

DOE/OR/22012--76

STANDARD REPORT FORM

STATIC RENEWAL TESTS USING ANODONTA IMBECILLIS
(FRESHWATER MUSSELS)

Test Title: Anodonta imbecillis QA Test 3, Clinch River - Environmental
Restoration Program (CR-ERP)

Principle Investigator: Damien J. Simbeck

Starting Date: May 10, 1994

Ending Date: May 19, 1994

1.0 EXECUTIVE SUMMARY

Toxicity testing of split whole sediment samples using juvenile freshwater mussels (Anodonta imbecillis) was conducted by TVA to provide a quality assurance mechanism for test organism quality and overall performance of the test being conducted by CR-ERP personnel as part of the CR-ERP biomonitoring study of Clinch River sediments [1]

Testing of sediment samples collected May 5 from Poplar Creek Miles 6.0 and 2.9 was conducted from May 10-19, 1994. Results from this test showed no toxicity (survival effects) to fresh-water mussels during a 9-day exposure to the sediments.

2.0 SAMPLE COLLECTION/TREATMENTS

- 2.1 Test Sample Identification (Chemical/Effluent/Elutriate, etc.):
The samples used for biomonitoring were whole sediments collected from Poplar Creek Miles 6.0 (CR-ERP ID No. 51650) and 2.9 (CR-ERP ID No. 51648).
- 2.2 Control and/or Dilution Sediment: Poplar Creek Mile (PCM) 6.0.
- 2.3 Sample Date: May 5, 1994
- 2.4 Sampling Method: Samples were collected by TVA Engineering Services personnel. An Eckman dredge was used to obtain whole sediments at each location. Sediment samples from numerous dredge collections were composited in a large container, then split into two samples. One set of samples was sent to TVA's Toxicity Testing Laboratory (TTL) at the Browns Ferry Nuclear Plant site near Athens, Alabama, and the other to Oak Ridge National Laboratory (ORNL) for comparative testing.
- 2.5 Sample Transport: All samples were placed in coolers on ice at the time of collection and shipped to TTL by TVA mail.

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- 2.6 Sample Storage/Handling: All samples were stored in a refrigerator at $4^{\circ}\text{C} \pm 1^{\circ}\text{C}$ prior to and during the test.
- 2.7 Test Treatments: Three treatments, PCM 6.0 (Control), PCM 2.9-100% and PCM 2.9-50% (diluted with PCM 6.0 sediment), were tested. Filtered (100 μm) non-toxic sediment (approximately 800 mg/L dry weight) from the same source used for culture maintenance was also included as a laboratory reference. Moderately hard reconstituted water served as overlying water for all sediment treatments.
- 2.8 Sample Pretreatment: Sediment samples were stirred thoroughly on May 9 with a stainless steel spoon, and sufficient 50 percent sample (V:V) was prepared. Four crystallizing dishes per treatment were set up by adding 25 mL of sediment and 100 mL moderately hard water to each dish. The dishes were placed in the test incubator 24-hr prior to test initiation to allow settling and temperature equilibration.

3.0 TEST ORGANISMS/CULTURING CONDITIONS

- 3.1 Species: Anodonta imbecillis, freshwater mussel
- 3.2 Culture of Test Organisms:
- 3.2.1 Source: In vitro culture, April 27-May 4, 1994, TVA Toxicity Testing Laboratory. The gravid adults from which glochidia were extracted were obtained from Haleyville City Reservoir, Haleyville, Alabama, on April 26, 1994. Adults were maintained in a 40-L aquarium with approximately 5 L non-toxic sediment from Taylor's ponds and 20 L Tennessee River water. Water was renewed at least once per week with bloomed phytoplankton water and sediment was renewed monthly.
- 3.2.2 Culture medium: Mussel culture medium used to transform larvae (glochidia) into juveniles consisted of a 2:1 mixture of cell culture medium (MEM) and 0.22 μm filtered catfish plasma. Antibiotics and antimycotics were added in small concentrations to prevent bacterial and fungal contamination. [2]
- 3.2.3 Temperature of culture: $24^{\circ}\text{C} \pm 1^{\circ}\text{C}$
- 3.3 Maintenance of Test Organisms:
- 3.3.1 Culture water: After transformation of larval mussels (May 4), the free-living juveniles were placed in filtered (100 μm) TR water with bloomed indigenous algae (phytoplankton). Non-toxic sediment (100 μm filtered) was added to provide additional food and substrate for healthy growth of the juvenile mussels. [3]
- 3.3.2 Temperature of culture: $24^{\circ}\text{C} \pm 1^{\circ}\text{C}$

- 3.3.3 General maintenance: Cultures were maintained in 2000-mL Nalgene® trays in 24-h dark incubators. From May 5-9, cultures were changed out daily with fresh phytoplankton water and silt. Cultures were also fed a concentrated phytoplankton (25 mL/L) daily. Health and survival of the culture were checked by microscopic examination of animals when culture water was changed.

One day prior to test initiation (May 9) mussels were counted and transferred into test cylinders which were placed in crystallizing dishes containing moderately hard water spiked with reference sediment and YCT-S.

3.4 Food Preparation:

- 3.4.1 Phytoplankton preparation: Phytoplankton was bloomed in 20-L glass aquaria 4-7 days (until dark green). Blooms were initiated by adding concentrated solids from TTL channel water to filtered (100 µm) TR water. Algal nutrients used for Selenastrum cultures were added (1 mL/L) to boost algal blooms. [4] Blooms were allowed to settle in a refrigerator to concentrate the algal cells into a dark green suspension, obtaining about 0.5 L per aquarium. Prepared phytoplankton concentrate was refrigerated until used.

- 3.4.2 YCT and Selenastrum preparation: YCT is made according to methods modified from EPA/600/4-89/001 with tropical fish food substituted for trout chow and alfalfa substituted for Cerophyll. [5] The alga Selenastrum capricornutum concentrated to 30×10^6 cells/mL is also fed as part of the test diet.

- 3.5 Sediment Preparation: Whole, non-toxic sediment from Taylor's Catfish ponds, Town Creek, Alabama, was filtered through a 100-µm nylon mesh filter. Filtered sediment was stored at $\leq 4^\circ\text{C}$ until used.

4.0 TEST METHODS

- 4.1 Mussels, Anodonta imbecillis, Survival Test, TVA Test Method, SOP-22, solid phase protocol. [4]
- 4.2 Modification/Deviations to SOP-22:
- 4.2.1 Mussels were fed 3 mL/L YCT and 3mL/L Selenastrum daily instead of concentrated phytoplankton.
- 4.2.2 Test sediment (25 mL per replicate) with overlying moderately hard reconstituted water (100 mL per replicate) was placed into dishes 24 hr before test initiation and placed in the incubator to allow settling and temperature equilibration. This sediment was not renewed during the 9-day test period.

- 4.2.3 Sample volume was 25 mL sediment and 100 mL water instead of 20 mL sediment and 150 mL water.
- 4.2.4 The final water sample from Taylor's Silt Reference was accidentally discarded before final chemistry measurement were made on Day 2 (May 12).
- 4.3 Date/Time Test Initiated: May 10, 1994/0845 CDT
- 4.4 Date/Time Test Terminated: May 19, 1994/0800 CDT
- 4.5 Age of Test Organisms: 6 days old
- 4.6 Test Chamber: 50 mm-diameter glass cylinder (75 mm tall) with 100- μ m nylon mesh bottom, placed in 200-mL crystallizing dish
- 4.7 Volume per Chamber: 100 mL water, 25 mL sediment
- 4.8 Number of Organisms Per Replicate: 10
- 4.9 Number of Replicates Per Treatment: 4
- 4.10 Test Control: PCM 6.0
- 4.11 Dilution Sediment: PCM 6.0
- 4.12 Overlying Water: Moderately hard synthetic water
- 4.13 Test Temperature: 24°C $\pm$ 1
- 4.14 Photoperiod: 24-h dark
- 4.15 Renewal Period: 24-h
- 4.16 Renewal Method: Following removal of 60 mL of the overlying water for chemical analyses, each test cylinder was placed in a petri dish with moderately hard reconstituted water for microscopic examination. After examination, the cylinder was returned to the same crystallizing dish, and 60 mL fresh water was poured into the test vessel through the test cylinder. Test sediment was not renewed during this test.
- Taylor's reference sediment was renewed daily by adding approximately 800 mg dry weight filtered sediment (2.7 mL) per liter of moderately hard water. Dishes were emptied and renewed with 150 mL water/sediment mixture.
- 4.17 Feeding Regime During Test: Following renewal, 0.45 mL each of YCT and Selenastrum were added to each test chamber.

- 4.18 Physical and Chemical Parameters Measured: Parameters measured daily ("initial") on overlying and reference waters (following addition of silt and algae) were temperature (temperature adjusted to equal "final" temperature before renewal), DO, pH, conductivity, alkalinity and hardness.

"Final" measurements of temperature were taken in one replicate per treatment before renewal. "Final" measurements of DO, pH, conductivity, alkalinity, hardness and total ammonia were measured in a combination of overlying waters (60 mL/replicate/day) from all replicates per treatment following renewal. The test solutions (75 mL) were preserved with 1:4 H₂SO₄ and refrigerated until sent to TVA's Environmental Chemistry Laboratory in Chattanooga, Tennessee, for ammonia analysis using the automated alkaline phenate methodology.

- 4.19 Test Endpoint Determination:

- 4.19.1 Survival: Test animals were counted as dead when microscopic examination revealed valves gaped open and no observable internal movement or an empty shell.

- 4.20 Statistics: Revised statistical procedures contained in the fourth edition of EPA's acute toxicity methods require a decision process for testing statistical assumptions before selecting a specific statistical test to determine toxicity endpoints. [6] No statistical analysis was necessary due to 100 percent survival in all test treatments. Control survival was 98 percent.

5.0 QUALITY ASSURANCE

- 5.1 Toxicity Test Methods: All phases of the study including, but not limited to, sample collection, handling and storage; glassware preparation; test organism culturing/acquisition and acclimation; test organism handling during test; and maintaining appropriate test conditions were conducted according to the protocol as described in this report, the TTL Quality Assurance Plan and SOP Manual, and EPA/600/4-89/001. [4][5] Any known deviations were noted during the study and are reported herein.

- 5.2 Physical and Chemical Methods

- 5.2.1 Reagents, Titrants, Buffers, etc.: All chemicals were certified products used before expiration dates (where applicable). All TTL chemicals are recorded in a bound Laboratory Chemical Logbook and specific chemicals used were documented on a chemical record sheet contained in the study notebook.

- 5.2.2 Instruments: All identification, service, and calibration information pertaining to TTL laboratory instruments is contained in bound Laboratory Instrument Logbooks and specific instruments used were documented on an instrument record sheet, along with daily calibration record sheets, contained in the study notebook.
- 5.2.3 Temperature was measured using mercury thermometers. The instrument was standardized and inspected with readings made according to TVA procedure ES-42.11. [7]
- 5.2.4 Dissolved oxygen was measured using a YSI Model 57 oxygen meter. The instrument was standardized (using the Winkler method) and readings were taken according to TVA procedures ES-43.6 and ES-42.4, respectively. [7]
- 5.2.5 The pH was measured using an Orion Model SA250 meter equipped with an Orion Ross combination electrode. The instrument was standardized and readings were made according to TVA procedures ES-43.7 and ES-42.8, respectively. [7]
- 5.2.6 Conductance was measured using a YSI Model 32 SCT meter. The instrument was standardized and readings were taken according to TVA procedures ES-43.3 and ES-42.3, respectively. [7]
- 5.2.7 Alkalinity was measured by titration of 100 mL samples with 0.02 N H₂SO₄ to an end point of 4.5 according to TVA procedure ES-42.1. [7]
- 5.2.8 Hardness was determined by titration of 50 mL samples with EDTA to a colorimetric endpoint using an indicator (Instructions provided by Reagent Manufacturer [Calgon]), Schwarzenbach Method.

