BIOASSAY REPORT
CHRONIC AND ACUTE BIOASSAYS CONDUCTED
April 26 through May 1, 2006,
May 3 through 7, 2006
and May 22 through 27, 2006

Prepared for

RAY POLAND AND SONS
KENNEWICK, WASHINGTON

Prepared by

CH2M HILL
2300 NW Walnut Boulevard
Corvallis, Washington 97330

June 6, 2006
Lab I.D. No. B1579

CONTENTS

INTRODUCTION

CH2M HILL conducted a series of bioassays and analytical testing from April 26 through May 27, 2006, on a sample provided by Ray Poland and Sons, Washington.

The bioassay tests were conducted using the water flea (*Daphnia magna*), the rainbow trout (*Oncorhynchus mykiss*), and the green algae (*Raphidocelis subcapitata*, formerly known as *Selenastrum capricornutum*).

The analytical tests conducted were Chemical Oxygen Demand (COD) and Biological Oxygen Demand (5 day and 30 day BOD).

SUMMARY OF RESULTS

The test results are summarized in Table 1 below. Individual test data are summarized in the Results and Discussion section below.

Table 1
Summary of Test Results
0.4% End Use Product

Bioassay Testing			
Test	Endpoint	Value	95% Confidence Limits
Daphnia magna - Acute	LC50	37,613 ppm	34,818 to 40,631 ppm
Rainbow trout - Acute	LC50	9,600 ppm	6,400 to 12,800 ppm
Green Algae - Chronic	IC50	3,517 ppm	2,838 to 4,070 ppm
Analytical Testing			
Test	Duration	Value	% of Total Product Biodegradation
Chemical Oxygen Demand (COD)	na	3012 mg/L	na
Biological Oxygen Demand (BOD)	5 day	1118 mg/L	37.1 %
Biological Oxygen Demand (BOD)	30 Day	1554	51.6 %

METHODS AND MATERIALS

TEST METHODS

The acute tests were performed according to: *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water (2002); EPA-821-R-02-012; and *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, Washington State Department of Ecology (revised December 2001) Pub# WQ-R-95-80.

The chronic test was performed according to: *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002); EPA-821-R-02-013; and *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, Washington State Department of Ecology (revised December 2001) Pub# WQ-R-95-80.

TEST ORGANISMS

For the testing initiated on April 26 and 27: The *Daphnia magna* were obtained from CH2M HILL's in-house cultures and were less than 24 hours old at test initiation. The rainbow trout were obtained from Trout Lodge, Sumner, Washington, and were 24 days old after swim up at test initiation. The *Raphidocelis subcapitata* were obtained from CH2M HILL's in-house cultures and were 6 days old at test initiation.

For the testing initiated on May 3: The *Daphnia magna* were obtained from CH2M HILL's in-house cultures and were less than 24 hours old at test initiation. The rainbow trout were obtained from Trout Lodge, Sumner, Washington, and were 30 days old after swim up at test initiation. The *Raphidocelis subcapitata* were obtained from CH2M HILL's in-house cultures and were 5 days old at test initiation.

For the testing initiated on May 22 and 23: The *Daphnia magna* were obtained from CH2M HILL's in-house cultures and were less than 24 hours old at test initiation. The rainbow trout were obtained from Trout Lodge, Sumner, Washington, and were 18 days old after swim up at test initiation. The *Raphidocelis subcapitata* were obtained from CH2M HILL's in-house cultures and were 4 days old at test initiation.

All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA. The test organisms appeared vigorous and in good condition prior to testing.

DILUTION WATER

The dilution water used was reconstituted, moderately hard water with a total hardness of 80 to 100 mg/L as $CaCO_3$ and an alkalinity of 60 to 70 mg/L as $CaCO_3$. The dilution water used for the algae test was reconstituted, moderately hard water with nutrients, including EDTA, added.

