8	19.7				
15							20.3	19.5				
16							19.6	19.2				
17							20.0	18.8				
18							21.9	17.9				
19							21.5	17.7				
20							19.1	17.4				
21							19.7	17.2				
22							20.8	18.2				
23							20.8	17.9				
24							21.0	18.3				
25							20.9	18.6				
26							19.7	18.1				
27							19.8	16.4				
28							17.7	15.7				
29							18.0	15.1				
30							19.0	16.1				
31							19.0	16.9				
Month							23.0	15.1	17.7	16.7		

Table 17. Lake O'Neil, Outlet, Daily Data Calendar Year 2006
Dissolved Oxygen, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1									8.2	5.9		
2												
3												
4												
5							9.5	7.3				
6							8.9	6.4				
7							8.8	6.5				
8							8.8	6.3				
9							8.1	5.8				
10							8.8	6.2				
11							10.3	6.8				
12							10.1	7.3				
13							9.8	7.4				
14							9.9	7.0				
15							7.9	6.2				
16							7.1	5.5				
17							7.4	5.4				
18							9.1	6.3				
19							8.9	5.8				
20							8.0	5.8				
21							9.6	7.3				
22							9.6	7.2				
23							12.3	6.5				
24							13.4	7.7				
25							11.8	6.9				
26							11.3	6.7				
27							10.2	6.4				
28							8.9	6.3				
29							10.2	7.1				
30							9.9	7.1				
31							9.5	6.3				
Month							13.4	5.4	8.2	5.9		

Table 18. Lake O'Neil, Outlet, Daily Data Calendar Year 2006 pH, Standard Units

pri, ota	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju		Aug			ember	Octo		Nove		Dece	
1									8.5	8.4		
2												
3												
4												
5							8.6	8.5				
6							8.6	8.5				
7							8.6	8.5				
8							8.6	8.5				
9							8.5	8.4				
10							8.6	8.5				
11							8.6	8.5				
12							8.6	8.5				
13							8.6	8.5				
14							8.6	8.5				
15							8.6	8.5				
16							8.5	8.5				
17							8.5	8.5				
18							8.6	8.5				
19							8.6	8.4				
20							8.5	8.4				
21							8.6	8.5				
22							8.6	8.5				
23							8.7	8.4				
24							8.8	8.5				
25							8.7	8.5				
26							8.6	8.4				
27							8.6	8.4				
28							8.5	8.4				
29							8.6	8.5				
30							8.6	8.5				
31							8.5	8.4				
Month							8.8	8.4	8.5	8.4		

Table 19. Lake O'Neil, Outlet, Daily Data Calendar Year 2006 Turbidity, NTU

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ily	Aug	just	Septe	mber	Octo	ber	Nove	mber	Dece	mber
1									>900	61		
2												
3												
4												
5							24	17				
6							23	18				
7							29	18				
8							38	19				
9							33	19				
10							37	16				
11							49	19				
12							31	22				
13							36	26				
14							39	26				
15							38	25				
16							43	25				
17							48	29				
18							141	33				
19							64	34				
20							74	34				
21							60	32				
22							>900	46				
23							>900	115				
24							>900	34				
25							>900	31				
26							97	25				
27							65	27				
28							53	26				
29							702	28				
30							>900	51				
31							>900	39				
Month							>900	16	>900	61		

Table 20. Lake O'Neil, Outlet, Daily Data Calendar Year 2006 Specific Conductance, (μS/cm) at 25 °C

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1									1,066	1,025		
2												
3												
4												
5							1,577	1,551				
6							1,590	1,547				
7							1,595	1,547				
8							1,598	1,545				
9							1,599	1,548				
10							1,602	1,548				
11							1,600	1,551				
12							1,606	1,562				
13							1,619	1,560				
14							1,602	1,537				
15							1,616	1,553				
16							1,615	1,550				
17							1,615	1,568				
18							1,616	1,582				
19							1,619	1,586				
20							1,615	1,584				
21							1,615	1,581				
22							1,624	1,588				
23							1,625	1,580				
24							1,631	1,588				
25							1,632	1,533				
26							1,583	702				
27							710	684				
28							771	695				
29							864	778				
30							945	867				
31							1,017	947				
Month							1,632	684	1,066	1,025		

Table 21. Lake O'Neil, Outlet, Daily Data Calendar Year 2006 Chlorophyll, Total (A+B),µg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ıly	Aug			mber	Octo	ber	Nove	mber	Dece	mber
1									357.0	59.2		
2												
3												
4												
5							28.3	16.5				
6							42.7	15.5				
7							42.1	17.2				
8							35.8	16.7				
9							29.2	17.1				
10							38.2	16.6				
11							28.0	15.4				
12							28.6	14.3				
13							34.1	20.7				
14							30.2	15.0				
15							31.2	20.9				
16							28.6	21.5				
17							28.3	18.9				
18							30.4	19.2				
19							33.1	21.8				
20							31.5	23.6				
21							53.5	29.6				
22							>500	34.3				
23							>500	43.5				
24							>500	55.8				
25							>500	38.5				
26							>500	38.7				
27							>500	36.4				
28							>500	40.8				
29							>500	40.1				
30							>500	42.8				
31							367.5	55.0				
Month							>500	14.3	357.0	59.2		

Table 22. Lake O'Neil, Outlet, Daily Data Calendar Year 2006 Total Dissolved Solids, mg/L

	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Day	Ju	ly	Aug	just	Septe	mber	Octo	ober	Nove	mber	Dece	mber
1									691	664		
2												
3												
4												
5							1,022	1,005				
6							1,030	1,003				
7							1,034	1,003				
8							1,036	1,001				
9							1,036	1,003				
10							1,038	1,003				
11							1,037	1,005				
12							1,041	1,012				
13							1,049	1,011				
14							1,038	996				
15							1,047	1,007				
16							1,047	1,005				
17							1,047	1,016				
18							1,047	1,025				
19							1,049	1,028				
20							1,047	1,027				
21							1,047	1,025				
22							1,053	1,029				
23							1,053	1,024				
24							1,057	1,029				
25							1,058	994				
26							1,026	455				
27							460	443				
28							500	450				
29							560	504				
30							612	562				
31							659	614				
Month							1,058	443	691	664		

Laboratory Analyses

Table 23. Laboratory Results for Surface Water Grab Samples Collected at the Diversion Ditch

Date and Time of Sample	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (pH units)	Total Dissolved Solids (mg/L)	Turbidity (NTU)	Chlorophyll (A+B) (μg/L)
3/22/06 15:25	893	7.1	7.7	564	29.6	
4/19/06 14:00	1,190	10.4	7.95	783	9.45	
5/31/06 13:00	1,250	6.65	8.14	809	3.07	
8/1/06 15:15	1,200	5.55	8.17	785	1.74	2.2
11/16/06 14:30	1,320	7.82	7.95	748	0.53	2.3
12/05/06 9:30	1,300	7.10	7.63	868	0.73	
1/04/07 10:00	1,330	6.72	7.73	844	1.06	

Table 24. Laboratory Results for Surface Water Grab Samples Collected at the Lake O'Neill, Boat Rental Dock

Date and Time of Sample	Specific Conductance (μS/cm)	Dissolved Oxygen (mg/L)	pH (pH units)	Total Dissolved Solids mg/L	Turbidity (NTU)	Chlorophyll (A+B) µg/L)
9/13/06 15:00	1,510	8.52	8.19	924	12.2	18.67

Table 25. Laboratory Results for Surface Water Grab Samples Collected at the Lake O'Neill, Outlet

Date and Time of Sample	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	pH (pH units)	Total Dissolved Solids mg/L	Turbidit y (NTU)	Chlorophyll (A+B) µg/L)
11/01/06 15:00	1,570	11.7	8.07	1,070	67.3	80.0

References

YSI Incorporated. 2006. YSI Environmental Operations Manual. YSI 6-Series Manual Supplement. Configuration and Deployment Instructions for YSI Model 6600EDS Sondes.

YSI Incorporated. How to Take Chlorophyll Measurements. http://www.ysi.com/extranet/EPGKL.nsf/9f95184cfc7511b485256b58006a905b/eb6dc2dcff822712852569e7005bfe1d!OpenDocument.