6.0 RESULTS

- 6.1 Summary of Results: Nine day exposure of juvenile freshwater mussels, Anodonta imbecillis, to whole sediments from Poplar Creek showed no toxicity at PCM 6.0 (Control) or PCM 2.9 (100 percent and 50 percent sample).
- 6.2 Results, Survival Data:
- 6.2.1 Statistical Decision Process for Determining Toxicity Endpoints for 9-day Exposure of the Juvenile Mussel, Anodonta imbecillis, to Test Sediments, May 10-19, 1994.

Not applicable

6.2.2 Daily Percent Survival Summary for Anodonta imbecillis, Whole Sediment QA Test 3, CR-ERP, May 10-19, 1994.

Treatment	Total Daily % Survival								
	1	2	3	4	5	6	7	8	9
PCM 6.0	100	100	100	100	98	98	98	98	98
PCM 2.9-100%	100	100	100	100	100	100	100	100	100
PCM 2.9-50%	100	100	100	100	100	100	100	100	100
Taylor's Silt Refer.	100	100	100	100	100	100	100	100	100

6.2.3 Nine-day Percent Survival Summary for Anodonta imbecillis, Whole Sediment QA Test 3, CR-ERP, May 10-19, 1994.

Mussel Survival Data (% Survival)												
Treatment	Replicate										Mean	S*
	1	2	3	4	5	6	7	8	9	10		
PCM 6.0	100	100	100	90								98
PCM 2.9-100%	100	100	100	100								100
PCM 2.9-50%	100	100	100	100								100

*S-Significant

6.3 Water Chemistry Summary for Anodonta imbecillis, Whole Sediment QA Test 3, CR-ERP, May 10-19, 1994.

6.3.1 Test Temperature: 24.2°C (23.8°-24.6°C)

6.3.2 See: Appendix A Water Chemistry Mean Values and Ranges for Anodonta imbecillis, Whole Sediment QA Test 3, CR-ERP, May 10-19, 1994.

7.0 CONCLUSION

Testing of sediment samples collected May 5 from Poplar Creek Miles 6.0 and 2.9 was conducted from May 10-19, 1994. Results from this test showed no toxicity (survival effects) to fresh-water mussels during a 9-day exposure to the sediments.

8.0 REFERENCES

1. Phipps, T. L., and L. A. Kszos, Statement of Work to Provide Assistance to Staff of the Clinch River-Environmental Restoration Program (CR-ERP) and to Evaluate Toxicity Tests of Water and Sediment Conducted by CR-ERP Staff, Environmental Sciences Division, Biomonitoring Group, Oak Ridge National Laboratory (April 1993).
2. Isom, B. G., and R. G. Hudson, "In Vitro Culture of Parasitic Freshwater Mussel Glochidia," The Nautilus, Vol. 96, No. 4, 1982, pp. 147-151.

3. Hudson, R. G., and B. G. Isom, "Rearing Juveniles of the Freshwater Mussels (Unionidae) in a Laboratory Setting," The Nautilus, Vol. 98, No. 4, 1984, pp. 129-135.
4. Toxicity Testing Laboratory Quality Assurance Program and Standard Operating Procedures Manual, Division of Water Resources, Tennessee Valley Authority (October 1992).
5. Weber, C. I., W. H. Peltier, T. J. Norberg-King, W. B. Horning, F. A. Kessler, J. R. Menkdick, T. W. Neiheisel, P. A. Lewis, D. J. Klemm, Q. H. Pickering, F. L. Robinson, J. M. Lazorchak, L. J. Wymer, and R. W. Freyberg. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. EPA/600/4-89/001 (March 1989) and EPA/600/4-89/001a (September 1989).
6. Weber, C. I. (ed.), Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-90/027 (September 1991).
7. Field Operations Natural Resource Engineering Procedures Manual, Vol. 1, Division of Natural Resource Operations, Tennessee Valley Authority.

PLARC501-494

Appendix A

Water Chemistry Mean Values and Ranges for *Anadonta imbecillis*, Whole Sediment QA Test 3, CR-ERP, May 10-19, 1994

Source	Temperature		Dissolved Oxygen		pH		Conductivity		Alk		Hardness		Ammonia	
	Final	(°C)	Initial	(mg/L)	Initial	(S.U.)	Final	(S.U.)	Initial	(µmhos)	Final	(µmhos)	Initial	(mg/L)
PCM 6.0	24.2	(23.8-24.6)	-	7.2	-	7.5	-	316	-	40	-	77.8	-	< 0.001
PCM 2.9-100%	24.2	(23.9-24.6)	-	6.9	-	7.7	-	361	-	60	-	99.1	-	< 0.002
PCM 2.9-50%	24.1	(23.8-24.5)	-	7.1	-	7.6	-	347	-	52	-	92.0	-	< 0.001
Taylor's Silt Refer.	24.2	(24.1-24.6)	7.8	7.8	7.8	8.0	330	343	62	64	88.2	92.3	0.008	
Moderately Hard Water	-	(8.0-8.4)	8.3	-	8.2	-	332	-	64	-	86.0	-	-	

* mg/L as CaCO₃

PLARC501-495

ATTACHMENT I

CHAIN OF CUSTODY RECORD - ORIGINAL

TVA - BFEEY

FOUO Rev. 03 28JAN94

DOCUMENT ID:

CR2-01920



ATTACHMENT II

TOXICITY TEST BENCH SHEETS

ARL ACUTE TOXICITY TEST (MUSSEL) MASTER CHECKLIST Study: CR-ERP Mussel / May 1994

Date Issued: 5-10-94 To: Simbeck From: DS

1. Test organism availability: T.L.* DS C.U.† DS Date 4-27-94
2. Sample Collection Coordination: Date 4-28-94 By Simbeck With L. Graser
3. Glassware availability: T.L. DS Tech - Date 5-3-94
4. Silt/Phytoplankton availability: Silt- By JPP Date 5-4-94
Phytoplankton- By JPP/DS Date 5-4-94
5. Glassware prep. complete: Date 5-9-94 By DS
6. Data Sheet prep. complete: Date 5-10-94 By DS
7. Test organism availability verification: T.L. DS
8. Test Initiation: Date/Time 5-10-94 / 0845

9. Test Renewal:	Day#:	0	1	2	3	4	5	6	7	8	9
Meter Calib.	T.L.	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>-</u>
	T.M.*	<u>-</u>	<u>MED</u>	<u>MED</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>-</u>
Log Samples	T.L.	<u>DS</u>	<u>NA</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>N/A</u>
	T.M.	<u>NA</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>N/A</u>
Storage Temp see custody seal log		<u>NA</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>N/A</u>
		<u>NA</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>N/A</u>
Initial Chem.	T.L.	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>N/A</u>
	T.M.	<u>NA</u>	<u>MED</u>	<u>MED</u>	<u>MED</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>TS</u>	<u>JPP</u>	<u>N/A</u>
Renewal/Counts	T.L.	<u>NA</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>JPP</u>
	T.M.	<u>NA</u>	<u>MED</u>	<u>MED</u>	<u>MED</u>	<u>NA</u>	<u>NA</u>	<u>MED</u>	<u>MED</u>	<u>-</u>	<u>-</u>
Final Chem.	T.L.	<u>N/A</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>TS</u>	<u>DS</u>	<u>JPP</u>
	T.M.	<u>N/A</u>	<u>MED</u>	<u>MED</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>TS</u>	<u>DS</u>	<u>JPP</u>	<u>-</u>
Meter Recal.	T.L.	<u>NA</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>TS</u>	<u>TS</u>
	T.M.	<u>NA</u>	<u>MED</u>	<u>MED</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>DS</u>	<u>-</u>
Paperwork reviewed	T.L.	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>DS</u>	<u>JPP</u>
	T.M.	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>-</u>

10. Test Termination: Date/Time 5-19-94 / 0800

12. Run Stats: Date NA By NA

13. Report Prep.: Date 6-2-94 By DS

14. Report Final: Date 6-14-94 By JFM Approved: DS

*Team Leader

†Culture Unit

#Team Member

N/A

JFM

TREATMENT: Taylor's Silt (Reference)

Crushed onck during change-out

DAY:	0	1	2	3	4	5	6	7	8	9
DATE:	5/10	5/11	5/12	5/13	5/14	5/15	5/16	5/17	5/18	5/19
Rep 1: # Alive	10	10	10	10	10	10	10	10	9**	9**
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 2: # Alive	10	10	10	10	10	10	9*	9	9	9
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 3: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 4: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
MS MS MS MS MS MS MS MS MS MS MS										

TREATMENT: PCM 6.0 (Control)

DAY:	0	1	2	3	4	5	6	7	8	9
DATE:	5/10	5/11	5/12	5/13	5/14	5/15	5/16	5/17	5/18	5/19
Rep 1: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 2: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 3: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 4: # Alive	10	10	10	10	10	9	9	9	9	8
# Stressed	0	0	0	0	0	0	0	0	0	1
# Dead	0	0	0	0	0	1	1	1	1	1
MS MS MS MS MS MS MS MS MS MS MS										

Reviewed By: MS

TREATMENT: PCM 2.9 50%

DAY:	0	1	2	3	4	5	6	7	8	9
DATE:	5/10	5/11	5/12	5/13	5/14	5/15	5/16	5/17	5/18	5/19
Rep 1: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 2: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 3: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 4: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
MS MTS MTS MS MS MS MS MS MS MS JPP										

TREATMENT: PCM 2.9 100%

DAY:	0	1	2	3	4	5	6	7	8	9
DATE:	5/10	5/11	5/12	5/13	5/14	5/15	5/16	5/17	5/18	5/19
Rep 1: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 2: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 3: # Alive	10	10	10	10	10	10	10	10	10	10
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
Rep 4: # Alive	10	10	10	10	9*	9	9	9	9	9
# Stressed	0	0	0	0	0	0	0	0	0	0
# Dead	0	0	0	0	0	0	0	0	0	0
MS MTS MS MTS MS Reviewed By: MS JPP										

*one crushed during change-out

MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS MS/MTS

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994PoseyEnding Date: May 19, 1994Date: 5-10-94

TREATMENT	F-Med #1707	Taylor Silt	50% PCm 6.0	100% PCm 2.9	100% PCm 2.9			
Temperature		24.1	24.0	23.8	24.1			
D.O. (before air)								
(after air)								
(w/silt/algae)	8.2*	8.1						
pH (before air)								
(after air)								
(w/silt/algae)	8.3*	7.8						
(Aeration time)								
Conductivity	337*	336						
Hardness	4.4*	4.5						
x 20.0	88*	90						
Alkalinity	6.4*	6.5						
x 10	64*	65						
Chlorine								
Ammonia								

NOTES: * chemistry of medium placed in dishes with
sediment on 5-9-94

Reviewed By: MS
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994JS 5-11-94
Posey BarfieldEnding Date: May 19, 1994Date: 5-11-94

TREATMENT	F-Med #1707	Taylor Silt						
Temperature	24.0	24.0						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.4	8.0						
pH (before air)								
(after air)								
(w/silt/algae)	8.2	7.8						
(Aeration time)								
Conductivity	338	336						
Hardness	4.4	4.6						
x 20.0	88	92						
Alkalinity	6.4	6.2						
x 10	64	62						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: JS
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey BarfieldEnding Date: May 19, 1994Date: 5-12-94

TREATMENT	F-Med #1707	Taylor Silt						
Temperature	24.7	24.7						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.0	7.3						
pH (before air)								
(after air)								
(w/silt/algae)	8.2	7.7						
(Aeration time)								
Conductivity	339	337						
Hardness		4.5						
x 20.0		¹⁷⁵⁰ 4590						
Alkalinity		6.3						
x 10		63						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: 8/5
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994PoseyEnding Date: May 19, 1994Date: 5-13-94

TREATMENT	F-Med #1707	Taylr Silt						
Temperature	24.2	24.3						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.2	7.8						
pH (before air)								
(after air)								
(w/silt/algae)	8.3	7.9						
(Aeration time)								
Conductivity	340	337						
Hardness		4.6						
x 20.0		92						
Alkalinity		6.4						
x 10		64						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: ES
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey ⁷³ 5-14-94Ending Date: May 19, 1994Date: 5-14-94