SAMPLE COLLECTION

A single sample, labeled "06186A – Baum's Novacool UEF", was shipped via Federal express by Ray Poland and Sons personnel on April 18, 2006. The sample was received by CH2M HILL on April 20, 2006. All Chain of Custody for sample collection is provided in Appendix C.

SAMPLE PREPARATION

The "06186A - Baum's Novacool UEF" sample was diluted to a "0.4% End Use Product" by diluting 4 ml of sample into 996 ml of deionized water. This 0.4% End Use Product stock solution represents the 1,000,000 ppm (= 100%) sample concentration. This stock solution was made daily just prior to test solutions being made.

Concentrations for the tests were made by diluting the 1,000,000 ppm stock solution into the dilution water used for each test.

TEST CONCENTRATIONS

For the testing initiated on April 26 and 27: The sample concentrations for all tests were 62500, 125000, 250000, 500000, and 1000000 ppm (= 6.25, 12.5, 25, 50 and 100%, respectively) of the "0.4% End Use Product" with dilution water for the control. For the acute *Daphnia magna* test, 40 organisms per concentration were used with four test vessels per concentration and ten organisms per vessel. For the acute rainbow trout test, 20 organisms per concentration were used with two test vessels per concentration and ten organisms per vessel. The chronic algae test was run with four replicates per test concentration using an initial cell density in each test chamber of 10,000 cells/ml.

For the testing initiated on May 3: The sample concentrations for all tests were 100, 400, 1600, 6400, 25600 ppm (= 0.01, 0.04, 0.16, 0.64, and 2.56%, respectively) of the "0.4% End Use Product" with dilution water for the control. For the acute *Daphnia magna* test, 10 organisms per concentration were used with two test vessels per concentration and five organisms per vessel. For the acute rainbow trout test, 20 organisms per concentration were used with two test vessels per concentration and ten organisms per vessel. The chronic algae test was run with four replicates per test concentration using an initial cell density in each test chamber of 10,000 cells/ml.

For the testing initiated on May 22 and 23:

The sample concentrations for the acute *Daphnia magna* test were 3125, 6250, 12500, 25000, and 50000 (= 0.313, 0.625, 1.25, 2.50 and 5.00%, respectively) of the "0.4% End Use Product" with dilution water for the control. Forty organisms per concentration were used with four test vessels per concentration and ten organisms per vessel.

The sample concentrations for the acute rainbow trout test were 3200, 6400, 12800, 25600, and 51200 (= 0.320, 0.640, 1.28, 2.56 and 5.12%, respectively) of the "0.4% End Use Product" with dilution water for the control. Twenty organisms per concentration were used with two test vessels per concentration and ten organisms per vessel.

The sample concentrations for the chronic algae test were 320, 800, 2000, 5000, and 12500 (= 0.032, 0.080, 0.200, 0.500 and 1.25%, respectively) of the "0.4% End Use Product" with dilution water for the control. Four replicates per test concentration using an initial cell density in each test chamber of 10,000 cells/ml.

MONITORING OF BIOASSAYS

For the *Daphnia magna* and rainbow trout acute tests, solutions were analyzed at initiation for dissolved oxygen, pH, and conductivity, and every 24 hours thereafter for mortality, dissolved oxygen, and pH. Conductivity was again taken at test termination. Temperature was monitored in the test chambers daily and in the incubator or waterbath continuously throughout the testing period.

For the chronic algae test, solutions were monitored for pH and temperature daily in the control and all concentrations tested. Conductivity and dissolved oxygen was measured in the control and all concentrations tested at test initiation. Total hardness and alkalinity were measured in the control, low, middle, and high test concentrations at test initiation. *Raphidocelis subcapitata* growth was determined by cell counts using a Coulter counter. Temperature was monitored in a surrogate chamber daily and in the incubator continuously throughout the testing period.