Attachment A. Extended Deployment System

Frequent data collection over a long period of time requires an instrument that is capable of working unattended and with minimal maintenance. The instrument used for this study is the EDS Extended Deployment System (EDS) 6600 from YSI Environmental. The EDS 6600 has an internal memory for unattended logging and hosts up to five probes for measurements of dissolved oxygen, turbidity, pH, conductivity, and chlorophyll. The conductivity probe also measures temperature so that a total of six different parameters are logged. Figure A-1 shows the five probes mounted on the EDS 6600 and the Clean Sweep® mechanism that keeps the sensors free of fouling.



Figure A-1. EDS 6600 from YSI Environmental.

Profile of the 6600EDS depicting probes for (clockwise from bottom) temperature/conductivity, turbidity, Rapid PulseTM dissolved oxygen, chlorophyll and pH—all of which (except conductivity) are kept free of fouling by the Clean Sweep® universal wiper. Picture taken from YSI data sheet.

Principles of Operation

The following paragraphs are based on the *YSI Environmental Operations Manual*, and have been condensed to give a brief introduction.

YSI 6560 Conductivity/Temperature Probe

The conductivity probe utilizes a cell with four pure nickel electrodes for measuring solution conductance. Two of the electrodes are current driven, and two are used to measure the voltage drop. The measured conductance value in milli-Siemens (millimhos) is converted with the known cell-constant of approximately 5.0 per centimeter (/cm) into a conductivity value in milli-Siemens per cm (mS/cm). Because of the temperature dependency of solution conductance the temperature is measured along with the conductance. This allows the conductivity data to be reported in temperature compensation form.

To measure temperature, the probe utilizes a thermistor of sintered metallic oxide that changes predictably in resistance with temperature variation. The algorithm for conversion of resistance to temperature is built into the sonde software.

YSI 6561 pH Probe

The EDS 6600 employs a field-replaceable pH electrode for the determination of hydrogen ion concentration. The probe is a combination electrode consisting of a proton selective glass reservoir filled with buffer at approximately pH 7 and a silver/silver chloride (Ag/AgCl) reference electrode that utilizes electrolyte that is gelled. A silver wire, coated with AgCl, is immersed in the buffer reservoir. Protons (H+ ions) on both sides of the glass (media and buffer reservoir) selectively interact with the glass, setting up a potential gradient across the glass membrane. Since the hydrogen ion concentration in the internal buffer solution is invariant, this potential difference, determined relative to the Ag/AgCl reference electrode, is proportional to the pH of the media. The EDS 6600 compensates the linear temperature dependency of the measured potential difference according to the Nernst equation.

YSI 6562 Dissolved Oxygen Probe

The dissolved oxygen (DO) probe YSI 6562 utilizes a Clarke-type sensor for its Rapid Pulse System. Clark cell sensors measure DO indirectly through an electrochemical reaction. The tip of the sensor contains a positive electrode (cathode) and a negative electrode (anode) connected electrically by a saturated electrolyte solution, all covered by a permeable Teflon membrane. Oxygen molecules dissolved in the water pass through the membrane and are chemically reduced within the sensor, generating an electrical current that is proportional to the oxygen concentration in the water. The current is converted to a DO concentration which is logged by the EDS 6600. The principle change from the standard Clark sensors to the Rapid Pulse System, employed by the YSI 6562 probe, is that a pulsed voltage is used rather than a continuous polarization which drops the necessity of stirring the evaluated medium.

YSI 6136 Turbidity Probe

The YSI 6136 turbidity probe measures the content of suspended solids (cloudiness) in water by shining a light beam into the sample solution and then measuring the light that is scattered off the particles which are present. For turbidity systems capable of field deployment, the usual light source is a light emitting diode (LED) which produces radiation in the near infrared region of the spectrum. The detector is usually a photodiode of high sensitivity. The International Standards Organization (ISO) recommends the use of a light source with a wavelength between 830 and 890 nanometers (nm) and an angle of 90 degrees between the emitted and detected radiation (ISO 7027). The YSI 6163 turbidity probe conforms to the above ISO recommendations. The output of the turbidity sensor is processed via the sonde software to provide readings in nephelometric turbidity units (NTUs).

YSI 6025 Chlorophyll Probe

The YSI 6025 probe induces chlorophyll to fluoresce by shining a beam of light of the proper wavelength into the sample, and then measuring the higher wavelength light which is emitted as a result of the fluorescence process. To quantify the fluorescence, the system detector is screened by an optical filter that restricts the detected light. The filter prevents the exciting light from being detected when it is backscattered off of particles in the water.

Attachment B. Laboratory Reports

- March 24, 2006 Enviromatrix Analytical Report for Samples Collected on 3/22/06
- May 2, 2006 Enviromatrix Analytical Report for Samples Collected on 4/19/06
- June 12, 2006 Enviromatrix Analytical Report for Samples Collected on 5/31/06
- August 14, 2006 Enviromatrix Analytical Report for Samples Collected on 8/1/06
- October 9, 2006 EcoAnalyst Report for Samples Collected on 8/1/06
- September 25, 2006 Enviromatrix Analytical Report for Samples Collected on 9/13/06
- October 9, 2006 EcoAnalyst Report for Samples Collected on 9/13/06
- November 13, 2006 Enviromatrix Analytical Report for Samples Collected on 11/1/06
- October 20, 2006 EcoAnalyst Report for Samples Collected on 11/1/06
- November 30, 2006 Enviromatrix Analytical Report for Samples Collected on 11/16/06
- December 1, 2006 EcoAnalyst Report for Samples Collected on 11/16/06
- December 15, 2006 Enviromatrix Analytical Report for Samples Collected on 12/5/06
- January 15, 2007 Enviromatrix Analytical Report for Samples Collected on 1/4/07

24 March 2006

Stetson Engineers

EMA Log #: 0603369

Attn: Jean Moran

2171 East Fransisco Suite K

San Rafeal, CA 94901

Project Name: 2148-002

Enclosed are the results of analyses for samples received by the laboratory on 03/22/06 17:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

For Dan Verdon

aboratory Director

CA ELAP Certification #: 2564

Client Name: Stetson Engineers

oject Name: 2148-002

EMA Log #: 0603369

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
YS1-3-22-06	0603369-01	Water	03/22/06 15:25	03/22/06 17:00

The results in this report apply to the samples analyzed in accordance with the chain of c dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
YS1-3-22-06 (0603369-01) Water	Sampled: 03/22/0	6 15:25 Rec	eived: 03/22/	06 17:00					
Specific Conductance (EC)	893	1	umhos/cm	1	6032321	03/23/06	03/23/06	SM2510 B	
Dissolved Oxygen	7.10	0.10	mg/l	**	6032406	03/22/06	03/22/06	SM4500 O G	
pH	7.70	0.10	pH Units	**	6032318	03/22/06	03/22/06	EPA 150.1	
Total Dissolved Solids	564	20	mg/l	**	6032222	03/22/06	03/23/06	SM2540 C	
Turbidity	29.6	0.05	NTU	"	6032226	03/23/06	03/23/06	SM2130 B	

The results in this report apply to the samples analyzed in accordance with the chain of dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6032222										
Duplicate (6032222-DUP1)		Source: 0603	256-05	Prepared:	03/22/06	Analyze	d: 03/23/06	<u> </u>		
Total Dissolved Solids	1660	20	mg/l		1650			0.6	20	
Reference (6032222-SRM1)				Prepared:	03/22/06	Analyze	d: 03/23/06	5		
Total Dissolved Solids	228	20	mg/l	240		95	86.2-114			
Batch 6032226										
Duplicate (6032226-DUP1)		Source: 0603	359-04	Prepared of	& Analyze	ed: 03/22/	′06			•
Turbidity	0.37	0.05	NTU		0.36			3	20	
Reference (6032226-SRM1)				Prepared a	& Analyze	ed: 03/22/	'06			
Turbidity	5.78	0.05	NTU	5.41		107	87.6-109.8	3		
Batch 6032318										
Duplicate (6032318-DUP1)		Source: 0603	353-03	Prepared 6	& Analyze	ed: 03/22/	'06			
pH	9.99	0.10	pH Units		9.98			0.1	20	
erence (6032318-SRM1)				Prepared 6	& Analyze	ed: 03/22/	'06			
рН	8.83	0.10	pH Units	9.10		97	97-103			
Batch 6032321										
Duplicate (6032321-DUP1)		Source: 0603	260-02	Prepared 6	& Analyze	ed: 03/23/	06			
Specific Conductance (EC)	ND	1	umhos/cm		ND				20	