TREATMENT	F-Med #1707	Taylr Silt						
Temperature	23.5	23.5						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.2	7.8						
pH (before air)								
(after air)								
(w/silt/algae)	8.3	7.8						
(Aeration time)								
Conductivity	336	337						
Hardness		4.5						
x 20.0		90						
Alkalinity		6.4						
x 10		64						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: 72
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey ⁷⁵ 5-15-94Ending Date: May 19, 1994Date: 5-15-94

TREATMENT	F-Med # 1707	Taylor Silt						
Temperature	24.0	24.0						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.4	7.8						
pH (before air)								
(after air)								
(w/silt/algae)	8.3	7.8						
(Aeration time)								
Conductivity	341	339						
Hardness		4.6						
x 20.0		92						
Alkalinity		6.2						
x 10		62						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: Griff
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994^{9/5}
Posey SerleEnding Date: May 19, 1994Date: 5-16-94

TREATMENT	F-Med #1716	Taylor Silt						
Temperature	24.1	24.1						
D.O. (before air)								
(after air)								
(w/silt/algae)	8.3	8.0						
pH (before air)								
(after air)								
(w/silt/algae)	8.2	7.9						
(Aeration time)								
Conductivity	319	317						
Hardness	4.2	4.1						
x 20.0	8.4	8.2						
Alkalinity	6.3	6.0						
x 10	63	60						
Chlorine								
Ammonia								

NOTES: _____

Reviewed By: JS
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Pogey ²⁷⁵Ending Date: May 19, 1994Date: 5-17-94

TREATMENT	F-Med # 1716	Taylor Silt							
Temperature	23.6	23.6							
D.O. (before air)									
(after air)									
(w/silt/algae)	8.3	7.8							
pH (before air)									
(after air)									
(w/silt/algae)	8.2	7.7							
(Aeration time)									
Conductivity	320	317							
Hardness		4.1							
x 20.0		82							
Alkalinity		6.0							
x 10		60							
Chlorine									
Ammonia									

NOTES: _____

Reviewed By: 173
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey^{MS}Ending Date: May 19, 1994Date: 5-18-94

TREATMENT	F-Med # 1716	Taylor Silt							
Temperature	24.4	24.0							
D.O. (before air)									
(after air)									
(w/silt/algae)	8.3	7.8							
pH (before air)									
(after air)									
(w/silt/algae)	8.2	7.7							
(Aeration time)									
Conductivity	320	317							
Hardness		4.2							
x 20.0		84							
Alkalinity		6.0							
x 10		60							
Chlorine									
Ammonia									

NOTES: _____

Reviewed By: JS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994JS 5-11-94
Posey BarfieldEnding Date: May 19, 1994Date: 5-11-94Replicate: 1

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.2	24.1	23.9	24.3				
D.O.	7.9	7.4 6.0	7.3	6.9				
pH	8.0	7.2	7.4	7.5				
Conductivity	345	275	330	361				
Hardness	4.8	3.9	4.9	5.4				
x 20.0	96	78	98	108				
Alkalinity	6.5	2.5	4.2	5.5				
x 10	65	25	42	55				
Chlorine								
Ammonia	0.006	0.001	0.002	0.008				

NOTES: _____

^H
4.6, 5.2 ^A Taylor's Silt Initial ChemReviewed By: JS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey BartfieldEnding Date: May 19, 1994Date: 5-12-94Replicate: 2

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.6	24.6	24.5	24.6				
D.O.	*	7.0	6.8	6.4				
pH	*	7.3	7.5	7.5				
Conductivity	*	302	359	363				
Hardness		3.7	4.6	4.8				
x 20.0	*	74 ^{MX3} 2.4	96 ^{MX3} 9.2	96				
Alkalinity		3.2	4.7	5.5				
x 10	*	32	47	55				
Chlorine								
Ammonia	*	0.001	<0.001	<0.001				

NOTES: * Accidentally discarded samples during renewal.Reviewed By: JS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey⁹⁵Ending Date: May 19, 1994Date: 5-13-94Replicate: 3

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.3	24.3	24.0	24.2				
D.O.	7.7	7.2	7.0	6.9				
pH	8.1	7.5	7.6	7.7				
Conductivity	357	311	349	364				
Hardness	4.7	3.8	4.7	5.0				
x 20.0	94	76	94	100				
Alkalinity	6.6	3.6	5.0	5.7				
x 10	66	36	50	57				
Chlorine								
Ammonia	0.012	<0.001	<0.001	<0.001				

NOTES: _____

Reviewed By: PS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey³⁵Ending Date: May 19, 1994Date: 5-14-94Replicate: 4

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.2	24.1	24.0	24.0				
D.O.	7.8	7.2	7.0	6.8				
pH	8.1	7.6	7.7	7.8				
Conductivity	350	324	351	367				
Hardness	4.9	4.1	4.5	5.0				
x 20.0	98	82	90	100				
Alkalinity	6.6	4.1	5.2	6.0				
x 10	66	41	52	60				
Chlorine								
Ammonia	0.013	0.001	<0.001	<0.001				

NOTES: _____

Reviewed By: 045
(PLARC500-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey ^{TJS} 5-14-94Ending Date: May 19, 1994Date: 5-15-94Replicate: 1

TREATMENT	Taylor	M6.0	M2.9	M2.9				
	Silt	Cntrl	50%	100%				
Temperature	24.3	24.4	24.2	24.2				
D.O.	7.8	7.3	7.1	6.8				
pH	8.1	7.6	7.7	7.8				
Conductivity	349	327	352	365				
Hardness	4.7	4.0	4.6	5.2				
x 20.0	94	80	92	104				
Alkalinity	6.6	4.2	5.3	6.2				
x 10	66	42	53	62				
Chlorine								
Ammonia	0.012	0.001	<0.001	<0.001				

NOTES: _____

 Reviewed By: AS
 (PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994^{as}
Posey SesterEnding Date: May 19, 1994Date: 5-16-94Replicate: 2

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.3	24.3	24.3	24.5				
D.O.	7.6	7.2	7.0	6.9				
pH	8.0	7.6	7.7	7.7				
Conductivity	352	331	353	368				
Hardness	4.6	3.8	4.5	^{as} 64.9				
x 20.0	92	76	90	98				
Alkalinity	6.5	4.5	5.5	6.3				
x 10	65	45	55	63				
Chlorine								
Ammonia	0.007	0.001	<0.001	<0.001				

NOTES: _____

Reviewed By: JS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994PoseyEnding Date: May 19, 1994Date: 5-17-94Replicate: 3

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.1	24.1	24.1	24.3				
D.O.	7.8	7.3	7.1	7.1				
pH	8.0	7.5	7.6	7.7				
Conductivity	327	323	346	358				
Hardness	4.3	3.9	4.5	4.8				
x 20.0	86	78	90	96				
Alkalinity	6.1	4.7	5.6	6.2				
x 10	61	47	56	62				
Chlorine								
Ammonia	0.006	<0.001	0.001	<0.001				

NOTES: _____

 Reviewed By: DS
 (PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey JSEnding Date: May 19, 1994Date: 5-18-94Replicate: 21

TREATMENT	Taylor	M6.0	M2.9	M2.9				
	Silt	Cntrl	50%	100%				
Temperature	24.1	24.0	23.8	23.9				
D.O.	7.8	7.2	7.1	7.0				
pH	7.9	7.6	7.7	7.7				
Conductivity	332	325	344	355				
Hardness	4.2 ^{SP}	3.8	4.5	4.8				
x 20.0	88 ⁴	76	90	96				
Alkalinity	6.3	*2.1	5.8	6.3				
x 10	63	42	58	63				
Chlorine								
Ammonia	0.002	0.004	<0.001	<0.001				

NOTES: * 50 ml sampleReviewed By: JS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994PoseyEnding Date: May 19, 1994Date: 5-19-94Replicate: 1

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
Temperature	24.1	23.8	23.9	24.2				
D.O.	7.6	7.3	7.2	7.0				
pH	8.0	7.7	7.7	7.7				
Conductivity	333	322	342	350				
Hardness	4.5	4.0	4.6	4.7				
x 20.0	90	80	92	94				
Alkalinity	6.3	*4.9	5.9	6.3				
x 10	63	49	59	63				
Chlorine								
Ammonia	0.002	0.001	0.001	<0.001				

NOTES: * checked twiceReviewed By: JPP
(PLARC501-130)

INITIAL CHEMISTRY

TAYLOR'S SILT

DAY	TEMP	DO	pH	COND	HARD	ALK	CHLORINE
0	24.1	8.1	7.8	336	90.0	65	-
1	24.0	8.0	7.8	336	92.0	62	-
2	24.7	7.3	7.7	337	90.0	63	-
3	24.3	7.8	7.9	337	92.0	64	-
4	23.5	7.8	7.8	337	90.0	64	-
5	24.0	7.8	7.8	339	92.0	62	-
6	24.1	8.0	7.9	317	82.0	60	-
7	23.6	7.8	7.7	317	82.0	60	-
8	24.0	7.8	7.7	317	84.0	60	-
MEAN	24.0	7.8	7.8	330	88.2	62	--
MIN	23.5	7.3	7.7	317	82.0	60	--
MAX	24.7	8.1	7.9	339	92.0	65	--

FISH MEDIUM

DAY	TEMP	DO	pH	COND	HARD	ALK	CHLORINE
0	-	-	-	-	-	-	-
1	24.0	8.4	8.2	338	88.0	64	-
2	24.7	8.0	8.2	339	-	-	-
3	24.2	8.2	8.3	340	-	-	-
4	23.5	8.2	8.3	336	-	-	-
5	24.0	8.4	8.3	341	-	-	-
6	24.1	8.3	8.2	319	84.0	63	-
7	23.6	8.3	8.2	320	-	-	-
8	24.4	8.3	8.2	320	-	-	-
MEAN	24.1	8.3	8.2	332	86.0	64	--
MIN	23.5	8.0	8.2	319	84.0	63	--
MAX	24.7	8.4	8.3	341	88.0	64	--

===== FINAL CHEMISTRY =====

PCM 6.0 CONTROL -----

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.1	7.4	7.2	275	78.0	25	(0.001
2	24.6	7.0	7.3	302	74.0	32	0.001
3	24.3	7.2	7.5	311	76.0	36	(0.001
4	24.1	7.2	7.6	324	82.0	41	0.001
5	24.4	7.3	7.6	327	80.0	42	0.001
6	24.3	7.2	7.6	331	76.0	45	0.001
7	24.1	7.3	7.5	323	78.0	47	(0.001
8	24.0	7.2	7.6	325	76.0	42	0.004
9	23.8	7.3	7.7	322	80.0	49	0.001

MEAN 24.2 7.2 7.5 316 77.8 40 (0.001

MIN 23.8 7.0 7.2 275 74.0 25 (0.001

MAX 24.6 7.4 7.7 331 82.0 49 0.004

PCM 2.9 100% -----

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.3	6.9	7.5	361	108.0	55	0.008
2	24.6	6.4	7.5	363	96.0	55	(0.001
3	24.2	6.9	7.7	364	100.0	57	(0.001
4	24.0	6.8	7.8	367	100.0	60	(0.001
5	24.2	6.8	7.8	365	104.0	62	(0.001
6	24.5	6.9	7.7	368	98.0	63	(0.001
7	24.3	7.1	7.7	358	96.0	62	(0.001
8	23.9	7.0	7.7	355	96.0	63	(0.001
9	24.2	7.0	7.7	350	94.0	63	(0.001