DATA ANALYSIS

The effect measured during the *Daphnia magna* and rainbow trout acute tests included survival. The statistical analyses performed were those outlined in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, USEPA Office of Water (2002); EPA-821-R-02-012, using CETIS version 1.1.2. LC_{50} values (the concentration of sample causing a 50 percent reduction in survival) were calculated for the acute tests using non-linear regression (Probit) analysis. When the assumptions needed for the Probit analysis could not be met, the Trimmed Spearman-Karber method was used. When the assumptions needed for the Trimmed Spearman-Karber could not be met, the Linear Interpolation method was used.

The effect measured during the algae test was algae growth response. For the chronic test, statistical analyses performed were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002); EPA-821-R-02-013, using CETIS version 1.1.2. IC_{50} values (the concentration of sample causing a 50 percent reduction in biological measurement, e.g. growth) were calculated for growth effects in the chronic tests using Linear Interpolation analysis.

RESULTS AND DISCUSSION

TEST RESULTS

The raw data sheets for all tests are presented in Appendix A.

The results for the *Daphnia magna* acute test initiated on April 27 are summarized in Table 2:

Table 2
Summary of Acute Results
Initiated on April 27
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr
Daphnia magna			
Control	100	100	100
62,500	100	0	0
125,000	100	0	0
250,000	100	0	0
500,000	100	0	0
1,000,000	100	0	0

The *Daphnia magna* test results indicated an LC_{50} value (the concentration of sample causing a 50 percent reduction in survival) of 31,250 ppm (95% confidence limits are listed as 31,250 to 31,250 ppm). Both the LC_{50} value and the confidence limits may be unreliable due to poor data bracketing of the calculated LC_{50} value.

The results for the *Daphnia magna* acute test initiated on May 3 are summarized in Table 3:

Table 3
Summary of Acute Results
Initiated on May 3
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr
Daphnia magna			
Control	100	100	100
100	100	100	100
400	100	100	100
1,600	100	100	100
6,400	100	90	70
25,600	100	90	60

The *Daphnia magna* test results indicated an LC_{50} value of 28,682 ppm (95% confidence limits are 11,735 and 1,645,534 ppm). Both the LC_{50} value and the confidence limits may be unreliable due to poor data bracketing of the calculated LC_{50} value

The results for the *Daphnia magna* acute test initiated on May 22 are summarized in Table 4:

Table 4
Summary of Acute Results
Initiated on May 22
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr
Daphnia magna			
Control	100	100	95
3,125	100	100	100
6,250	100	100	100
12,500	100	100	100
25,000	100	100	100
50,000	100	75	15

The *Daphnia magna* test results indicated an LC_{50} value of 37,613 ppm (95% confidence limits are 34,818 and 40,631 ppm).

For all *Daphnia magna* tests, the dissolved oxygen concentrations remained at 4 mg/L or greater throughout the test period. Test temperatures remained in the range of 20±1°C. The tests proceeded without interruption or incidence that could have affected test results.

The results for the rainbow trout acute test initiated on April 26 are summarized in Table 5:

Table 5
Summary of Acute Results
Initiated on April 26
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr	72 hr	96 hr
Oncorhynchus mykiss					
Control	100	100	100	100	100
62,500	100	0	0	0	0
125,000	100	0	0	0	0
250,000	100	0	0	0	0
500,000	100	0	0	0	0
1,000,000	100	0	0	0	0

The rainbow trout test results indicated an LC_{50} value of 31,250 ppm (95% confidence limits are listed as 31,250 to 31,250 ppm). Both the LC_{50} value and the confidence limits may be unreliable due to poor data bracketing of the calculated LC_{50} value.

The results for the rainbow trout acute test initiated on May 3 are summarized in Table 6:

Table 6
Summary of Acute Results
Initiated on May 3
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr	72 hr	96 hr
Oncorhynchus mykiss					
Control	100	100	100	100	100
100	100	100	100	100	100
400	100	100	100	100	100
1,600	100	100	100	100	100
6,400	100	100	100	100	100
25,600	100	0	0	0	0

The rainbow trout test results indicated an LC_{50} value of 16,000 ppm. The 95% confidence limits are listed as 16,000 to 16,000 ppm, but are unreliable due to poor data bracketing of the calculated LC_{50} value and the limitations of the statistical analysis (Linear Interpolation method). A conservative estimate of the 95% confidence values would be 6,400 to 25,600 ppm.