The results in this report apply to the samples analyzed in accordance with the chain of dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6032321										
Reference (6032321-SRM1)				Prepared	& Analyze	ed: 03/23/0)6			
Specific Conductance (EC)	376	1	umhos/cm	374		101	95-105			
Batch 6032406										
Duplicate (6032406-DUP1)		Source: 0603	369-01	Prepared	& Analyze	ed: 03/22/0)6			
Dissolved Oxygen	6.90	0.10	mg/l	-	7.10			3	20	

The results in this report apply to the samples analyzed in accordance with the chain of dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of ϵ dy document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD



7763

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EMA ID#	Client Sample ID	Sample Date	Sample Time	Sample Matrix		tainer(s) Type*	418.1 (TRPH)	Oil & Grease	TPH (8015B)	TPH-Extended 8015B	602 / 8021	601 / 8021	1808 / 809	608 / 8082	624 / 8260	625/8270	TTLC Metals	STLC Metals	TCLP (RCRA)	ان ای	pH (EC	9	73	74 90	2			
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	ner Types: B=Brass Tube; V=VOA; G=Glass	: P=Plastic;	O=Other (li	ist)	_				QUI					<u> 1 1212</u>		DAT	E/1	'IM	<u>E</u>			0 4	REC	CEIV	ā /			<u> </u>
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*EMA	reserves the right to return samples that do not	match our w	aste profile.	Wh	ite - E	ipany:	<u>. 4 4</u>	Car	nary -	Acco	untin	g		Pink -	- Clie	nt (w	/Repo	ort)		L	ipany lenroc		ent (I	Reling	uish	Samr	oles)	<u> </u>

02 May 2006

Stetson Engineers

EMA Log #: 0604330

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafeal, CA 94901

Project Name: 2148-002

Enclosed are the results of analyses for samples received by the laboratory on 04/19/06 17:02. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

aboratory Director

CA ELAP Certification #: 2564

Client Name: Stetson Engineers

oject Name: 2148-002

EMA Log #: 0604330

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
YS1-4-19-06	0604330-01	Water	04/19/06 14:00	04/19/06 17:02
YS1-4-19-06-DO-Surf	0604330-02	Water	04/19/06 14:00	04/19/06 17:02

The results in this report apply to the samples analyzed in accordance with the chain of c γ dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reportir Limit	ng Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
YS1-4-19-06 (0604330-01) Water S	ampled: 04/19/0	6 14:00	Received: 04/19	0/06 17:02					
Specific Conductance (EC)	1190	1	umhos/cm	1	6042507	04/25/06	04/25/06	SM2510 B	······································
Dissolved Oxygen	10.4	0.10	mg/l	11	6042018	04/19/06	04/19/06	SM4500 O G	
pH	7.95	0.10	pH Units	"	6042007	04/19/06	04/19/06	EPA 150.1	
Total Dissolved Solids	783	20	mg/l	n	6050119	04/26/06	05/01/06	SM2540 C	
Turbidity	9.45	0.05	NTU	n	6042032	04/20/06	04/20/06	SM2130 B	
YS1-4-19-06-DO-Surf (0604330-02)	Water Sample	d: 04/19/(06 14:00 Receiv	ved: 04/19	/06 17:02				
Dissolved Oxygen	7.66	0.10	mg/l	1	6042018	04/19/06	04/19/06	SM4500 O G	

The results in this report apply to the samples analyzed in accordance with the chain of dy document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6042007										
Duplicate (6042007-DUP1)		Source: 0604	311-06	Prepared of	& Analyze	ed: 04/19	/06			
pH	6.89	0.10	pH Units		6.94			0.7	20	
Reference (6042007-SRM1)				Prepared 6	& Analyze	d: 04/19	/06			
pH	8.83	0.10	pH Units	9.10		97	97-103			
Batch 6042018										
Duplicate (6042018-DUP1)		Source: 0604	330-01	Prepared a	& Analyze	d: 04/19	06			
Dissolved Oxygen	11.0	0.10	mg/l		10.4			6	20	
Duplicate (6042018-DUP2)		Source: 0604	330-02	Prepared of	& Analyze	d: 04/19	06			
Dissolved Oxygen	9.18	0.10	mg/l		7.66			18	20	
Batch 6042032										
Duplicate (6042032-DUP1)		Source: 0604	330-01	Prepared &	& Analyze	d: 04/20/	'06			
Turbidity	9.50	0.05	NTU		9.45			0.5	20	
erence (6042032-SRM1)				Prepared &	& Analyze	d: 04/20/	06			
Turbidity	5.62	0.05	NTU	5.41	•	104	87.6-109.8	3		
Batch 6042507										
Duplicate (6042507-DUP1)		Source: 0604	364-02	Prepared &	& Analyze	d: 04/25/	'06			
Specific Conductance (EC)	697	1	umhos/cm		696			0.1	20	

The results in this report apply to the samples analyzed in accordance with the chain of curtody document. This analytical report must be reproduced in its entirety.



oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6042507										
Reference (6042507-SRM1)				Prepared .	& Analyze	ed: 04/25	/06			
Specific Conductance (EC)	449	1	umhos/cm	465		97	.484-104.	5		
Batch 6050119										
Duplicate (6050119-DUP1)		Source: 0604.	311-03	Prepared:	04/26/06	Analyze	d: 05/01/0	6		
Total Dissolved Solids	782	20	mg/l		846			8	20	
Duplicate (6050119-DUP2)		Source: 0604:	339-01	Prepared:	04/26/06	Analyze	d: 05/01/0	6		
Total Dissolved Solids	1560	20	mg/l		1560			0	20	
Reference (6050119-SRM1)				Prepared:	04/26/06	Analyze	d: 05/01/0	6		
Total Dissolved Solids	350	20	mg/l	345		101	.696-111.	3	TO THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED AS A DATE OF T	
Reference (6050119-SRM2)				Prepared:	04/26/06	Analyze	d: 05/01/0	6		
Total Dissolved Solids	354	20	mg/l	345		103	.696-111.	}		

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oject Name: 2148-002

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of c 'ady document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD



4340 Viewridge Ave., Ste. A • San Diego, CA 92123 • Phone (858) 560-7717 • Fax (858) 560-7763

EMA LOG #: 0604330					-5-)A]							one ,	(050)	, 500			an (050)	1 300-1
Client: USBR/STETSON ENGINEERS									RI	EQ	UE	ST	ED	Al	VA)	LY	SIS	;	171	N 1 J	00	1 4	1.02
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SAN RAFAEL, CA 9490] #	1664		ASTM D2887						(S)			ics					7				
Attn: BENBREZING Phone: 415-457	0*701				M.		pons				ganic			Organics	Zn				gesian e				
Sampled by: BEN BREZING Fax: 415-457	1636	1	413.2	Diesel	AST	MTBE	locai			anics	e Ori	e 22)	\$ 22)		Ag			1	The same of				
Billing Address:	SARSES ATA]		3513	В	2	le H	les)		e Org	olati	Titl	E	Metals	ź	S		and the same of th	g engles				
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Project: 214 & -002 PO#: 214 6		$]$ \in	ıse 4	5B)	nded	l .				1	1			RA)	n O	TSS		Ñ	6				
	nple Container(s ttrix # Type*		Oil & Grease	TPH (8015B)	TPH-Extended 8015B	602 / 8021	601 / 8021	1808 / 8091	608 / 8082	624 / 8260	625/8270	TTLC Metals	STLC Metals	TCLP (RCRA)	J J J J J	pH) EC	90	3	Í				
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Sample(s): Cold Ambient Warm VOAs w/ZHS: Yes No N/A	Print S.C.					1900 111					i m	. 0	A.		Print		Q.			Com	res. 🖟		
All Samples-Properly Preserved: Yes No N/A	Company:	3 (C)	5) h-)	er Green	. A.)	6-14				1/	* **	Sum		Com	pany		C.	m	G.	<u>:</u>		
Disposal: N/C (aqueous) *EMA (@\$5.00/sample) Return Hold	Signature		***						4.5%						Sign	ature		<u> </u>	1 1 2 4	<u> </u>		<u>. : '</u>	
Turnaround Time: 24 hr 48 hr 3 day 4 day 5 day Normal	Print			Prof. f. Language											Print		187 <u>1</u> 387						
Comments:	Company:					<u> </u>	<u> </u>								Com	pany:		<u> </u>	<u></u>		- ,		
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*EMA reserves the right to return samples that do not match our waste profile.	Company: White - EMA		Cana	rv - /	VCCO1	inting	,		Pink -	Clie	nt (w	Repo	rt)			pany:		ent (I	Palina	uish Sa	mel-	c)]