MEAN 24.2 6.9 7.7 361 99.1 60 (0.002

MIN 23.9 6.4 7.5 350 94.0 55 (0.001

MAX 24.6 7.1 7.8 368 108.0 63 0.008

PCM 2.9 50% -----

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	23.9	7.3	7.4	330	98.0	42	0.002
2	24.5	6.8	7.5	359	92.0	47	(0.001
3	24.0	7.0	7.6	349	94.0	50	(0.001
4	24.0	7.0	7.7	351	90.0	52	(0.001
5	24.2	7.1	7.7	352	92.0	53	(0.001
6	24.3	7.0	7.7	353	90.0	55	(0.001
7	24.1	7.1	7.6	346	90.0	56	0.001
8	23.8	7.1	7.7	344	90.0	58	(0.001
9	23.9	7.2	7.7	342	92.0	59	0.001

MEAN 24.1 7.1 7.6 347 92.0 52 (0.001

MIN 23.8 6.8 7.4 330 90.0 42 (0.001

MAX 24.5 7.3 7.7 359 98.0 59 0.002

TAYLOR'S SILT -----

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.2	7.9	8.0	345	96.0	65	0.006
2	24.6	-	-	-	-	-	-
3	24.3	7.7	8.1	357	94.0	66	0.012
4	24.2	7.8	8.1	350	98.0	66	0.013
5	24.3	7.8	8.1	349	94.0	66	0.012
6	24.3	7.8	8.0	352	92.0	65	0.007
7	24.1	7.8	8.0	327	86.0	61	0.006
8	24.1	7.8	7.9	332	88.0	63	0.002
9	24.1	7.6	8.0	333	90.0	63	0.002

MEAN 24.2 7.8 8.0 343 92.3 64 0.008

MIN 24.1 7.6 7.9 327 86.0 61 0.002

MAX 24.6 7.9 8.1 357 98.0 66 0.013

Test Temperature: 24.2

MIN 23.8

MAX 24.6

Reviewed by: ops L-1-84

CUSTODY SEAL LOG

Project Study CR-ERP Sediment

Location cooler in trailer

Beginning Date 5-10-94

Ending Date _____

Personnel Simbeck

[illegible]

Notes:

Sample Temperatures: 5-6 5-7 5-8 5-9

ρ_{cm} 2.9 3.3 0.4°C 0.5°C

PC m 6.0 2.6 0.3°C 0.5°C

PROJECT REAGENT RECORD SHEET

Project/Study: CR-ERP Mussel May 1994
 Personnel: Srinbeck, Barfield

Beginning Date: 5-10-94
 Ending Date: 5-19-94

WINKLER TITRATION METHOD

Alkaline-Iodide-Azide:

Brand Fisher
 Lot # 935045-24
 Exp. Sept 95

Manganous Sulfate:

Brand Fisher
 Lot # 931266-24
 Exp. Feb 95

Sodium Thiosulfate:

Brand Ricca
 Lot # H128
 Exp. Apr 95

Sulfuric Acid:

Brand Mallinckrodt
 Lot # 2876 KTCM
 Exp. NA

Thyodene:

Brand Fisher
 Lot # 912254
 Exp. NA

pH BUFFER SOLUTIONS

pH 4:

Brand Mallinckrodt
 Lot # 0097 KLGK
 Exp. Sept 1994

pH 7:

Brand Mallinckrodt
 Lot # 0098 KLVJ
 Exp. May 1995

pH 10:

Brand Whatman
 Lot # 3483
 Exp. Oct 1995

pH _____:

Brand _____
 Lot # _____
 Exp. _____

CONDUCTIVITY STANDARD SOLUTIONS

200 μ mhos:

Brand Whatman
 Lot # 2853
 Exp. Sept 96

720 μ mhos:

Brand Whatman
 Lot # 3143
 Exp. Sept 96

200 μ mhos:

Brand Biopharm
 Lot # F1438
 Exp. June 1995

ALKALINITY TITRATION

Sulfuric Acid Solution N/50:

Brand Fisher
 Lot # 935304
 Exp. NA

HARDNESS TITRATION

Hardness Titrating Solution:

Brand Calgon
 Lot # R1005702
 Exp. NA

Hardness Indicator:

Brand Calgon
 Lot # 01I98
 Exp. NA

Hardness Buffer Solution:

Brand Calgon
 Lot # 26C68
 Exp. NA

CHLORINE TITRATION

DPD Powder Pillows:

Brand Hach
 Lot # 03CM
 Exp. NA

Potassium Iodide:

Brand Fisher
 Lot # 863484A
 Exp. NA

FAS:

Brand Ricca
 Lot # 8199
 Exp. 6-10-94

Project Instrument Record Sheet

Project Study CR-ERP Mussels May 1994

Beginning Date 5-10-94

Ending Date 5-19-94

DO Meter

Model YSI Model 57

TVA Tag ~~543349~~ 531047 557673

Calibration Date ~~8-10-93~~ 3-23-94

531047 6
used ~~543349~~ 53
on 5/10, 11 + 12/9

pH Meter(s)

Model Orion Research Model SA250

TVA Tag ~~8447V3~~ 7413

Calibration Date ~~3-2-94~~ 5-5-94

Model Orion Research Model 407A

TVA Tag 543347

Calibration Date 11-16-93

Conductivity Meter

Model YSI Model 32 6-1-94

TVA Tag ~~931117905~~ 577779

Calibration Date ~~28-94~~ 3-29-94

Thermometer(s)

Model SAMA-CP 40

TVA Tag M216

Calibration Date 11-30-94

Model _____

TVA Tag _____

Calibration Date _____

CUSTODY SEAL LOG

Project Study CR-ERP Sediment

Location cooler in trailer

Beginning Date 5-10-94

Ending Date 5-19-94

Personnel Simbeck

[illegible]

Notes:

Sample Temperatures: 5-6 5-7 5-8 5-9

p_{cm} 2.9 3.3 0.4°C 0.5°C

PC m 6.0 2.6 0.3°C 0.5°C

ATTACHMENT III

AMMONIA ANALYSIS REQUEST AND RESULTS

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-16-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia analyses

Consignor's Number	Specific Description for Each Sample
	<u>Samples from 5-11-94</u>
	<u>R.O. Blank pH = 5.8 @ 24°C</u>
	<u>Taylor's 5.14 pH = 8.0 "</u>
	<u>PCM 6.0 pH = 7.2 "</u>
	<u>PCM 2.9 50% pH = 7.4 "</u>
	<u>PCM 2.9 100% pH = 7.5 "</u>
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel J. Simbeck

Notebook page _____

Address TTL 1A-BFN

Analyzed by _____

Request approved by DJ/S-6

Laboratory _____

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729-4519

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-16-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia Analyses

Consignor's Number	Specific Description for Each Sample
	<u>Samples from 5-12-94</u>
	<u>R.O. Blank pH- 5.7 @ 24°C</u>
	<u>PCM 6.0 pH- 7.3 "</u>
	<u>PCM 2.9 50% pH- 7.5 "</u>
	<u>PCM 2.9 100% pH- 7.5 "</u>
Remarks, method, etc.: <u>No Taylor's S.I.T. sample - JFS</u>	

ANALYZE FOR

Lab. No.	Consignor's Number										

Requested by Damen J. S. Beck

Notebook page _____

Address TTL 1A-BFN

Analyzed by _____

Request approved by D. J. S. W.

Laboratory _____

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REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-16-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia Analyses

Consignor's Number	Specific Description for Each Sample
	<u>Samples from 5-13-94</u>
	<u>R.O. Blank pH = 5.6 @ 24°C</u>
	<u>Taylor's S.H pH = 8.1 "</u>
	<u>PCM 6.0 pH = 7.5 "</u>
	<u>PCM 2.9 50% pH = 7.6 "</u>
	<u>PCM 2.9 100% pH = 7.7 "</u>
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel T. Sember

Notebook page _____

Address TTL 1A REN

Analyzed by _____

Request approved by D. J. Smith

Laboratory _____

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729-4549

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-16-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia Analyses

Consignor's Number	Specific Description for Each Sample
	<u>Samples from 5-14-94</u>
	<u>R.O. Blank pH = 5.6 @ 24°C</u>
	<u>Taylor's SH pH = 8.1 "</u>
	<u>PCM 6.0 pH = 7.6 "</u>
	<u>PCM 2.9 50% pH = 7.7 "</u>
	<u>PCM 2.9 100% pH = 7.8 "</u>
Remarks, method, etc.: _____	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel J. Smbeck

Notebook page _____

Address TTL 1A - BEN

Analyzed by _____

Request approved by D. J. Smbeck

Laboratory _____

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REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-16-94 Laboratory No. _____
 Date wanted ASAP _____
 Date reported _____ Charge to account No. 0009687

GENERAL DESCRIPTION: Ammonia Analyses

Consignor's Number	Specific Description for Each Sample		
	<u>Sample from 5-15-94</u>		
	<u>R.D. Blank</u>	<u>pH = 5.5</u>	<u>@24°C</u>
	<u>Taylor's 5.14</u>	<u>pH = 8.1</u>	<u>"</u>
	<u>PCM 6.0</u>	<u>pH = 7.6</u>	<u>"</u>
	<u>PCM 2.9 50%</u>	<u>pH = 7.7</u>	<u>"</u>
	<u>PCM 2.9 100%</u>	<u>pH = 7.8</u>	<u>"</u>
Remarks, method, etc.:			

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Damien J. Simbeck Notebook page _____
 Address TIL 1A BEN Analyzed by _____
 Request approved by Dan J. Silva Laboratory _____

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727 4549

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-19-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia Analysis Samples from 5-17-94

Consignor's Number	Specific Description for Each Sample
TS-(5-17-94)	Taylor's 5.1+ pH- 8.0 @ 24°C
6.0-(5-17-94)	PCM 6.0 pH- 7.5
2.9-50-(5-17-94)	PCM 2.9 50% pH- 7.6
2.9-100-(5-17-94)	PCM 2.9 100% pH- 7.7
R.O.-(5-17-94)	R.O. Black pH- 5.5
Remarks, method, etc.: _____	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Damien J. Simbeck

Notebook page _____

Address TTL 1A BEN

Analyzed by _____

Request approved by D. J. Simbeck

Laboratory _____

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729 4549

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-19-94

Laboratory No. _____

Date wanted ASAP

Date reported _____

Charge to account No. 0009687GENERAL DESCRIPTION: Ammonia Analyses samples from 5-18-94

Consignor's Number	Specific Description for Each Sample
TS(5-18-94)	Taylor's SH, pH = 7.9 @ 24°C
6.0(5-18-94)	PCM 6.0 pH = 7.6 "
2.950(5-18-94)	PCM 2.9 50% pH = 7.7 "
2.9-100(5-18-94)	PCM 2.9 100% pH = 7.7 "
R.O.(5-18-94)	R.O. Blank pH = 5.3 "
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel J. Smolch

Notebook page _____

Address 771 1A PEN

Analyzed by _____

Request approved by [Signature]

Laboratory _____

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REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-19-94 Laboratory No. _____Date wanted ASAP _____Date reported _____ Charge to account No. D009687GENERAL DESCRIPTION: Ammonia analyses samples from 5-19-94

Consignor's Number	Specific Description for Each Sample		
TS-(5-19-94)	Tailings S.H	pH: 8.0	@ 24°C
6.0 (5-19-94)	PCM 6.0	pH: 7.7	"
2.9-50 (5-19-94)	PCM 2.9 50%	pH: 7.7	"
2.9-100 (5-19-94)	PCM 2.9 100%	pH: 7.7	"
R.O. (5-19-94)	R.O. Blank	pH: 5.7	"
Remarks, method, etc.:			

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Doreen S. Simbeck Notebook page _____Address TTL 1A BEN Analyzed by _____Request approved by [Signature] Laboratory _____

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TENNESSEE VALLEY AUTHORITY
Resource Development Group
River Basin Operations
Water Resources
Department of Water Quality
Environmental Chemistry
150 401 Chestnut Street
Chattanooga, Tennessee 37402-2801

DAMIEN J. SIMBECK
TTL 1A-BFN

Dear DAMIEN J. SIMBECK :

Enclosed is a copy of the analytical results for your sample(s)
received by our laboratory.

If you have any questions, please contact me at (615) 751-3135 and
refer to the Lab Sample Number.