The results for the rainbow trout acute test initiated on May 23 are summarized in Table 7:

Table 7
Summary of Acute Results
Initiated on May 23
Percent Survival

Concentration (ppm)	0 hr	24 hr	48 hr	72 hr	96 hr
Oncorhynchus mykiss					
Control	100	100	100	100	100
3,200	100	100	100	100	100
6,400	100	100	100	100	100
12,800	100	100	90	0	0
25,600	100	0	0	0	0
51,200	100	0	0	0	0

The rainbow trout test results indicated an LC_{50} value of 9,600 ppm. The 95% confidence limits are listed as 9,600 to 9,600 ppm, but are unreliable due to poor data bracketing of the calculated LC_{50} value and the limitations of the statistical analysis (Linear Interpolation method). A conservative estimate of the 95% confidence values would be 6,400 to 12,800 ppm.

For all rainbow trout tests, the dissolved oxygen concentrations remained at 6 mg/L or greater throughout the test period. Test temperatures remained in the range of 12±1°C. The tests proceeded without interruption or incidence that could have affected test results.

The results for the algae chronic test initiated on April 27 are summarized in Table 8:

Table 8 **Summary of Chronic Results** **Initiated on April 27** ***Raphidocelis subcapitata***	
Concentration (ppm)	**Growth (Cells/ml x 10^6)**
Control	3.963
62,500	0.088
125,000	0.064
250,000	0.100
500,000	0.087
1,000,000	0.131

The algae test results indicated an IC_{50} value of 32,000 ppm (95% confidence limits are listed as 31,878 to 32,202 ppm). Both the IC_{50} value and the confidence limits may be unreliable due to poor data bracketing of the calculated IC_{50} value.

The results for the algae chronic test initiated on May 3 are summarized in Table 9:

Table 9 **Summary of Chronic Results** **Initiated on May 3** ***Raphidocelis subcapitata***	
Concentration (ppm)	**Growth (Cells/ml x 10^6)**
Control	3.699
100	2.587
400	1.940
1,600	1.712
6,400	0.686
25,600	0.106

The algae test results indicated an IC_{50} value of 876 ppm (95% confidence limits are listed as 107 to 2,932 ppm).

The results for the algae chronic test initiated on May 23 are summarized in Table 10:

Table 10
Summary of Chronic Results
Initiated on May 23
Raphidocelis subcapitata

Concentration (ppm)	**Growth (Cells/ml x 10^6)**
Control	4.466
320	3.361
800	3.187
2,000	2.729
5,000	1.748
12,500	0.401

The algae test results indicated an IC_{50} value of 3,517 ppm (95% confidence limits are listed as 2,838 to 4,070 ppm).

For all algae tests, the test temperatures remained in the range of 25±1°C. The tests proceeded without interruption or incidence that could have affected test results.

REFERENCE TOXICANT TESTS

The results of the reference toxicant tests using sodium chloride (*Daphnia magna* and *Raphidocelis subcapitata*) and sodium lauryl sulfate (*Oncorhynchus mykiss*) indicate that the test organisms were within their respective sensitivity range based on EPA guidelines (EPA 1994), The IC_{25} values, LC_{50} values, and control chart limits are listed in Tables 11 and 12. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 11
Acute Reference Toxicant Tests (g/L)

Species	LC_{50}	Control Chart
Oncorhynchus mykiss (RBT 236)	3.8	1.6 to 5.3
Oncorhynchus mykiss (RBT 237)	2.5	1.6 to 5.3
Daphnia magna	4.4	3.6 to 5.4

Table 12
Chronic Reference Toxicant Tests (g/L)

Species	IC_{25}	Control Chart Limits
Raphidocelis subcapitata (growth) April	1.40	0.28 to 2.25
Raphidocelis subcapitata (growth) May	0.83	0.27 to 2.19