12 June 2006

Stetson Engineers

EMA Log #: 0606004

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafeal, CA 94901

Project Name: 2148-002

Enclosed are the results of analyses for samples received by the laboratory on 05/31/06 16:13. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

aboratory Director

CA ELAP Certification #: 2564

roject Name: 2148-002

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
YS1-5-31-06A	0606004-01	Water	05/31/06 13:00	05/31/06 16:13

The results in this report apply to the samples analyzed in accordance with the chain of critical document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
YS1-5-31-06A (0606004-01) Water	Sampled: 05/31	06 13:00	Received: 05/	31/06 16:1	13				
Specific Conductance (EC)	1250	1	umhos/cm	1	6060720	06/07/06	06/07/06	SM2510 B	
Dissolved Oxygen	6.65	0.10	mg/l	"	6060539	05/31/06	05/31/06	SM4500 O G	
pH	8.14	0.10	pH Units	11	6060101	05/31/06	05/31/06	EPA 150.1	
Total Dissolved Solids	809	20	mg/l	11	6060739	06/05/06	06/05/06	SM2540 C	
Turbidity	3.07	0.05	NTU	"	6060223	06/02/06	06/02/06	SM2130 B	

The results in this report apply to the samples analyzed in accordance with the chain of c^{-1} and you document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6060101										
Duplicate (6060101-DUP1)		Source: 0605	Prepared &	ι Analyze	ed: 05/31/					
pH	9.28	0.10	pH Units		9.22			0.6	20	
Reference (6060101-SRM1)				Prepared &	z Analyze	ed: 05/31/				
pH	8.84	0.10	pH Units	9.10		97	97-103			
Batch 6060223										
Duplicate (6060223-DUP1)		Source: 0605	498-04	Prepared &	ι Analyze	ed: 06/01/			•	
Turbidity	0.31	0.05	NTU		0.31			0	20	
Reference (6060223-SRM1)			Prepared 8	. Analyze	d: 06/01/					
Turbidity	5.00	0.05	NTU	5.41		92	87.6-109.8			
Batch 6060539										
Duplicate (6060539-DUP1)		Source: 0606	Prepared 8	Analyze	d: 05/31/					
Dissolved Oxygen	6.58	0.10	mg/l		6.65			1	20	
ιch 6060720										
Duplicate (6060720-DUP1)	·	Source: 0606	Prepared 8	z Analyze	d: 06/07/	/06				
Specific Conductance (EC)	22500	1	umhos/cm		22800			1	20	
Reference (6060720-SRM1)				Prepared 8	ι Analyze	ed: 06/07/	/06			
Specific Conductance (EC)	458	1	umhos/cm	465		98	.484-104.5	;		

The results in this report apply to the samples analyzed in accordance with the chain of \sim 'dy document. This analytical report must be reproduced in its entirety.

EMA Log #: 0606004 Client Name: Stetson Engineers

oject Name: 2148-002

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes			
Batch 6060739													
Duplicate (6060739-DUP1)		Source: 0605502-05				Prepared & Analyzed: 06/05/06							
Total Dissolved Solids	2940	20	mg/l		2890			2	20				
Duplicate (6060739-DUP2)		Source: 06055	05-03	Prepared	& Analyze	ed: 06/05/	06						
Total Dissolved Solids	751	20	mg/l	772				3	20				
Reference (6060739-SRM1)				Prepared									
Total Dissolved Solids	340	20	mg/l	345		99	.696-111.	3		3.11.201			
Reference (6060739-SRM2)													
Total Dissolved Solids	326	20	mg/l	345		94	.696-111.	3					

The results in this report apply to the samples analyzed in accordance with the chain of c 'ady document. This analytical report must be reproduced in its entirety.

oject Name: 2148-002

Notes and Definitions

Analyte NOT DETECTED at or above the reporting limit ND

NR Not Reported

Sample results reported on a dry weight basis dry

RPD Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of c ''dy document. This analytical report must be reproduced in its entirety.

CHAIN-OF-CUSTODY RECORD



MAY 31 706 16.36

980800 0606004					4340 Viewridge Ave., Ste. A • San Diego, CA 92123 • Phone (858) 560-7717 • Fax (858) 560-7													50-7		
EMA LOG # 1605520	1	EMA DATE/TIME STAMP REQUESTED ANALYSIS																		
Client: USBR/STETSON ENGINEE	i		·				RE	$\overline{\mathbf{QU}}$	EST	ED	AN	IAL	YSI	S						
address: 2171 B. FRANCIS CO B	EK														П	T	T	П		
CAN DAMAGE CA 9490	1	1664		ASTM D2887_TBE	S			19	2		nics									
Attn: BENBREZING Phone: 418	01	413.2		I W	rbon						Organics	Zn			右					
Attn: BENBREZING Phone: 415-457-0701 Sampled by: BENBREZING Fax: 415-457-163 &				Diesel	AST! MTBE	aloca			ganic	(CAC Title 22)	le 22)	li	Ag		1	ζ. Σ.				
Billing Address: SAME				$\mathbf{I}_{-1}\mathbf{I}_{-}$		ble H	des)		le Or	C Tit	C Tit	Metals	ž		15	IA	1			
			413.1	Gas	ed 8015	(Purgeable Halocarbons)	(Pesticides)	(PCB's)	(Volatile Organics)	[S	(CAC Title 22)	1	a (0	13				
Project: 2148-002 PO#: 214	- 8		ase 4	5B)	nded					tals	tals	ZRA)	J. Cu	2	120	9				
EMA Sample S	Sample Sample C	ontainer(s)	Jil 8's Gre	TPH (8015B)	TPH - Extended 8015B 602 / 8021 BTXE	601 / 8021	608 / 8081	608 / 8082	624 / 8260	TT LC Me	ST/LC Metals	TCLP (RCRA)	r Cg Cg		3/2	C01				
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Container Types: B=Brass Tube; V=VOA; G=Glass; P=Plastic; O=	=Other (list)									CEIVED BY										
Famper-Proof Seals Intact: Yes No N/A Correct Containers: Yes No			K4-87						5/	31/	06	5	Signature M.							
Sample(s): Cold Ambient Warm VOAs w/ZHS: Yes No N/A			PBEN BREZING 16 STETSON ENGR 16							5/31/06 Signature M: Print Michaela Norrh on Company: FMA							m	\dashv		
			STETSON ENGL							, -			Company: EMA							
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EMA reserves the right to return samples that do not match our waste	ompany: - EMA								iish Sar	nples)										
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14 August 2006

Stetson Engineers

EMA Log #: 0608033

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafeal, CA 94901

Project Name: YSI/Sondes

Project Desc./#: 2148-02

Enclosed are the results of analyses for samples received by the laboratory on 08/01/06 16:55. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

_aboratory Director

CA ELAP Certification #: 2564

oject Name: YSI/Sondes

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
YS1-8-1-06	0608033-01	Water	08/01/06 15:15	08/01/06 16:55

NOTE: Chlorophyll analyses performed by a subcontract laboratory, results to follow in a separate report.