Sincerely,

TENNESSEE VALLEY AUTHORITY

Larry O. Hill , Analytical Chemist
Environmental Chemistry

Lab Sample Number :94/05199 Project Leader :Larry O. Hill

Sample ID Information :R 0 BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=5.8;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

Lab Sample Number :94/05200 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=8.0;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.09	mg/L
00619	Calc Union NH3 in Water	0.006	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.11	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.02	mg/L

Lab Sample Number :94/05201 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.2;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc UnIon NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.23	mg/L

Lab Sample Number :94/05202 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 PRECISION
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.2;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.03	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.037	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.23	mg/L

```

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| TVA Environmental Chemistry           Chattanooga, Tennessee |
| 05/23/94                FINAL DATA REPORT                12:02 |
===== Page 1 =====

```

Lab Sample Number :94/05203 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.4;TEMP=24

```

-----
| Alt. IDC | Analysis Performed | result | units |
-----
00610      Ammonia Nitrogen      0.09    mg/L
00619      Calc Union NH3 in Water 0.002   mg NH3/L
NH3NH4'W   Calc NH3+NH4-NH3 Water 0.11    mg NH3/L
00630      Nitrate-Nitrite Nitrogen 0.38    mg/L

```

Lab Sample Number :94/05204 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940511
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.5;TEMP=24

```

-----
| Alt. IDC | Analysis Performed | result | units |
-----
00610      Ammonia Nitrogen      0.38    mg/L
00619      Calc Union NH3 in Water 0.008   mg NH3/L
NH3NH4'W   Calc NH3+NH4-NH3 Water 0.46    mg NH3/L
00630      Nitrate-Nitrite Nitrogen 0.46    mg/L

```

Lab Sample Number :94/05205 Project Leader :Larry O. Hill

Sample ID Information :R O BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940512
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=5.7;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

=====

TVA Environmental Chemistry	Chattanooga, Tennessee
05/23/94	FINAL DATA REPORT 11:11
===== Page 1 =====	

Lab Sample Number :94/05206 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :DOE
Sample type/matrix :WATER
Sample collected by :DJS
Sample collection date :940512
Sample login date :940517 Sample received by lab :940517
Sample account number :0009687.LOHDSNH3
Method of Analysis :TTL:pH=7.3;TEMP=24

Alt. IDC	Analysis Performed	result	units	
00610	Ammonia Nitrogen	0.08	mg/L	
00619	Calc Union NH3 in Water	0.001	mg NH3/L	
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.098	mg NH3/L	
00630	Nitrate-Nitrite Nitrogen	0.20	mg/L	

```

=====
| TVA Environmental Chemistry          Chattanooga, Tennessee |
| 05/23/94                          FINAL DATA REPORT        11:09 |
===== Page 1 =====

```

Lab Sample Number :94/05207 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940512
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.5;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.33	mg/L

Lab Sample Number :94/05208 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940512
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.5;TEMP=24

```

-----
| Alt. IDC | Analysis Performed | result | units |
-----
00610      Ammonia Nitrogen      0.01    mg/L
00619      Calc Union NH3 in Water < 0.001  mg NH3/L
NH3NH4'W   Calc NH3+NH4-NH3 Water  0.012   mg NH3/L
00630      Nitrate-Nitrite Nitrogen 0.48    mg/L

```

=====

TVA Environmental Chemistry	Chattanooga, Tennessee
05/23/94	FINAL QUALITY CONTROL DATA REPORT 11:27
===== Page 1 =====	

Lab Sample Number :94/05209 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100% - % RECOVERY
Sample comments :DOE
Sample type/matrix :WATER
Sample collected by :DJS
Sample collection date :940512
Sample login date :940517 Sample received by lab :940517
Sample account number :0009687.LOHDSNH3
Method of Analysis :TTL:pH=7.5;TEMP=24

Alt. IDC	Anaylsis Performed	result
00610	Ammonia Nitrogen	100. % REC
00630	Nitrate-Nitrite Nitrogen	97. % REC

=====

TVA Environmental Chemistry	Chattanooga, Tennessee
05/23/94	FINAL DATA REPORT 11:09
===== Page 1 =====	

Lab Sample Number :94/05210 Project Leader :Larry O. Hill

Sample ID Information :R 0 BLANK
Sample comments :DOE
Sample type/matrix :WATER
Sample collected by :DJS
Sample collection date :940513
Sample login date :940517 Sample received by lab :940517
Sample account number :0009687.LOHDSNH3
Method of Analysis :TTL:pH=5.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

Lab Sample Number :94/05211 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940513
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=8.1;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.13	mg/L
00619	Calc Union NH3 in Water	0.012	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.16	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.03	mg/L

```

=====
| TVA Environmental Chemistry          Chattanooga, Tennessee |
| 05/23/94                          FINAL DATA REPORT        12:02 |
===== Page 1 =====

```

Lab Sample Number :94/05212 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT - PRECISION
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940513
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=8.1;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.13	mg/L
00619	Calc Union NH3 in Water	0.012	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.16	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.03	mg/L

Lab Sample Number :94/05213 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940513
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.5;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.23	mg/L

=====

TVA Environmental Chemistry	Chattanooga, Tennessee
05/23/94	FINAL DATA REPORT 12:02
===== Page 1 =====	

Lab Sample Number :94/05214 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50 %
Sample comments :DOE
Sample type/matrix :WATER
Sample collected by :DJS
Sample collection date :940513
Sample login date :940517 Sample received by lab :940517
Sample account number :0009687.LOHDSNH3
Method of Analysis :TTL:pH=7.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.27	mg/L

```

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| TVA Environmental Chemistry          Chattanooga, Tennessee |
| 05/23/94                          FINAL DATA REPORT        12:02 |
===== Page 1 =====

```

Lab Sample Number :94/05215 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940513
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.27	mg/L

```

=====
| TVA Environmental Chemistry          Chattanooga, Tennessee |
| 05/23/94                          FINAL DATA REPORT        11:09 |
===== Page 1 =====

```

Lab Sample Number :94/05216 Project Leader :Larry O. Hill

Sample ID Information :R 0 BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940514
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=5.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc UnIon NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

```

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| TVA Environmental Chemistry           Chattanooga, Tennessee |
| 05/23/94                           FINAL DATA REPORT         12:02 |
===== Page 1 =====

```

Lab Sample Number :94/05217 Project Leader :Larry O. Hill

Sample ID Information : TAYLOR'S SILT
 Sample comments : DOE
 Sample type/matrix : WATER
 Sample collected by : DJS
 Sample collection date : 940514
 Sample login date : 940517 Sample received by lab : 940517
 Sample account number : 0009687.LOHDSNH3
 Method of Analysis : TTL:pH=8.1;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.14	mg/L
00619	Calc Union NH3 in Water	0.013	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.17	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.03	mg/L

```

=====
| TVA Environmental Chemistry          Chattanooga, Tennessee |
| 05/23/94                          FINAL DATA REPORT        12:02 |
===== Page 1 =====

```

Lab Sample Number :94/05218 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940514
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc UnIon NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.36	mg/L

Lab Sample Number :94/05219 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940514
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.29	mg/L

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```

Lab Sample Number :94/05220 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940514
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.8;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc UnIon NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.24	mg/L

```

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Lab Sample Number :94/05221 Project Leader :Larry O. Hill

Sample ID Information :R.O BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940515
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=5.5;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

Lab Sample Number :94/05222 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940515
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=8.1;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.13	mg/L
00619	Calc Union NH3 in Water	0.012	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.16	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.05	mg/L

```

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Lab Sample Number :94/05223 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940515
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.43	mg/L

Lab Sample Number :94/05224 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940515
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.32	mg/L

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Lab Sample Number :94/05225 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940515
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.8;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.27	mg/L

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Lab Sample Number :94/05226 Project Leader :Larry O. Hill

Sample ID Information :R O BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=5.8;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

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Lab Sample Number :94/05227 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=8.0;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.12	mg/L
00619	Calc Union NH3 in Water	0.007	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.15	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.09	mg/L

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Lab Sample Number :94/05228 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.6;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.49	mg/L

Lab Sample Number :94/05229 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50 %
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.36	mg/L

Lab Sample Number :94/05230 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.27	mg/L

Lab Sample Number :94/05231 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100% - PRECISION
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

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| Alt. IDC | Analysis Performed | result | units |
-----
00610      Ammonia Nitrogen      < 0.01      mg/L
00619      Calc Union NH3 in Water < 0.001     mg NH3/L
NH3NH4'W   Calc NH3+NH4-NH3 Water    < 0.012     mg NH3/L
00630      Nitrate-Nitrite Nitrogen 0.27        mg/L

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Lab Sample Number :94/05232 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100% - % RECOVERY
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940516
 Sample login date :940517 Sample received by lab :940517
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH=7.7;TEMP=24

```

-----
| Alt. IDC |      Anaylsis Performed      |                      result                      |
-----
00610            Ammonia Nitrogen                      102. % REC
00630            Nitrate-Nitrite Nitrogen                      97. % REC

```

TENNESSEE VALLEY AUTHORITY
Resource Development Group
River Basin Operations
Water Resources
Department of Water Quality
Environmental Chemistry
150 401 Chestnut Street
Chattanooga, Tennessee 37402-2801

DAMIEN J. SIMBECK
TTL 1A-BFN

Dear DAMIEN J. SIMBECK :

Enclosed is a copy of the analytical results for your sample(s)
received by our laboratory.

If you have any questions, please contact me at (615) 751-3135 and
refer to the Lab Sample Number.

Sincerely,

TENNESSEE VALLEY AUTHORITY

Larry O. Hill , Analytical Chemist
Environmental Chemistry

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Lab Sample Number :94/05379 Project Leader :Larry O. Hill

Sample ID Information :R O BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 5.5 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

Lab Sample Number :94/05380 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 8.0 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.10	mg/L
00619	Calc Union NH3 in Water	0.006	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.12	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.13	mg/L

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Lab Sample Number :94/05381 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.5 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.45	mg/L

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Lab Sample Number :94/05382 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.6 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.37	mg/L

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Lab Sample Number :94/05383 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50% PRECISION
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.6 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.36	mg/L

Lab Sample Number :94/05384 Project Leader :Larry O. Hill

Sample ID Information :PCB 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940517
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.29	mg/L

Lab Sample Number :94/05385 Project Leader :Larry O. Hill

Sample ID Information :RO BLANK
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 5.3 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc UnIon NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

Lab Sample Number :94/05386 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.9 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.04	mg/L
00619	Calc Union NH3 in Water	0.002	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.049	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.15	mg/L

Lab Sample Number :94/05387 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT PRECISION
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.9 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.04	mg/L
00619	Calc Union NH3 in Water	0.002	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.049	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.15	mg/L

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Lab Sample Number :94/05388 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT - %RECOVERY
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.9 ; TEMP = 24

Alt. IDC	Anaylsis Performed	result
00610	Ammonia Nitrogen	102. % REC
00630	Nitrate-Nitrite Nitrogen	100. % REC

Lab Sample Number :94/05389 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.6 ; TEMP = 24