APPENDIX D
ANALYTICAL RESULTS

CH2M HILL
Applied Sciences Laboratory
2300 NW Walnut Blvd
Corvallis, OR
97330-3538
P.O. Box 428
Corvallis, OR
97339-0428
Tel 541.752.4271
Fax 541.752.0276

CH2MHILL
Applied Sciences Laboratory

June 5, 2006

RE: Laboratory Report for
Applied Sciences Laboratory Reference No. B1579-01

Dear Ray Poland and Sons:

On April 26th, CH2M HILL Applied Sciences Laboratory received 1 sample with a request for analysis of selected parameters. All analyses were performed by CH2M HILL unless otherwise indicated below.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analysis of your samples are discussed in the case narrative. This data package meets standards requested by client and is not intended or implied to meet any other standard.

CH2M HILL Applied Sciences Laboratory appreciates your business and looks forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call Kathy McKinley at (541) 758-0235, extension 3144.

Sincerely,

Dayna Kaumanns

Dayna Kaumanns

Enclosures

CASE NARRATIVE
GENERAL CHEMISTRY

Lab Reference No.: B1579-01

Client/Project:

I. Holding Time:
All acceptance criteria were met.

II. Digestion Exceptions:
None.

III. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Method Blank(s):
All acceptance criteria were met.

C. Duplicate Sample(s):
Not applicable.

D. Spike Sample(s):
Not applicable.

E. Lab Control Sample(s):
All acceptance criteria were met.

F. Other:
Not applicable.

IV. Documentation Exceptions:
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Prepared by: Dayna Zumann Date: 6/5/06

Reviewed by: _____ Date: 6-6-06

CH2M HILL Applied Sciences Laboratory

Client Sample ID: METHOD BLANK
Project Name: Ray Poland and Sons
Sampling Date: N/A
Sampling Time: N/A

Lab Information
Lab Batch ID: B1579
Date Received: 04/26/2006
Report Revision No.: 0
Reported By: DHK
Reviewed By:

Analyte	MRL	Sample Result	Qualifier	Units	Analysis Method	Date Analyzed
General Chemistry						
BOD-30 Day	2	2	U	mg/L	EPA 405.1	05/03/2006 14:40:00 PM

U=Not detected at specified reporting limits

CH2M HILL
Applied Sciences Group

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P.O. Box 428, Corvallis, OR 97339-0428
Tel 541.752.4271 Fax 541.752.0276

CH2M HILL Applied Sciences Laboratory

Client Information
Client Sample ID: 06186A
Project Name: Ray Poland and Sons
Sampling Date: 04/18/2006
Sampling Time: 13:54

Lab Information
Lab Batch ID: B1579-01
Date Received: 04/26/2006
Report Revision No.: 0
Reported By: DHK
Reviewed By: RKJ

Analyte	MRL	Sample Result	% of Total Product Biodegradation	Qualifier	Units	Analysis Method	Date Analyzed
General Chemistry							
BOD-30 Day	2	1554	51.60%		mg/L	EPA 405.1	05/03/2006 14:50:00 PM

U=Not detected at specified reporting limits

CH2M HILL
Applied Sciences Group

2300 NW Walnut Blvd., Corvallis, OR 97330-3538
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Tel 541.752.4271 Fax 541.752.0276