oject Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
YS1-8-1-06 (0608033-01) Water	Sampled: 08/01/06	15:15 Rec	eived: 08/01/	06 16:55					
Specific Conductance (EC)	1200	1	umhos/cm	1	6081021	08/10/06	08/10/06	SM2510 B	
Dissolved Oxygen	5.55	0.10	mg/l	11	6081108	08/01/06	08/01/06	SM4500 O G	
рН	8.17	0.10	pH Units	11	6080126	08/01/06	08/01/06	EPA 150.1	
Total Dissolved Solids	785	20	mg/l	u	6081408	08/08/06	08/14/06	SM2540 C	
Turbidity	1.74	0.05	NTU	u	6080316	08/02/06	08/02/06	SM2130 B	

oject Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6080126										
Duplicate (6080126-DUP1)		Source: 0608	020-01	Prepared	& Analyze	ed: 08/01.	/06			
H	7.88	0.10	pH Units		7.93			0.6	20	
Reference (6080126-SRM1)				Prepared of	& Analyze	ed: 08/01	/06			
pH	8.84	0.10	pH Units	9.10		97	97-103			
Batch 6080316										
Duplicate (6080316-DUP1)		Source: 0607	427-01	Prepared of	& Analyze	ed: 08/02	/06			
Turbidity	0.19	0.05	NTU		0.19			0	20	
Reference (6080316-SRM1)				Prepared of	& Analyze	ed: 08/02	/06			
Turbidity	4.93	0.05	NTU	5.41		91	87.6-109.	3)	
Batch 6081021										WPA-L-11
Duplicate (6081021-DUP1)		Source: 0608	006-01	Prepared a	& Analyze	ed: 08/10	/06			
Specific Conductance (EC)	1150	1	umhos/cm	THE RESIDENCE OF THE PERSON AND ADDRESS OF THE PERSON ADDRESS OF	1150			0	20	
erence (6081021-SRM1)				Prepared 6	& Analyze	ed: 08/10/	/06			
Specific Conductance (EC)	398	1	umhos/cm	408		98	96.3-107.			
Batch 6081108										
Duplicate (6081108-DUP1)		Source: 0608	033-01	Prepared of	& Analyze	ed: 08/01/	/06			
Dissolved Oxygen	5.56	0.10	mg/l		5.55			0.2	20	

The results in this report apply to the samples analyzed in accordance with the chain of c 'ady document. This analytical report must be reproduced in its entirety.

Page 4 of 6

oject Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6081408										
Duplicate (6081408-DUP1)		Source: 06080	36-02	Prepared:	08/09/06	Analyze	d: 08/14/0	5		
Total Dissolved Solids	698	20	mg/l		680			3	20	
Reference (6081408-SRM1)				Prepared:	08/09/06	Analyze	d: 08/14/0	5		
Total Dissolved Solids	224	20	mg/l	256		88	83.2-109			

oject Name: YSI/Sondes

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

EMALOG#: 0608033						4340 V	iewrid;	ge Ave	., Ste.	A · San	Diego	, CA 92	123 · P	hone (858) 56	0-7717	· Fax (858) 560-	-7763				
Client USBR /STETSON ENGINEERS										R	EQU	ESTE) AN	ALYS	IS								
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EMALOG#: 060808) Client: USBR /STETSU ENGINEERS Attn: BEN BREZING Sampler(s): REN BREZING Address: 2171 E. FRANCISCO 13LVD., SITTE V SAN RAFAEL, CA 94901 Phone: 415-457-1638 Small: benbastetzoneug Leers com Billing Address: 7171 E. FRANCISCO BLUD: SUITE V Project ID: CPEN Project ID: CPEN POPE: 71668] କ୍ର	ASTM D2887	□Oxy	,								g	∵Colileπ,T+E.Coli			T.							
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Additional costs may apply, consult a project manager for details.

²EMA reserves the right to return any samples that do not match our waste profile.

An /tical Sciences Laborate University of Idaho

Holm Research Center 2222 West 6th Street. P.O. Box 442203 Moscow, Idaho 83844-2203

Phone: (208) 885-7081

FAX: (208) 885-8937

email: asl@uidaho.edu

http://www.agls.uidaho.edu/asl/

Certificate of Analysis

Prepared For: Shanda McGraw

EcoAnalysts, Inc.

105 East 2nd Street, Suite 1

Moscow, ID 83843

Case ID: EOCT06-002

Report Date: 09-Oct-06

Date Received: 03-Oct-06

Client Ref.: 873-2

Project ID: 373

Case Comments:

Harry 9, tester. Establists, Inc.

09-Oct-06

Analytical Sciences Laborator, Certificate of Analysis

Case ID: EOCT06-002

Client SampleID: YS1-8-1-06

ASL Sample ID: E0603515

Site/Location:

Matrix: Solid - Wet Weight

Chlorophyll AnalysisMethod:EPA 446.0Prep:Acetone ExtractionAnalysis Date:04-Oct-06ResultsMDLPres.;FreezeFilter?N/AChlorophyll A1.3 μg0.1Chlorophyll B0.8 μg0.1Sample Volume:964 mLs

Samples will be discarded one month after date of final report unless otherwise requested

ND = Not Detected

NA = Not Applicable

MDL = Method Detection Limit

QNS = Quantity Not Sufficient

25 September 2006

Stetson Engineers EMA Log #: 0609219

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafeal, CA 94901

Project Name: YSI/Sondes Project Desc./#:2148-02-005

Enclosed are the results of analyses for samples received by the laboratory on 09/13/06 16:36. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon Laboratory Director

CA ELAP Certification #: 2564

Project Name: YSI/Sondes

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LON-9-13-06	0609219-01	Water	09/13/06 15:00	09/13/06 16:36

NOTE: Chlorophyll analyses performed by a subcontract laboratory, results to follow in a separate report.



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	g Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LON-9-13-06 (0609219-01) Water	Sampled: 09/13/0	6 15:00	Received: 09/1	3/06 16:36	5				
Specific Conductance (EC)	1510	1	umhos/cm	1	6091411	09/14/06	09/14/06	SM2510 B	
Dissolved Oxygen	8.52	0.10	mg/l	"	6092025	09/13/06	09/13/06	SM4500 O G	
рН	8.19	0.10	pH Units	"	6091403	09/13/06	09/13/06	EPA 150.1	
Total Dissolved Solids	924	20	mg/l	"	6092028	09/15/06	09/20/06	SM2540 C	
Turbidity	12.2	0.05	NTU	"	6091521	09/15/06	09/15/06	SM2130 B	



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source	0/77-	%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 6091403										
Duplicate (6091403-DUP1)		Source: 0609	195-01	Prepared &	& Analyz	ed: 09/13	/06			
pH	6.75	0.10	pH Units		6.74			0.1	20	
Reference (6091403-SRM1)				Prepared &	& Analyze	ed: 09/13	/06			
рН	8.88	0.10	pH Units	9.10		98	97-103			
Batch 6091411										
Duplicate (6091411-DUP1)		Source: 0609	186-01	Prepared &	& Analyz	ed: 09/14	/06			
Specific Conductance (EC)	14600	1	umhos/cm		14600			0	20	
Reference (6091411-SRM1)				Prepared &	& Analyze	ed: 09/14	/06			
Specific Conductance (EC)	291	1	umhos/cm	297		98	93-107			
Batch 6091521										
Duplicate (6091521-DUP1)		Source: 0609	219-01	Prepared &	& Analyz	ed: 09/15	/06			
Turbidity	12.2	0.05	NTU		12.2			0	20	
Reference (6091521-SRM1)				Prepared &	& Analyze	ed: 09/15	/06			
Turbidity	5.18	0.05	NTU	5.41		96	87.6-109.	8		
Batch 6092025										
Duplicate (6092025-DUP1)		Source: 0609219-01 Prep			& Analyze	ed: 09/13	/06			
Dissolved Oxygen	8.01	0.10	mg/l		8.52			6	20	



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6092028										
Duplicate (6092028-DUP1)		Source: 0609	193-02	Prepared:	09/15/06	Analyzed	: 09/20/00	5		
Total Dissolved Solids	708	20	mg/l		696	-		2	20	
Duplicate (6092028-DUP2)		Source: 0609	184-03	Prepared:	09/15/06	Analyzed	: 09/20/06	5		
Total Dissolved Solids	11200	20	mg/l		11100			0.9	20	
Reference (6092028-SRM1)				Prepared:	09/15/06	Analyzed	: 09/20/00	5		
Total Dissolved Solids	185	20	mg/l	185		100	86-114			
Reference (6092028-SRM2)				Prepared:	09/15/06	Analyzed	: 09/20/06	5		
Total Dissolved Solids	189	20	mg/l	185		102	86-114			



Project Name: YSI/Sondes

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



EnviroMatrix



Analytical, Inc.