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| Alt. IDC | Analysis Performed | result | units |
-----
00610      Ammonia Nitrogen      0.13    mg/L
00619      Calc Union NH3 in Water 0.004   mg NH3/L
NH3NH4'W   Calc NH3+NH4-NH3 Water  0.16    mg NH3/L
00630      Nitrate-Nitrite Nitrogen 0.58    mg/L

```

Lab Sample Number :94/05390 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 50%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.44	mg/L

Lab Sample Number :94/05391 Project Leader :Larry O. Hill

Sample ID Information :PCM 2.9 100%
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940518
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.38	mg/L

Lab Sample Number :94/05392 Project Leader :Larry O. Hill

Sample ID Information :R 0 BLANK
Sample comments :DOE
Sample type/matrix :WATER
Sample collected by :DJS
Sample collection date :940519
Sample login date :940520 Sample received by lab :940520
Sample account number :0009687.LOHDSNH3
Method of Analysis :TTL:pH = 5.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	< 0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	< 0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	< 0.01	mg/L

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Lab Sample Number :94/05393 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940519
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 8.0 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.03	mg/L
00619	Calc Union NH3 in Water	0.002	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.037	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.19	mg/L

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Lab Sample Number :94/05394 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
 Sample comments :DOE
 Sample type/matrix :WATER
 Sample collected by :DJS
 Sample collection date :940519
 Sample login date :940520 Sample received by lab :940520
 Sample account number :0009687.LOHDSNH3
 Method of Analysis :TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.03	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.037	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.58	mg/L

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Lab Sample Number : 94/05395 Project Leader : Larry O. Hill

Sample ID Information : PCM 2.9 50%
 Sample comments : DOE
 Sample type/matrix : WATER
 Sample collected by : DJS
 Sample collection date : 940519
 Sample login date : 940520 Sample received by lab : 940520
 Sample account number : 0009687.LOHDSNH3
 Method of Analysis : TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.02	mg/L
00619	Calc Union NH3 in Water	0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.024	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.45	mg/L

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Lab Sample Number : 94/05396 Project Leader : Larry O. Hill

Sample ID Information : PCM 2.9 100%
 Sample comments : DOE
 Sample type/matrix : WATER
 Sample collected by : DJS
 Sample collection date : 940519
 Sample login date : 940520 Sample received by lab : 940520
 Sample account number : 0009687.LOHDSNH3
 Method of Analysis : TTL:pH = 7.7 ; TEMP = 24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.01	mg/L
00619	Calc Union NH3 in Water	< 0.001	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.38	mg/L

ATTACHMENT IV

METER CALIBRATION LOG SHEETS

DO METER STANDARDIZATION

43

METER ID: #1 531047

DATE: 05-06-94 TIME: 0600 BY: CR
INITIAL READING: 7.4
WATER TEMP: 20.8°C
WINKLER #1: 7.5 #2: 7.6
X: 7.55
CORRECTED READING: 7.5

DATE: 05-06-94 TIME: 1555 BY: CR
INITIAL READING: 7.6
WATER TEMP: 20.9°C
WINKLER #1: 7.5 #2: 7.6
X: 7.55
CORRECTED READING: 7.6

NOTES:

DATE: 5-7-94 TIME: 7:00 BY: DH
INITIAL READING: 7.5
WATER TEMP: 20.8
WINKLER #1: 7.5 #2: 7.5
X: 7.5
CORRECTED READING: 7.5

DATE: 05-07-94 TIME: 1310 BY: CR
INITIAL READING: 7.4
WATER TEMP: 20.8°C
WINKLER #1: 7.4 #2: 7.4
X: 7.4
CORRECTED READING: 7.4

NOTES:

DATE: 5-8-94 TIME: 7:39 BY: DH
INITIAL READING: 7.9
WATER TEMP: 20.5°C
WINKLER #1: 7.8 #2: 7.9
X: 7.85
CORRECTED READING: 7.9

DATE: 05-08-94 TIME: 1210 BY: CR
INITIAL READING: 7.9
WATER TEMP: 20.4°C
WINKLER #1: 7.8 #2: 8.0
X: 7.9
CORRECTED READING: 7.9

NOTES:

DATE: 5-9-94 TIME: 7:15 BY: DH
INITIAL READING: 8.1
WATER TEMP: 20.7
WINKLER #1: 8.7 #2: 8.1
X: 8.15
CORRECTED READING: 8.1

DATE: 5-9-94 TIME: 3:35 BY: DH
INITIAL READING: 8.0
WATER TEMP: 21.0
WINKLER #1: 8.0 #2: 8.0
X: 8.0
CORRECTED READING: 8.0

NOTES:

DATE: 5-10-94 TIME: 7:02 BY: DH
INITIAL READING: 7.9
WATER TEMP: 20.8
WINKLER #1: 7.8 #2: 7.8
X: 7.8
CORRECTED READING: 7.8

DATE: 5-10-94 TIME: 1602 BY: DH
INITIAL READING: 8.0
WATER TEMP: 21.2
WINKLER #1: 8.0 #2: 8.0
X: 8.0
CORRECTED READING: 8.0

NOTES:

DO METER STANDARDIZATION

44

METER ID: #1 531047

DATE: 5-11-94 TIME: 7:09 BY: DA
INITIAL READING: 7.8
WATER TEMP: 20.8
WINKLER #1: 7.8 #2: 7.8
X: 7.8
CORRECTED READING: 7.8

DATE: 5-11-94 TIME: 1010 BY: OS
INITIAL READING: 7.8
WATER TEMP: 20.7
WINKLER #1: 7.8 #2: 7.8
X: 7.8
CORRECTED READING: 7.8

NOTES: _____

DATE: 05-12-94 TIME: 0810 BY: CR
INITIAL READING: 7.5
WATER TEMP: 20.7°C
WINKLER #1: 7.5 #2: 7.5
X: 7.5
CORRECTED READING: 7.5

DATE: 05-12-94 TIME: 1340 BY: MSB
INITIAL READING: 7.4
WATER TEMP: 21.0°C
WINKLER #1: 7.35 #2: 7.4
X: 7.37
CORRECTED READING: 7.4

NOTES: _____

DATE: 5-13-94 TIME: 7:07 BY: DA
INITIAL READING: 7.9
WATER TEMP: 21.7°C
WINKLER #1: 8.0 #2: 7.9
X: 7.95
CORRECTED READING: 7.9

DATE: 5-13-94 TIME: 1:56 BY: DA
INITIAL READING: 21.1 7.8
WATER TEMP: 21.1
WINKLER #1: 7.8 #2: 7.9
X: 7.85
CORRECTED READING: 7.8

NOTES: _____

DATE: 5-14-94 TIME: 7:15 BY: DA
INITIAL READING: 7.8
WATER TEMP: 21.1
WINKLER #1: 7.8 #2: 7.8
X: 7.8
CORRECTED READING: 7.8

DATE: 5/14/94 TIME: 1220 BY: TSB/JS
INITIAL READING: 7.8
WATER TEMP: 21.1
WINKLER #1: 7.8 #2: 7.8
X: 7.8
CORRECTED READING: 7.8

NOTES: _____

DATE: 5-15-94 TIME: 7:01 BY: DA
INITIAL READING: 7.7
WATER TEMP: 20.7
WINKLER #1: 7.7 #2: 7.8
X: 7.75
CORRECTED READING: 7.7

DATE: 5-15-94 TIME: 1130 BY: 95
INITIAL READING: 7.7
WATER TEMP: 21.0
WINKLER #1: 7.7 #2: 7.8
X: 7.75
CORRECTED READING: 7.7

NOTES: _____

DO METER STANDARDIZATION

45

METER ID: #3 557673

DATE: 2-16-94 TIME: 0905 BY: JPP
INITIAL READING: 8.9
WATER TEMP: 19.50C
WINKLER #1: 8.7 #2: 8.7
X: 8.7
CORRECTED READING: 8.7

DATE: 02-16-94 TIME: 1415 BY: Cue
INITIAL READING: 8.7
WATER TEMP: 21.4C
WINKLER #1: 8.7 #2: 8.8
X: 8.7
CORRECTED READING: 8.7

NOTES: _____

DATE: 02-17-94 TIME: 0600 BY: Cue
INITIAL READING: 9.5
WATER TEMP: 19.4C
WINKLER #1: 9.6 #2: 9.7
X: 9.65
CORRECTED READING: 9.6

DATE: 02-17-94 TIME: 1600 BY: Cue
INITIAL READING: 9.9
WATER TEMP: 21.5C
WINKLER #1: 9.8 #2: 9.9
X: 9.85
CORRECTED READING: 9.9

NOTES: _____

DATE: 02-18-94 TIME: 0550 BY: Cue
INITIAL READING: 9.4
WATER TEMP: 20.0C
WINKLER #1: 9.4 #2: 9.4
X: 9.4
CORRECTED READING: 9.4

DATE: _____ TIME: _____ BY: _____
INITIAL READING: _____
WATER TEMP: _____
WINKLER #1: _____ #2: _____
X: _____
CORRECTED READING: _____

NOTES: Change membrane on probe again 2-22-94 8:00 hr

DATE: 03-01-94 TIME: 0940 BY: Cue
INITIAL READING: 9.9
WATER TEMP: 20.1C
WINKLER #1: _____ #2: _____
X: _____
CORRECTED READING: _____

DATE: 5-12-94 TIME: 0805 BY: UAB
INITIAL READING: 8.5
WATER TEMP: 24.8
WINKLER #1: _____ #2: _____
X: _____
CORRECTED READING: _____

NOTES: next used will not hold next time

DATE: 5-13-94 TIME: 0745 BY: UAB
INITIAL READING: 8.4
WATER TEMP: 21.5
WINKLER #1: 7.7 #2: 7.7
X: 7.7
CORRECTED READING: 7.7

DATE: 5-12-94 TIME: 1350 BY: JPP
INITIAL READING: 7.7
WATER TEMP: 21.5
WINKLER #1: 7.6 #2: 7.7
X: 7.7
CORRECTED READING: -

NOTES: _____

DO METER STANDARDIZATION

46

METER ID: # 3 557673

DATE: 5-14-94 TIME: 0710 BY: 8/5
INITIAL READING: 21.3 8.0
WATER TEMP: 21.3 75.5-4
WINKLER #1: 8.0 #2: 8.0
X: 8.0
CORRECTED READING: 8.0

DATE: 5/14/94 TIME: 1000 BY: TS
INITIAL READING: 8.0
WATER TEMP: 21.4
WINKLER #1: 7.9 #2: 7.9
X: 7.9
CORRECTED READING: 7.9

NOTES: _____

DATE: 5-15-94 TIME: 0700 BY: 8/5
INITIAL READING: 8.6
WATER TEMP: 21.6
WINKLER #1: 8.4 #2: 8.5
X: 8.45
CORRECTED READING: 8.5

DATE: 5/15/94 TIME: 0950 BY: TS
INITIAL READING: 8.4
WATER TEMP: 21.8
WINKLER #1: 8.5 #2: 8.5
X: 8.5
CORRECTED READING: 8.5

NOTES: _____

DATE: 5-16-94 TIME: 0720 BY: 8/5
INITIAL READING: 8.4
WATER TEMP: 21.7
WINKLER #1: 8.5 #2: 8.4
X: 8.45
CORRECTED READING: 8.4

DATE: 5-16-94 TIME: 1530 BY: JPP
INITIAL READING: 8.25
WATER TEMP: 21.7°C
WINKLER #1: 8.25 #2: 8.25
X: 8.25
CORRECTED READING: —

NOTES: _____

DATE: 5-17-94 TIME: 0650 BY: 8/5
INITIAL READING: 8.0
WATER TEMP: 21.2
WINKLER #1: 8.0 #2: 8.0
X: 8.0
CORRECTED READING: 8.0

DATE: 5/17/94 TIME: 1330 BY: TS
INITIAL READING: 7.9
WATER TEMP: 21.4