5-Day BOD Bench Sheet

			Date set-up		05/03/2006		Date off		06/02/2006		
				Time	14:00		Time		12:00		
				Analyst	DHK		Analyst		dhk		
			mL Seed/L	Vol. seed	B1 seed	B2 seed	DO used seed				
			30	10	8.50	4.70	3.80				
	Sample ID, pH										
TIME		No.	Dilution	Volume			DO used	f	BOD	Comments	
14:30	Blank w/o seed	9	1	300	8.55	8.50	0.05	0.000	0	IN t= 22	
		31	1	300	8.55	8.50	0.05	0.000	0	do= 8.72	
		11	1	300	8.55	8.60	-0.05	0.000	0	Room =20	
14:35	SEED	6	150	2	8.50	7.80	0.70	0.894	-405	INC003=20	
	3-PGC-39-8A	23	60	5	8.50	7.10	1.40	0.885	-118		
		1A	30	10	8.50	4.70	3.80	0.870	15		
		40	12	25	8.50	0.20	8.30	0.825	62	OUT t=19	
		21	12	25	8.50	0.20	8.30	0.825	62	do=	
14:40	WB1-0503	7	1	300	8.50	5.40	3.10	0.000	3	INC003=20	
	Blank w/seed	63	1	300	8.50	5.80	2.70	0.000	3	Room = 20	
		432	1	300	8.50	5.50	3.00	0.000	3		
14:50	1B1579-01	410	1500	0.2	8.50	4.30	4.20	0.899	1173	**2 MLS 10X DIL.**	
	0.4% SOLUTION	28	750	0.4	8.50	2.95	5.55	0.899	1601	**4 MLS 10X DIL.**	
	30-DAY	4	600	0.5	8.50	2.60	5.90	0.899	1491	**5 MLS 10X DIL.**	
		55	500	0.6	8.50	1.35	7.15	0.898	1868	**6 MLS 10X DIL.**	
		417	400	0.75	8.50	1.00	7.50	0.898	1635	**7.5 MLS 10X DIL.**	
		24	300	1	8.50	0.00	8.50	0.897	1527	**10 MLS 10X DIL.**	x
		50	200	1.5	8.50	0.00	8.50	0.896	1019	**15 MLS 10X DIL.**	x
		20	150	2	8.50	0.00	8.50	0.894	765		x
							average=		**1553.9**		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
							average=		**#DIV/0!**		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
							average=		**#DIV/0!**		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
			#DIV/0!				0.00	0.900	#DIV/0!		
							average=		**#DIV/0!**		
	X = Depletion requirements not met										
	Diluted samples are prepared with 10 mls of sample brought to 100mls with buffered seeded water										

CH2M HILL
Applied Sciences Laboratory
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P.O. Box 428
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CH2MHILL
Applied Sciences Laboratory

May 15, 2006

RE: Laboratory Report for
Applied Sciences Laboratory Reference No. 1B1579-01

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The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analysis of your samples are discussed in the case narrative. This data package meets standards requested by client and is not intended or implied to meet any other standard.

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Sincerely,

Dayna Kaumanns

Dayna Kaumanns

Enclosures

CASE NARRATIVE
GENERAL CHEMISTRY

Lab Reference No.: 1B1579-01

Client/Project:

I. Holding Time:
All acceptance criteria were met.

II. Digestion Exceptions:
None.

III. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Method Blank(s):
All acceptance criteria were met.

C. Duplicate Sample(s):
Analysis performed in accordance with standard operating procedure.

D. Spike Sample(s):
Analysis performed in accordance with standard operating procedure.

E. Lab Control Sample(s):
All acceptance criteria were met.

F. Other:
Not applicable.

IV. Documentation Exceptions:
None.

V. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Prepared by: Dayna Kumarich Date: 5/15/06

Reviewed by: _____ Date: _____

CH2M HILL Applied Sciences Laboratory

Client Information
Client Sample ID: 06186A
Project Name: Ray Poland and Sons
Sampling Date: 04/18/2006
Sampling Time: 13:54

Lab Information
Lab Batch ID: 1B1579-01
Date Received: 04/26/2006
Report Revision No.: 0
Reported By: DHK
Reviewed By:

Analyte	MRL	Sample Result	% of Total Product Biodegradation	Qualifier	Units	Analysis Method	Date Analyzed
General Chemistry							
BOD-5 Day	2	1118	37.12		mg/L	EPA 405.1	05/03/2006 14:50:00 PM
COD	20	3012			mg/L	EPA 410.4	04/27/2005