EMA LOG #: 060120											43	40 Vi	ewrid	ge Av	e., Ste.	. A·S	an Di	ego, C	A 921	23 · Plı	one ((858) 5	560-77	17 · F	ax (85	8) 560	-7763					
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Client Sample ID	Samı Date/T		Sample Matrix	Container(s) # of / Type	Oil & Gre	418.1 (Total Recoverable Petroleum Hydrocarbons)	8015B (TPH)	624 / 8260	625 / 8270	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (XpH XConductivity (EC)	Nitrate	TTLC Metals (CAC Title 22) / (CAM 17)	STLC Metals	TCLP (RCRA)	Cd Cr	Coliform, Total (MTF)	Enterococcus,	Heterotrophic Plate Count (HPC)	DISSOLVED	TURBIDIT	CHI				Sar	iple Com	ments:	
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Additional costs may apply consult a project manager f	for details.				#20000000			V	/hite -	EMA		(Canary	y - Acc	ountir	ng		Pink	- Clie	nt (w/R	eport	:)		Golde	enrod .	- Clien	t (Reli	nguish	Samples)			

CHAIN-OF-CUSTODY FORM

^{&#}x27;Additional costs may apply, consult a project manager for details.

²EMA reserves the right to return any samples that do not match our waste profile.

Note: By relinquishing samples to EnviroMatrix Analytical, Inc., client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of the invoice. Sample(s) will be disposed of after 30 days unless otherwise noted. All work is subject to EMA's terms and conditions.

An tical Sciences Laborator University of Idaho

Holm Research Center 2222 West 6th Street, P.O. Box 442203 Moscow, Idaho 83844-2203

Phone: (208) 885-7081

FAX: (208) 885-8937

email: asl@uidaho.edu

http://www.agls.uidaho.edu/asl/

Certificate of Analysis

Prepared For: Shanda McGraw

EcoAnalysts, Inc.

105 East 2nd Street, Suite 1

Date Received: 22-Sep-06

Client Ref.: 873-EnviroMatrix Chlor

Case ID: ESEP06-008

Project ID: 873

Report Date: 09-Oct-06

Moscow, ID 83843

Case Comments:

Jar was received frozen and broken (transferred to a new jar). No contents were lost or damaged.

09-Oct-06

Analytical Sciences Laborator, Certificate of Analysis

Case ID: ESEP06-008

Client SampleID: 873-1 ASL Sample ID: E0603388 Site/Location: LON-9-13-06

Matrix: Solid - Wet Weight

Chlorophyll AnalysisMethod: EPA 446.0Prep: Acetone ExtractionAnalysis Date: 04-Oct-06ResultsMDLPres:: FreezeFilter? N/AChlorophyll A16.1 μg0.1Chlorophyll B0.8 μg0.1Sample Volume: 905 mLs

Samples will be discarded one month after date of final report unless otherwise requested

13 November 2006

Stetson Engineers EMA Log #: 0611060

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafael, CA 94901

Project Name: YSI/Sondes Project Desc./#:2148-02-005

Enclosed are the results of analyses for samples received by the laboratory on 11/02/06 16:08. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

Laboratory Director

CA ELAP Certification #: 2564

Project Name: YSI/Sondes

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LON-OUT-110106	0611060-01	Water	11/01/06 10:00	11/02/06 16:08

NOTE: Chlorophyll analyses performed by a subcontract laboratory, results to follow in a separate report.



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LON-OUT-110106 (0611060-01) Water	Sampled:	11/01/06 10:00	Received	: 11/02/06	16:08				
Specific Conductance (EC)	1570	1	umhos/cm	1	6111028	11/10/06	11/10/06	SM2510 B	
Dissolved Oxygen	11.7	0.10	mg/l	"	6111029	11/02/06	11/02/06	SM4500 O G	HT-04
pН	8.07	0.10	pH Units	"	6110226	11/02/06	11/02/06	EPA 150.1	HT-04
Total Dissolved Solids	1070	20	mg/l	"	6110721	11/06/06	11/07/06	SM2540 C	
Turbidity	67.3	0.05	NTU	"	6110905	11/03/06	11/09/06	SM2130 B	



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 6110226										
Duplicate (6110226-DUP1)		Source: 0611	060-01	Prepared	& Analyz	ed: 11/02	/06			
pH	8.15	0.10	pH Units		8.07			1	20	
Reference (6110226-SRM1)				Prepared	& Analyz	ed: 11/02	/06			
pH	8.83	0.10	pH Units	9.10		97	97-103			
Batch 6110721										
Duplicate (6110721-DUP1)		Source: 0611	007-02	Prepared	& Analyz	ed: 11/07	/06			
Total Dissolved Solids	824	20	mg/l		798			3	20	
Reference (6110721-SRM1)				Prepared	& Analyz	ed: 11/07	/06			
Total Dissolved Solids	190	20	mg/l	185	•	103	86-114			
Batch 6110905										
Duplicate (6110905-DUP1)		Source: 0611	060-01	Prepared:	11/03/06	Analyze	d: 11/09/0	6		
Turbidity	67.7	0.05	NTU		67.3			0.6	20	
Reference (6110905-SRM1)				Prepared:	11/03/06	Analyze	d: 11/09/0	6		
Turbidity	5.13	0.05	NTU	5.41		95	87.6-109.	8		
Batch 6111028										
Duplicate (6111028-DUP1)		Source: 0611	189-05	Prepared	& Analyz	ed: 11/10	/06			·
Specific Conductance (EC)	13500	1	umhos/cm		13400			0.7	20	



Project Name: YSI/Sondes

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 6111028

 Reference (6111028-SRM1)
 Prepared & Analyzed: 11/10/06

 Specific Conductance (EC)
 313
 1
 umhos/cm
 297
 105
 93-107

Batch 6111029

Duplicate (6111029-DUP1)		Source: 06110	060-01	Prepared & Analyzed: 11/02/06			
Dissolved Oxygen	13.7	0.10	mg/l	11.7	16	20	



Project Name: YSI/Sondes

Notes and Definitions

HT-04 This sample was received outside of the EPA recommended holding time for this analysis.

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



EMALOG#: OUTOGO Client: USBR/STETSON EN Attn: BEN BREZING Sampler(s): BEN BREZING Address: 2171 E. TRANSCO SAN RAFAEL CA Phone: Land - 457 - 0701 Email: banb @stetsoner Billing Address:										4340	Viewr	idge A	ve., Ste	. A · S	an Die	go, CA	9212	3 · Pho	ne (858	3) 560-7	717·1	ax (85	3) 560-77	763				
Client: USBR/STETSON EN	GIR REE	25													**********	UEST	******	888888888	**********	**********								
Attn: BEN BREZING	- ()						٠	T				T						_		T			•	T		licrobiole	gy Note	s:
Sampler(s): REN RRED IN	6			1		ASTM D2887	Nap											Conlert, I +E. Con		-	,							
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Client Sample ID	Sample Date/Time	Sample Matrix	Container(s) # of / Type	Oil & Gr	418.1 (T	8015B (TPH)	624 / 8260 (VOC)	625 / 8270	608 / 8081	608 / 8082 (Polychlorinated Biphenyls)		-	Nitrate	TTLC Metals	STLC Metals		ב פ	Colitorm,	Heterotrophic Plate Count (HPC)	Dissoc	102	CE C				Sample Cr	omments:	
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Sample Matrix Codes: GW=ground water WW=waste w	vater DW=drinkin	g water SW=st	orm water										1	CH	AIN-	OF-Q	-6 V	MV	er co	RD		LL			1			
A=air SED=sediment O=oil T=tissue S=solid other (sp						1		BÆLT	NOTES	SHED I	BY					(X	/		IVED I	BY				Т	ATE/TIM	E STAM	IP
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¹Additional costs may apply, consult a project manager for details.

²EMA reserves the right to return any samples that do not match our waste profile.

oldenrod - Client (Relinquish Samples)

Analytical Sciences Laboratory University of Idaho

Holm Research Center 2222 West 6th Street, P.O. Box 442203 83844-2203 Moscow, Idaho

Phone: (208) 885-7081

FAX: (208) 885-8937

email: asl@uidaho.edu

http://www.agls.uidaho.edu/asl/

Certificate of Analysis

Prepared For: Shanda McGraw

EcoAnalysts, Inc.