WINKLER #1: 7.9 #2: 8.0
X: 7.95
CORRECTED READING: 7.9

NOTES: _____

DATE: 5-18-94 TIME: 0700 BY: TS
INITIAL READING: 21.3 8.5
WATER TEMP: 21.3
WINKLER #1: 8.6 #2: 8.5
X: 8.55
CORRECTED READING: 8.5

DATE: 5/18/94 TIME: 1330 BY: TS
INITIAL READING: 8.4
WATER TEMP: 21.3
WINKLER #1: 8.5 #2: 8.4
X: 8.45
CORRECTED READING: 8.5

NOTES: _____

DO METER STANDARDIZATION

47

METER ID: A83557673

DATE: 5-19-94 TIME: 0750 BY: JPP
 INITIAL READING: 21.3 8.3
 WATER TEMP: 21.3°C
 WINKLER #1: 8.2 #2: 8.4
 X: 8.3
 CORRECTED READING: -

NOTES: _____

DATE: 5/19/94 TIME: 1345 BY: TS
 INITIAL READING: 8.2
 WATER TEMP: 21.4
 WINKLER #1: 8.3 #2: 8.2
 X: 8.25
 CORRECTED READING: 8.2

5/19/94

DATE: 5-26-94 TIME: 0740 BY: DS
 INITIAL READING: 7.8
 WATER TEMP: 21.6
 WINKLER #1: 7.8 #2: 7.9
 X: 7.85
 CORRECTED READING: 7.8

NOTES: _____

DATE: 5-28-94 TIME: 1200 BY: DS
 INITIAL READING: 6.9
 WATER TEMP: 21.9°C
 WINKLER #1: 6.9 #2: 6.9
 X: 6.9
 CORRECTED READING: 6.9

used w/in one hour

DATE: 6-7-94 TIME: 0830 BY: DS
 INITIAL READING: 7.3
 WATER TEMP: 21.1
 WINKLER #1: 7.3 #2: 7.4
 X: 7.35
 CORRECTED READING: 7.3

NOTES: used within 1 hour

DATE: 6-8-94 TIME: 0802 BY: MS
 INITIAL READING: 7.5
 WATER TEMP: 21.1
 WINKLER #1: 7.5 #2: 7.5
 X: 7.5
 CORRECTED READING: 7.5

DATE: 6-8-94 TIME: 1405 BY: MS
 INITIAL READING: 7.6
 WATER TEMP: 21.1
 WINKLER #1: 7.6 #2: 7.6
 X: 7.6
 CORRECTED READING: 7.6

NOTES: _____

DATE: 6-9-94 TIME: 0815 BY: MS
 INITIAL READING: 7.7
 WATER TEMP: 21.3 2.7
 WINKLER #1: 7.7 #2: 7.7
 X: 7.7
 CORRECTED READING: 7.7

DATE: 6-9-94 TIME: 1345 BY: MS
 INITIAL READING: 21.0 7.95
 WATER TEMP: 21.0
 WINKLER #1: 7.9 #2: 7.9
 X: 7.9
 CORRECTED READING: 7.9

NOTES: _____

DATE: 6-10-94 TIME: 0810 BY: MS
 INITIAL READING: 8.2
 WATER TEMP: 21.2
 WINKLER #1: 8.1 #2: 8.2
 X: 8.15
 CORRECTED READING: 8.15

used in one hour

pH METER STANDARDIZATION

78

METER ID: 16 7413

DATE: <u>04-17-94</u>	TIME: <u>1510</u>	BY: <u>CM</u>	DATE: <u>04/18/94</u>	TIME: <u>0915</u>	BY: <u>TS</u>
	Buffer Temp: <u>21.6°C</u>			Buffer Temp: <u>21.5</u>	
pH 7.0 BUFFER	Initial Reading: <u>6.95</u>		pH 7.0 BUFFER	Initial Reading: <u>7.01</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/ <u>10.0</u>	Initial Reading: <u>10.00</u>		pH 4.0/10.0	Initial Reading: <u>9.99</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.0</u>	
	% Slope: <u>99.1%</u>			% Slope: <u>99.2</u>	
ADDITIONAL	Reading -15 Sec: <u>7.74</u>		ADDITIONAL	Reading -15 Sec: <u>7.89</u>	
STANDARD	Reading - 1 Min: <u>7.77</u>		STANDARD	Reading - 1 Min: <u>7.88</u>	

NOTES:

DATE: <u>4.18.94</u>	TIME: <u>1215</u>	BY: <u>MXB</u>	DATE: <u>4/18/94</u>	TIME: <u>1400</u>	BY: <u>TS</u>
	Buffer Temp: <u>21.7</u>			Buffer Temp: <u>20.7</u>	
pH 7.0 BUFFER	Initial Reading: <u>6.99</u>		pH 7.0 BUFFER	Initial Reading: <u>7.0</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/10.0	Initial Reading: <u>6.99 9.99</u>		pH 4.0/10.0	Initial Reading: <u>9.96</u>	
BUFFER	Corrected Reading: <u>7.00 10.00</u>		BUFFER	Corrected Reading: <u>10.0</u>	
	% Slope: <u>99.2</u>			% Slope: <u>98.0%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.95</u>		ADDITIONAL	Reading -15 Sec: <u>7.85</u>	
STANDARD	Reading - 1 Min: <u>7.96</u>		STANDARD	Reading - 1 Min: <u>7.85</u>	

NOTES:

DATE: <u>4.19.94</u>	TIME: <u>0908</u>	BY: <u>MXB</u>	DATE: <u>4-20-94</u>	TIME: <u>0735</u>	BY: <u>GKK</u>
	Buffer Temp: <u>21.6</u>			Buffer Temp: <u>20.6</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.03</u>		pH 7.0 BUFFER	Initial Reading: <u>7.03</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>10.03</u>		pH 4.0/10.0	Initial Reading: <u>9.98</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>99.1</u>			% Slope: <u>99.1</u>	
ADDITIONAL	Reading -15 Sec: <u>7.80</u>		ADDITIONAL	Reading -15 Sec: <u>7.80</u>	
STANDARD	Reading - 1 Min: <u>7.83</u>		STANDARD	Reading - 1 Min: <u>7.83</u>	

NOTES:

DATE: <u>5-10-94</u>	TIME: <u>0810</u>	BY: <u>MS</u>	DATE: <u>5-11-94</u>	TIME: <u>0803</u>	BY: <u>MS</u>
	Buffer Temp: <u>21.1</u>			Buffer Temp: <u>20.9</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.00</u>		pH 7.0 BUFFER	Initial Reading: <u>6.98</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>9.98</u>		pH 4.0/10.0	Initial Reading: <u>9.93</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>100.0%</u>			% Slope: <u>100.00</u>	
ADDITIONAL	Reading -15 Sec: <u>7.70</u>		ADDITIONAL	Reading -15 Sec: <u>8.31</u>	
STANDARD	Reading - 1 Min: <u>7.81</u>		STANDARD	Reading - 1 Min: <u>8.32</u>	

NOTES: used within the hour probe cleaned 5-10-94

DATE: <u>5-11-94</u>	TIME: <u>0955</u>	BY: <u>MS</u>	DATE: <u>5-12-94</u>	TIME: <u>0755</u>	BY: <u>MS</u>
	Buffer Temp: <u>21.5</u>			Buffer Temp: <u>25.2</u>	
pH 7.0 BUFFER	Initial Reading: <u>6.99</u>		pH 7.0 BUFFER	Initial Reading: <u>6.99</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>9.92</u>		pH 4.0/10.0	Initial Reading: <u>9.98</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>97.4</u>			% Slope: <u>97.4</u>	
ADDITIONAL	Reading -15 Sec: <u>8.34</u>		ADDITIONAL	Reading -15 Sec: <u>8.45</u>	
STANDARD	Reading - 1 Min: <u>8.34</u>		STANDARD	Reading - 1 Min: <u>8.45</u>	

NOTES:

pH METER STANDARDIZATION

79

METER ID: #6 7413

DATE: <u>5-12-94</u>	TIME: <u>1040</u>	BY: <u>JS</u>	DATE: <u>5-13-94</u>	TIME: <u>0755</u>	BY: <u>JS</u>
Buffer Temp: <u>27.5</u>			Buffer Temp: <u>22.2</u>		
pH 7.0 BUFFER Initial Reading: <u>7.01</u>			pH 7.0 BUFFER Initial Reading: <u>6.96</u>		
Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>		
pH 4.0/10.0 Initial Reading: <u>9.97</u>			pH 4.0/10.0 Initial Reading: <u>10.00</u>		
BUFFER Corrected Reading: <u>10.00</u>			BUFFER Corrected Reading: <u>10.00</u>		
% Slope: <u>96.6%</u>			% Slope: <u>97.5%</u>		
ADDITIONAL Reading -15 Sec: <u>7.83</u>			ADDITIONAL Reading -15 Sec: <u>7.74</u>		
STANDARD Reading - 1 Min: <u>7.91</u>			STANDARD Reading - 1 Min: <u>7.80</u>		

NOTES:

DATE: <u>5/13/94</u>	TIME: <u>1345</u>	BY: <u>TS</u>	DATE: <u>5-14-94</u>	TIME: <u>0725</u>	BY: <u>JS</u>
Buffer Temp: <u>22.4</u>			Buffer Temp: <u>22.2</u>		
pH 7.0 BUFFER Initial Reading: <u>7.03</u>			pH 7.0 BUFFER Initial Reading: <u>6.99</u>		
Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.00</u>		
pH 4.0/10.0 Initial Reading: <u>9.99</u>			pH 4.0/10.0 Initial Reading: <u>9.98</u>		
BUFFER Corrected Reading: <u>10.0</u>			BUFFER Corrected Reading: <u>10.00</u>		
% Slope: <u>97.5</u>			% Slope: <u>97.7%</u>		
ADDITIONAL Reading -15 Sec: <u>7.90</u>			ADDITIONAL Reading -15 Sec: <u>7.87</u>		
STANDARD Reading - 1 Min: <u>7.93</u>			STANDARD Reading - 1 Min: <u>7.92</u>		

NOTES:

DATE: <u>5/14/94</u>	TIME: <u>1015</u>	BY: <u>JS</u>	DATE: <u>5-15-94</u>	TIME: <u>0755</u>	BY: <u>JS</u>
Buffer Temp: <u>22.8</u>			Buffer Temp: <u>22.3</u>		
pH 7.0 BUFFER Initial Reading: <u>7.00</u>			pH 7.0 BUFFER Initial Reading: <u>6.97</u>		
Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>		
pH 4.0/10.0 Initial Reading: <u>9.98</u>			pH 4.0/10.0 Initial Reading: <u>10.00</u>		
BUFFER Corrected Reading: <u>10.00</u>			BUFFER Corrected Reading: <u>10.00</u>		
% Slope: <u>97.5%</u>			% Slope: <u>97.8%</u>		
ADDITIONAL Reading -15 Sec: <u>7.86</u>			ADDITIONAL Reading -15 Sec: <u>7.87</u>		
STANDARD Reading - 1 Min: <u>7.92</u>			STANDARD Reading - 1 Min: <u>7.93</u>		

NOTES:

DATE: <u>5/15/94</u>	TIME: <u>1005</u>	BY: <u>TS</u>	DATE: <u>5-16-94</u>	TIME: <u>0750</u>	BY: <u>JS</u>
Buffer Temp: <u>21.2</u>			Buffer Temp: <u>22.3</u>		
pH 7.0 BUFFER Initial Reading: <u>7.03</u>			pH 7.0 BUFFER Initial Reading: <u>6.95</u>		
Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.00</u>		
pH 4.0/10.0 Initial Reading: <u>9.96</u>			pH 4.0/10.0 Initial Reading: <u>10.03</u>		
BUFFER Corrected Reading: <u>10.0</u>			BUFFER Corrected Reading: <u>10.00</u>		
% Slope: <u>96.7</u>			% Slope: <u>98.4</u>		
ADDITIONAL Reading -15 Sec: <u>7.98</u>			ADDITIONAL Reading -15 Sec: <u>7.79</u>		
STANDARD Reading - 1 Min: <u>8.02</u>			STANDARD Reading - 1 Min: <u>7.84</u>		

NOTES:

DATE: <u>5-16-94</u>	TIME: <u>1525</u>	BY: <u>JAP</u>	DATE: <u>5-17-94</u>	TIME: <u>0725</u>	BY: <u>JS</u>
Buffer Temp: <u>23.1°C</u>			Buffer Temp: <u>21.9</u>		
pH 7.0 BUFFER Initial Reading: <u>7.01</u>			pH 7.0 BUFFER Initial Reading: <u>7.06</u>		
Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>		
pH 4.0/10.0 Initial Reading: <u>9.95</u>			pH 4.0/10.0 Initial Reading: <u>10.00</u>		
BUFFER Corrected Reading: <u>10.00</u>			BUFFER Corrected Reading: <u>10.00</u>		
% Slope: <u>97.2%</u>			% Slope: <u>97.2%</u>		
ADDITIONAL Reading -15 Sec: <u>7.60</u>			ADDITIONAL Reading -15 Sec: <u>7.66</u>		
STANDARD Reading - 1 Min: <u>7.13</u>			STANDARD Reading - 1 Min: <u>7.78</u>		