U=Not detected at specified reporting limits

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Tel 541.752.4271 Fax 541.752.0276

5/3/06 OK

5-Day BOD Bench Sheet

			Date set-up	05/03/2006			Date off		05/08/2006		
				Time	14:00		Time		13:00		
				Analyst	DHK		Analyst		DHK		
			mL Seed/L	Vol. seed	B1 seed	B2 seed	DO used seed				
			30	25	8.50	3.10	5.40				
	Sample ID, pH										
TIME		No.	Dilution	Volume			DO used	f	BOD	Comments	
14:30	Blank w/o seed	24	1	300	8.55	8.50	0.05	0.000	0	IN t= 19	
		6	1	300	8.55	8.50	0.05	0.000	0	do= 9.26	
		25	1	300	8.55	8.50	0.05	0.000	0	Room =20	
14:35	SEED	59	12	25	8.50	3.00	5.50			INC003=20	
	3-PGC-39-8A	11	12	25	8.50	3.10	5.40			OUT t=19	
		33	6	50	8.50	0.50	8.00			do=9.26	
14:40	WB1-0503	38	1	300	8.50	6.60	1.90	0.000	1	INC003=20	
	Blank w/seed	63	1	300	8.50	6.60	1.90	0.000	1	Room = 20	
		189	1	300	8.50	6.50	2.00	0.000	1		
14:45	BS1W0503	14	150	2	8.50	3.90	4.60	0.358	200		
	2-PGC-98-6	429	150	2	8.50	3.90	4.60	0.358	200		
	Hach 14865-10	5	150	2	8.50	4.00	4.50	0.358	193	TV=198	
							average=		**197.7**	**99.83%**	
14:50	1B1579-01	5	600	0.5	8.50	4.10	4.40	0.359	1476	**5 MLS 10X DIL.**	
	0.4% SOLUTION	18	500	0.6	8.50	4.35	4.15	0.359	1105	**6 MLS 10X DIL.**	
		9	400	0.75	8.50	3.90	4.60	0.359	1064	**7.5 MLS 10X DIL.**	
	5-DAY	8	300	1	8.50	3.80	4.70	0.359	829	**10 MLS 10X DIL.**	
		1	200	1.5	8.50	0.00	8.50	0.358	1313	**15 MLS 10X DIL.**	X
		7	150	2	8.50	0.00	8.50	0.358	985		X
		14	60	5	8.50	0.00	8.50	0.354	395		X
							average=		**1118.4**		
14:55	F1635-01	23	12	25	8.60	5.20	3.40	0.330	19		
	ENTEK	28	6	50	8.70	4.30	4.40	0.300	17		
	pH adj. to 7.19	4	3	100	8.95	2.15	6.80	0.240	17		
		48	2	150	9.20	0.00	9.20	0.180	16	X	
		21	1.5	200	9.40	0.00	9.40	0.120	13	X	
							average=		**17.5**		
15:00	F1642-01	7	12	25	8.60	5.80	2.80	0.330	12		
	ENTEK	55	6	50	8.80	5.20	3.60	0.300	12		
	pH adj. to 6.83	5	3	100	9.05	4.20	4.85	0.240	11		
		114	2	150	9.50	2.50	7.00	0.180	12		
		54	1.5	200	9.90	1.60	8.30	0.120	11		
							average=		**11.7**		
	F1657-01	316	12	25	8.60	5.50	3.10	0.330	16		
	ENTEK	27	6	50	8.80	4.70	4.10	0.300	15		
	pH adj. to 6.89	11	3	100	9.05	3.00	6.05	0.240	14		
		11	2	150	9.50	1.10	8.40	0.180	15		
		8	1.5	200	9.90	0.00	9.90	0.120	14	X	
							average=		**15.0**		
	X = Depletion requirements not met										
	Dliuted samples are prepared with 10 mls of sample brought to 100mls with buffered seeded water										