105 East 2nd Street, Suite 1

Moscow, ID 83843

Case ID: ENOV06-009

Report Date: 20-Nov-06

Date Received: 16-Nov-06

Client Ref.: 873 EnviroMatrix Chlor

Project ID: <73

Case Comments:

Requested Due Date 11/21/06

Sandysts, Inc.

20-Nov-06

Analytical Sciences Laboratory Certificate of Analysis

Case ID: ENOV06-009 Date Rec'd.: 16-Nov-06

Client ID: 873-3 ASL Sample ID: E0604000	Site: Ref/Loc.: LON-OUT-11 Matrix: Solid - Wet V		o by: Date: 01-Nov-06
Chambril Ambroin	Method: Winterman/DeMots Mod Filter	Pres: Freeze	Prep Date: N/A
Chlorophyll Analysis	Prep: Acetone Extraction	Filter: N/A	Analysis Date: 17-Nov-06
	Results	MDL	
Chlorophyll A	25.5 µg	0.1	
Chlorophyll B	< 0.1 µg	0.1	
Chlorophyil A & B	25.5 µg	0.1	
Reported results are for a :	319 mL aliquot of the total sample of 893 mLs.		

Samples will be discarded one month after date of final report unless otherwise requested

30 November 2006

Stetson Engineers EMA Log #: 0611292

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafael, CA 94901

Project Name: 2148-02-005

Enclosed are the results of analyses for samples received by the laboratory on 11/16/06 16:08. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

Laboratory Director

CA ELAP Certification #: 2564

Project Name: 2148-02-005

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DIUDITCH111606	0611292-01	Water	11/16/06 14:30	11/16/06 16:08

NOTE: Chlorophyll analyses performed by a subcontract laboratory, results to follow in a separate report.



Project Name: 2148-02-005

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DIUDITCH111606 (0611292-01) Water	Sampled:	11/16/06 14:3	0 Received	l: 11/16/06	6 16:08				
Specific Conductance (EC)	1320	1	umhos/cm	1	6112010	11/20/06	11/20/06	SM2510 B	
Dissolved Oxygen	7.82	0.10	mg/l	"	6112725	11/16/06	11/16/06	SM4500 O G	
pH	7.95	0.10	pH Units	"	6111626	11/16/06	11/16/06	EPA 150.1	
Total Dissolved Solids	748	20	mg/l	"	6112820	11/22/06	11/28/06	SM2540 C	
Turbidity	0.53	0.05	NTU	"	6112712	11/17/06	11/27/06	SM2130 B	



Project Name: 2148-02-005

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyta	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Not
Analyte	Kesult	Limit	Units	Levei	Kesuit	%KEC	Limits	KPD	Limit	Notes
Batch 6111626										
Duplicate (6111626-DUP1)		Source: 0611	292-01	Prepared &	k Analyze	ed: 11/16	/06			
рН	7.80	0.10	pH Units		7.95			2	20	
Reference (6111626-SRM1)				Prepared &	k Analyze	ed: 11/16	/06			
pН	8.83	0.10	pH Units	9.10		97	97-103			
Batch 6112010										
Duplicate (6112010-DUP1)		Source: 0611	292-01	Prepared &	k Analyze	ed: 11/20	/06			
Specific Conductance (EC)	1340	1	umhos/cm		1320			2	20	
Reference (6112010-SRM1)				Prepared &	k Analyze	ed: 11/20	/06			
Specific Conductance (EC)	302	1	umhos/cm	297	•	102	93-107			
Batch 6112712										
Duplicate (6112712-DUP1)		Source: 0611	292-01	Prepared:	11/17/06	Analyze	d: 11/27/0	6		
Turbidity	0.52	0.05	NTU		0.53			2	20	
Reference (6112712-SRM1)				Prepared:	11/17/06	Analyze	d: 11/27/0	6		
Turbidity	5.16	0.05	NTU	5.41		95	87.6-109.	8		
Batch 6112725										
Duplicate (6112725-DUP1)		Source: 0611	292-01	Prepared &	k Analyze	ed: 11/16	/06			·
Dissolved Oxygen	7.68	0.10	mg/l		7.82			2	20	



Project Name: 2148-02-005

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 6112820										
Duplicate (6112820-DUP1)		Source: 06113	310-01	Prepared:	11/22/06	Analyzed	l: 11/28/0	6		
Total Dissolved Solids	1680	20	mg/l		1720			2	20	
Reference (6112820-SRM1)				Prepared:	11/22/06	Analyzed	l: 11/28/0	6		
Total Dissolved Solids	190	20	mg/l	185		103	86-114			_



Project Name: 2148-02-005

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



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Sampler(s): KELI KREZIN	9		- 499 . d			ASTM D2887											Issolved									
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Client Sample ID	Sample Date/Time	Sample Matrix	Container(s) # of / Type	Oil & Gr	418.1 (Total Recoverable Petroleum Hydrocarbons)	8015B (TPH)	OCC / 8250 (VUC)	608 / 8081 (Organochlor	608 / 8082 (Polychlorinated Biphenyls)	8141 (C	TBT (C	N V	Nitrate	TTLC Metals	STLC Metals			Enterococcus.	Heterotrophic Plate Count (HPC)	Ā	3	5			Sample Comments:	
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²EMA reserves the right to return any samples that do not match our waste profile.

White - EMA

Canary - Accounting

Pink - Client (w/Report)

Goldenrod - Client (Relinquish Samples)

Additional costs may apply, consult a project manager for details.

An ytical Sciences Laborate University of Idaho

Holm Research Center 2222 West 6th Street, P.O. Box 442203 Moscow, Idaho 83844-2203

Phone: (208) 885-7081

FAX: (208) 885-8937

email: asl@uidaho.edu

http://www.agls.uidaho.edu/asl/

Certificate of Analysis

Prepared For: Shanda McGraw

EcoAnalysts, Inc.

105 East 2nd Street, Suite 1

Moscow, ID 83843

Case ID: ENOV06-011

Report Date: 01-Dec-06

Date Received: 28-Nov-06

Client Ref.: DIU-DITCH-111606

Project ID: §73

Date:

2nd Level QC:

Date:

Case Comments:

EcoAnalysts, Inc.

1-Dec-06

Analytical Sciences Laboratory Certificate of Analysis

Case ID: ENOV06-011

Date Rec'd.: 28-Nov-06

Client ID: 873-4

ASL Sample ID: E0604004

Site:

Collected by:

Ref/Loc.: Matrix: Solid - Wet Weight Collect Date: 28-Nov-06

	Method: Winterman/DeMots Mod Filter	Pres: Freeze	Prep Date: N/A
Chlorophyll Analysis	Prep: Acetone Extraction	Filter: N/A	Analysis Date: 29-Nov-06
	Results	MDL	
Chlorophyll A	1.3 µg	0.1	
Chlorophyll B	0.8 µg	0.1	
Chlorophyll A & B	2.1 μg	0.1	
Used the total sample	volume of 933 mLs in the test.		

Samples will be discarded one month after date of final report unless otherwise requested

15 December 2006

Stetson Engineers EMA Log #: 0612095

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafael, CA 94901

Project Name: 2148-02-5

Enclosed are the results of analyses for samples received by the laboratory on 12/05/06 16:06. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

Laboratory Director

CA ELAP Certification #: 2564

Project Name: 2148-02-5

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DIVDITCH1205	0612095-01	Water	12/05/06 09:30	12/05/06 16:06



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DIVDITCH1205 (0612095-01) Water	Sampled: 12/	05/06 09:30	Received: 1	12/05/06 1	6:06				
Specific Conductance (EC)	1300	1	umhos/cm	1	6121317	12/13/06	12/13/06	SM2510 B	
Dissolved Oxygen	7.10	0.10	mg/l	"	6121319	12/05/06	12/05/06	SM4500 O G	
pH	7.63	0.10	pH Units	"	6120533	12/05/06	12/05/06	EPA 150.1	
Total Dissolved Solids	868	20	mg/l	"	6121421	12/11/06	12/14/06	SM2540 C	
Turbidity	0.73	0.05	NTU	"	6121124	12/06/06	12/06/06	SM2130 B	



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 6120533	Todati	2		20.01	result	,,,,,	2			1.000
Duplicate (6120533-DUP1)		Source: 0612	087-03	Prepared	& Analyz	ed: 12/05/	06			
pH	8.78	0.10	pH Units	Trepared	8.77	ca. 12/03/	00	0.1	20	
Reference (6120533-SRM1)				Prepared	& Analyz	ed: 12/05/	06			
pH	8.87	0.10	pH Units	9.10	cc / thany 2	97	97-103			
Batch 6121124										
Duplicate (6121124-DUP1)		Source: 0612	066-10	Prepared	& Analyz	ed: 12/06/	06			
Turbidity	0.25	0.05	NTU		0.26			4	20	
Batch 6121317										
Duplicate (6121317-DUP1)		Source: 0612	086-01	Prepared	& Analyz	ed: 12/13/	06			
Specific Conductance (EC)	9410	1	umhos/cm	•	9400			0.1	20	
Duplicate (6121317-DUP2)		Source: 0612	086-02	Prepared	& Analyz	ed: 12/13/	06			
Specific Conductance (EC)	9700	1	umhos/cm		9700			0	20	
Reference (6121317-SRM1)				Prepared	& Analyz	ed: 12/13/	06			
Specific Conductance (EC)	302	1	umhos/cm	297		102	93-107			
Reference (6121317-SRM2)				Prepared	& Analyz	ed: 12/13/	06			
Specific Conductance (EC)	308	1	umhos/cm	297		104	93-107			
Batch 6121319										
Duplicate (6121319-DUP1)		Source: 0612	095-01	Prepared	& Analyz	ed: 12/05/	06			
Dissolved Oxygen	6.18	0.10	mg/l		7.10			14	20	



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 6121421										
Duplicate (6121421-DUP1)		Source: 0612	101-02	Prepared:	12/11/06	Analyzed	l: 12/14/0	6		
Total Dissolved Solids	630	20	mg/l		598			5	20	
Reference (6121421-SRM1)				Prepared:	12/11/06	Analyzed	1: 12/14/0	6		
Total Dissolved Solids	179	20	mg/l	185		97	86-114			



Project Name: 2148-02-5

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



CHAIN-OF-CUSTODY FORM

EMA LOG#: 0612095										4340	View	ridge .	Ave., 5	Ste. A ·	San D	iego, C	CA 921	23 · P	hone ((858) 5	60-77	17 · Fa	x (858)	560-7763	3	-			
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Address: 7 171 E. FRANCIS	CO PLV	D . Cu	ITE Y			[M D	Oxy										pa	t,T			V								
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Phone: 415-457-070 I Email: benb@stetsonengiv Billing Address:	10056.6	LOVA	<u> </u>		n Hy	11		(S)	(des)	ryls)	es)	-	- I ~	AM	AM	Organics		Fecal (MTF)	ಕ			1	·						
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	PO#: 214	-6		41	ccov	5	(00)	emi V	rganc	olych	(Organophosphorus Pesticides)	(Organotin Compounds)	Mitrite	- 1	1		Pb	Total (MTF)		Plate	Q	2						•	
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Client Sample ID	Sample	Sample Matrix	Container(s) # of / Type	Oil & Gr	418.1 (Total Recoverable Petroleum Hydrocarbons)	8015B (TPH)	624 / 8260 (VOC)	625 / 8270 (Semi Volatile Organics)	608 / 8081 (Organochlorine Pesticides)			1B1 (Organoun Compou		TTLC Metals	STLC Metals	TCLP (RCRA)	Cd Cr	Coliform,	Enterococcus,	eterotrophic Plate Count (HPC)	۵	-				S	ample Con	ments:	
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^{&#}x27;Additional costs may apply, consult a project manager for details. ²EMA reserves the right to return any samples that do not match our waste profile.

Note: By relinquishing samples to EnviroMatrix Analytical, Inc., client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of the invoice. Sample(s) will be disposed of after 30 days unless otherwise noted. All work is subject to EMA's terms and conditions.

EMA Log #: 0701099

15 January 2007

Stetson Engineers

Attn: Ben Brezing

2171 East Francisco Suite K

San Rafael, CA 94901

Project Name: 2148-02-5

Enclosed are the results of analyses for samples received by the laboratory on 01/04/07 16:50. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon

Laboratory Director

CA ELAP Certification #: 2564

Project Name: 2148-02-5

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DIVDITCH010207	0701099-01	Water	01/04/07 10:00	01/04/07 16:50



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
DIVDITCH010207 (0701099-01) Water	Sampled: (01/04/07 10:0	0 Received	: 01/04/07	16:50				
Specific Conductance (EC)	1330	1	umhos/cm	1	7011127	01/11/07	01/11/07	SM2510 B	
Dissolved Oxygen	6.72	0.10	mg/l	"	7011206	01/04/07	01/04/07	SM4500 O G	
pН	7.73	0.10	pH Units	"	7010501	01/04/07	01/04/07	EPA 150.1	
Total Dissolved Solids	844	20	mg/l	"	7011118	01/10/07	01/11/07	SM2540 C	
Turbidity	1.06	0.05	NTU	"	7010512	01/05/07	01/05/07	SM2130 B	



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 7010501										
Duplicate (7010501-DUP1)		Source: 0701	090-02	Prepared	& Analyz	ed: 01/04	/07			
pH	9.13	0.10	pH Units		9.01			1	20	
Reference (7010501-SRM1)				Prepared	& Analyz	ed: 01/04	/07			
pH	8.83	0.10	pH Units	9.10		97	97-103			
Batch 7010512										
Duplicate (7010512-DUP1)		Source: 0701	064-01	Prepared	& Analyz	ed: 01/05	/07			
Turbidity	0.26	0.05	NTU		0.26			0	20	
Reference (7010512-SRM1)				Prepared	& Analyz	ed: 01/05	/07			
Turbidity	1.70	0.05	NTU	1.59		107	32.39-117.	ŧ.		
Batch 7011118										
Duplicate (7011118-DUP1)		Source: 0701	044-02	Prepared:	01/10/07	Analyze	d: 01/11/07	7		
Total Dissolved Solids	672	20	mg/l		676			0.6	20	
Reference (7011118-SRM1)				Prepared:	01/10/07	Analyze	ed: 01/11/07	7		
Total Dissolved Solids	187	20	mg/l	185		101	1.64-108.3	li .		
Batch 7011127										
Duplicate (7011127-DUP1)		Source: 0701	Source: 0701099-01 Pro			Prepared & Analyzed: 01/11/07				
Specific Conductance (EC)	1330	1	umhos/cm	-	1330			0	20	



Project Name: 2148-02-5

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 7011127

 Reference (7011127-SRM1)
 Prepared & Analyzed: 01/11/07

 Specific Conductance (EC)
 293
 1
 umhos/cm
 297
 99
 93-107

Batch 7011206

Duplicate (7011206-DUP1)		Source: 07010	99-01	Prepared & Analyzed: 01/04/07			
Dissolved Oxygen	6.40	0.10	mg/l	6.72	5	20	



Project Name: 2148-02-5

Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference



EMA LOG #: 0701099										43	340 Vi	ewrid	lge Av	e., Ste	. A · S:	an Di	ego, C	A 921	23 · Ph	one (8	58) 56	50-771	7 · Fa	x (858)	560-77	63				
EMA LOG #: 0701099 Client USBR STETON E Attn: REN BREZIN Sampler(s): BEN BREZIN Address: 2171 E. FRANK Phone: 415-457-4701 Email: ben b & stestsone Billing Address:	NGINE	SER'	S													REC)UES	TED	ANA	LYSI	S									
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# Client Sample ID	Sample Date/Time	Sample Matrix	Container(s) # of / Type	Oil & G	418.1 (7	8015B (TPH)	624 / 8260	625/8270	608 / 8081	608 / 8082 (Polychlorinated Biphenyls)	8141 (0	TBT (XpH X Conductivity (EC)	Nitrate	TTLC Metals	STLC Metals	TCLP (RCRA)	Cd Cr	Coliform,	Enterococcus,	Heterotrophic Plate Count (HPC)	اکّ	2					Sample C	omments	
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'Additional costs may apply, consult a project manager for details.

²EMA reserves the right to return any samples that do not match our waste profile.

disposed of after 30 days unless otherwise noted. All work is subject to EMA's terms and conditions.

White - EMA

Canary - Accounting

Pink - Client (w/Report)

Goldenrod - Client (Relinquish Samples)