G\Chemist\Forms\Bench\Gencher~1\COD.XLS
revised 4/2006

CH2MHILL
Applied Sciences Laboratory

COD-Reactor Digestion Method-EPA 410.4, SM5220 D

Date: 4/27/06 Clients: BIO ASSY
Analyst: DHK
Page: 1 of 1

0-150 PPM Range @ 420 nm (stored program 45)
0-1500 PPM Range @ 620 nm (stored program 46)
check wavelength w/ preprogrammed value

	Lab ID/Client ID	Range	mL sample	final volume	spike: mL/ppm	DF	Conc. Reading	mg/L	Comments
A	BLANK WBI-0427	1500	2mL	2mL			SET 0		
B	CCV CVI-0427	↓	↓	↓	2/1000		1024	1024	TV=1000 mg/L 10
C	LCS BSLW-0427	↓	↓	↓	2/300		308	308	TV=300 mg/L 10
	dup								
	MS IB1579-01	1500	0.5mL	2mL	0.5/1000		945		250 mg/L spike 92%
	MSD IB1579-01	↓	↓	↓	0.5/1000		998		↓ 99%
1	IB1579-01	1500	0.5mL	2mL		4	753	3012	
2	IB1579-01	↓	1mL	2mL		2	1449	2898	
3	↓	↓	0.25mL	2mL		8	390	3085	
4	↓	↓	0.5mL	2mL		4	753	3012	
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Reagent	Lot #	Expiration Date
1500 vials	3-PLC-46-8	10/31/2010
300mg/L	3-PLC-13-9	4/30/2010
1000 mg/L	1-PLC-5/31	5/31/2010

LCS must be ±20% T.V.
MS/MSD must be ±15% T.V.
CCV must be ±15% T.V.
T.V.= True Value

CH2M HILL
Applied Sciences Group
2300 NW Walnut Blvd., Corvallis, OR 97330-3538
P.O. Box 428, Corvallis, OR 97339-0428
Tel 541.752.4271 Fax 541.752.0276

CH2M HILL CHAIN OF CUSTODY RECORD For Aquatic Toxicity and Biodegradability

Client Ray Poland and Sons
Address 525 W. Grand Ronds
Kennewick, WA 99336

Contact Person: Jacek Kobiesa
Phone: 509-586-2158

CH2M HILL Project #

NPDES# N/A
Composite Sample Information

Samples/Hour Volume/Sample
Total Hours Total Volume
Initiated: Date Time
Ended: Date Time
Chilled During Collection

Ship Samples to:
PO#

CH2M HILL, Inc.
Attention: Aquatic Toxicology Laboratory
2300 NW Walnut Blvd.
Corvallis, OR 97330
Phone: (541) 752-4271, ext. 3160
Message: (541) 758-0235, ext. 3160

Check Chlorine (Y/N) n 0.14
Temp. Upon Arrival (°C) N/A 21.5
Check Ammonia (Y/N) n Dechlorinated (Y/N) N/A

Analysis Required / Comments

Sample ID	Date	Time	Sample Type: Comp.	Sample Type: Grab	# of Containers	Lab ID#																		Concentration and/or Comments
06186A						1B1579-01																		test for aquatic toxicity
																								test for biodegradability

Sampled By & Title: Paul H. Berger	(Please sign and print name): Paul H. Berger Vice President	Date/Time: 4/18/06 13:54	Relinquished By: Paul H. Berger	(Please sign and print name): Paul H. Berger	Date/Time: 4/18/06 13:54
Received By: JACEK KOBIESA	(Please sign and print name): J. KOBIESA	Date/Time: 4-20-06 11:50	Relinquished By: JACEK KOBIESA	(Please sign and print name): J. KOBIESA	Date/Time: 4-20-06 12:00
Received By	(Please sign and print name)	Date/Time	Relinquished By	(Please sign and print name)	Date/Time
Received By	(Please sign and print name)	Date/Time	Shipped Via: UPS ___ Bis ___ Fed-Ex ___ Hand ___ Other ___		Shipping #
Work Authorized By	(Please sign and print name)	Remarks			