NOTES:

PH METER STANDARDIZATION

80

METER ID: #6 7413

DATE: <u>5/17/94</u>	TIME: <u>1315</u>	BY: <u>TS</u>	DATE: <u>5-18-94</u>	TIME: <u>0715</u>	BY: <u>DS</u>
	Buffer Temp: <u>22.5</u>			Buffer Temp: <u>21.1</u>	
pH 7.0 BUFFER	Initial Reading: <u>6.98</u>		pH 7.0 BUFFER	Initial Reading: <u>6.25</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>10.06</u>		pH 4.0/10.0	Initial Reading: <u>10.02</u>	
BUFFER	Corrected Reading: <u>10.0</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>99.6%</u>			% Slope: <u>100.5</u>	
ADDITIONAL	Reading -15 Sec: <u>7.55</u>		ADDITIONAL	Reading -15 Sec: <u>7.45</u>	
STANDARD	Reading - 1 Min: <u>7.58</u>		STANDARD	Reading - 1 Min: <u>7.58</u>	
NOTES:					

DATE: <u>5/18/94</u>	TIME: <u>1030</u>	BY: <u>TS</u>	DATE: <u>5-19-94</u>	TIME: <u>0750</u>	BY: <u>JPP</u>
	Buffer Temp: <u>20.6</u>			Buffer Temp: <u>22.2°C</u>	
pH 7.0 BUFFER	Initial Reading: <u>6.99</u>		pH 7.0 BUFFER	Initial Reading: <u>7.00</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>9.93</u>		pH 4.0/10.0	Initial Reading: <u>9.93</u>	
BUFFER	Corrected Reading: <u>10.0</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>98.2</u>			% Slope: <u>98.6%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.52</u>		ADDITIONAL	Reading -15 Sec: <u>7.47</u>	
STANDARD	Reading - 1 Min: <u>7.57</u>		STANDARD	Reading - 1 Min: <u>7.52</u>	
NOTES:					

DATE: <u>5/19/94</u>	TIME: <u>1340</u>	BY: <u>TS</u>	DATE: <u>5/25/94</u>	TIME: <u>0620</u>	BY: <u>1473</u>
	Buffer Temp: <u>22.2</u>			Buffer Temp: <u>21.8</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.01</u>		pH 7.0 BUFFER	Initial Reading: <u>7.14</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>10.03</u>		pH 4.0/10.0	Initial Reading: <u>7.97</u>	
BUFFER	Corrected Reading: <u>10.0</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>99.8%</u>			% Slope: <u>99.0</u>	
ADDITIONAL	Reading -15 Sec: <u>7.49</u>		ADDITIONAL	Reading -15 Sec: <u>8.12</u>	
STANDARD	Reading - 1 Min: <u>7.53</u>		STANDARD	Reading - 1 Min: <u>8.18</u>	
NOTES:					

DATE: <u>5-26-94</u>	TIME: <u>0810</u>	BY: <u>DS</u>	DATE: <u>5-28-94</u>	TIME: <u>1210</u>	BY: <u>9J</u>
	Buffer Temp: <u>21.6</u>			Buffer Temp: <u>22.1</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.01</u>		pH 7.0 BUFFER	Initial Reading: <u>6.99</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>10.14</u>		pH 4.0/10.0	Initial Reading: <u>9.98</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>99.6</u>			% Slope: <u>99.3%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.44</u>		ADDITIONAL	Reading -15 Sec: <u>8.02</u>	
STANDARD	Reading - 1 Min: <u>7.63</u>		STANDARD	Reading - 1 Min: <u>8.02</u>	
NOTES: <u>used w/ in m. low</u>					

DATE: <u>6-1-94</u>	TIME: <u>0925</u>	BY: <u>1473</u>	DATE: <u>06-02-94</u>	TIME: <u>0648</u>	BY: <u>Cup</u>
	Buffer Temp: <u>21.1</u>			Buffer Temp: <u>20.6</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.08</u>		pH 7.0 BUFFER	Initial Reading: <u>6.94</u>	
	Corrected Reading: <u>7.00</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>9.99</u>		pH 4.0/10.0	Initial Reading: <u>10.01</u>	
BUFFER	Corrected Reading: <u>10.00</u>		BUFFER	Corrected Reading: <u>10.00</u>	
	% Slope: <u>99.4</u>			% Slope: <u>100.3%</u>	
ADDITIONAL	Reading -15 Sec: <u>8.25</u>		ADDITIONAL	Reading -15 Sec: <u>7.44</u>	
STANDARD	Reading - 1 Min: <u>4.26</u>		STANDARD	Reading - 1 Min: <u>7.54</u>	
NOTES:					

pH METER STANDARDIZATION

34

METER ID: #3 543347

DATE: <u>5-3-94</u> TIME: <u>8:00</u> BY: <u>DM</u>	DATE: <u>5-3-94</u> TIME: <u>1445</u> BY: <u>GKK</u>
Buffer Temp: <u>22.1</u>	Buffer Temp: <u>23.2</u>
pH 7.0 BUFFER Initial Reading: <u>7.0</u>	pH 7.0 BUFFER Initial Reading: <u>7.0</u>
Corrected Reading: <u>7.0</u>	Corrected Reading: <u>7.0</u>
pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>	pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>
Corrected Reading: <u>4.0</u>	Corrected Reading: <u>4.0</u>
% Slope: <u>99.50</u>	% Slope: <u>99%</u>
ADDITIONAL Reading -15 Sec: <u>7.65</u>	ADDITIONAL Reading -15 Sec: <u>7.5</u>
STANDARD Reading - 1 Min: <u>7.72</u>	STANDARD Reading - 1 Min: <u>7.7</u>
NOTES: _____	NOTES: _____

DATE: <u>5-4-94</u> TIME: <u>0900</u> BY: <u>GKK</u>	DATE: <u>5-5-94</u> TIME: <u>1221</u> BY: <u>GKK</u>
Buffer Temp: <u>21.6</u>	Buffer Temp: <u>21.5</u>
pH 7.0 BUFFER Initial Reading: <u>7.0</u>	pH 7.0 BUFFER Initial Reading: <u>7.0</u>
Corrected Reading: <u>7.0</u>	Corrected Reading: <u>7.0</u>
pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>	pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>
Corrected Reading: <u>4.0</u>	Corrected Reading: <u>4.0</u>
% Slope: <u>99%</u>	% Slope: <u>99%</u>
ADDITIONAL Reading -15 Sec: <u>7.7</u>	ADDITIONAL Reading -15 Sec: <u>7.6</u>
STANDARD Reading - 1 Min: <u>7.8</u>	STANDARD Reading - 1 Min: <u>7.8</u>
NOTES: <u>Used within 1 hr of Standardization</u>	NOTES: <u>Used within 1 hr of Standardization</u>

DATE: <u>5-6-94</u> TIME: <u>7:00</u> BY: <u>DM</u>	DATE: <u>5-6-94</u> TIME: <u>1255</u> BY: <u>GKK</u>
Buffer Temp: <u>21.5 °C</u>	Buffer Temp: <u>20.7</u>
pH 7.0 BUFFER Initial Reading: <u>7.04</u>	pH 7.0 BUFFER Initial Reading: <u>7.0</u>
Corrected Reading: <u>7.00</u>	Corrected Reading: <u>7.0</u>
pH 4.0/10.0 BUFFER Initial Reading: <u>3.97</u>	pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>
Corrected Reading: <u>4.00</u>	Corrected Reading: <u>4.0</u>
% Slope: <u>99.50</u>	% Slope: <u>99%</u>
ADDITIONAL Reading -15 Sec: <u>7.78</u>	ADDITIONAL Reading -15 Sec: <u>7.8</u>
STANDARD Reading - 1 Min: <u>7.80</u>	STANDARD Reading - 1 Min: <u>7.8</u>
NOTES: _____	NOTES: _____

DATE: <u>5-7-94</u> TIME: <u>0945</u> BY: <u>GKK</u>	DATE: <u>05-08-94</u> TIME: <u>1015</u> BY: <u>Cec</u>
Buffer Temp: <u>21.3</u>	Buffer Temp: <u>25.0 °C</u>
pH 7.0 BUFFER Initial Reading: <u>7.0</u>	pH 7.0 BUFFER Initial Reading: <u>7.0</u>
Corrected Reading: <u>7.0</u>	Corrected Reading: <u>7.0</u>
pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>	pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>
Corrected Reading: <u>4.0</u>	Corrected Reading: <u>4.0</u>
% Slope: <u>99%</u>	% Slope: <u>97.5%</u>
ADDITIONAL Reading -15 Sec: <u>7.6</u>	ADDITIONAL Reading -15 Sec: <u>7.85</u>
STANDARD Reading - 1 Min: <u>7.8</u>	STANDARD Reading - 1 Min: <u>7.90</u>
NOTES: <u>Used within 1 hr of Standardization</u>	NOTES: <u>used w/in 1 hour Cec</u>

DATE: <u>5-9-94</u> TIME: <u>1000</u> BY: <u>GKK</u>	DATE: <u>5-10-94</u> TIME: <u>0920</u> BY: <u>js</u>
Buffer Temp: <u>21.2</u>	Buffer Temp: <u>21.0</u>
pH 7.0 BUFFER Initial Reading: <u>7.0</u>	pH 7.0 BUFFER Initial Reading: <u>7.0</u>
Corrected Reading: <u>7.0</u>	Corrected Reading: <u>7.0</u>
pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>	pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u>
Corrected Reading: <u>4.0</u>	Corrected Reading: <u>4.0</u>
% Slope: <u>99.5%</u>	% Slope: <u>98.5%</u>
ADDITIONAL Reading -15 Sec: <u>7.4</u>	ADDITIONAL Reading -15 Sec: <u>7.7</u>
STANDARD Reading - 1 Min: <u>7.6</u>	STANDARD Reading - 1 Min: <u>7.8</u>
NOTES: <u>Used within 1 hr</u>	NOTES: <u>Used within 1 hr</u>

pH METER STANDARDIZATION

35

METER ID: #3 543347

DATE: <u>05-11-94</u> TIME: <u>0646</u> BY: <u>CW</u> Buffer Temp: <u>25.0°C</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH <u>4.0</u> /10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>98%</u> ADDITIONAL Reading -15 Sec: <u>7.5</u> STANDARD Reading - 1 Min: <u>7.6</u>	DATE: <u>5-11-94</u> TIME: <u>1030</u> BY: <u>GKK</u> Buffer Temp: <u>21.1</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>98%</u> ADDITIONAL Reading -15 Sec: <u>7.6</u> STANDARD Reading - 1 Min: <u>7.8</u>
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NOTES:

DATE: <u>5-12-94</u> TIME: <u>0907</u> BY: <u>MEB</u> Buffer Temp: <u>heated to 25.0</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>3.9</u> Corrected Reading: <u>4.0</u> % Slope: <u>98%</u> ADDITIONAL Reading -15 Sec: <u>7.4</u> STANDARD Reading - 1 Min: <u>7.6</u>	DATE: <u>5-13-94</u> TIME: <u>8:43</u> BY: <u>DA</u> Buffer Temp: <u>21.5°C</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>98%</u> ADDITIONAL Reading -15 Sec: <u>7.7</u> STANDARD Reading - 1 Min: <u>7.8</u>
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NOTES:

DATE: <u>5-13-94</u> TIME: <u>1250</u> BY: <u>BKK</u> Buffer Temp: <u>21.3</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>98.5%</u> ADDITIONAL Reading -15 Sec: <u>7.7</u> STANDARD Reading - 1 Min: <u>7.9</u>	DATE: <u>5-14-94</u> TIME: <u>7:51</u> BY: <u>DA</u> Buffer Temp: <u>21.5</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.01</u> Corrected Reading: <u>4.0</u> % Slope: <u>98.5%</u> ADDITIONAL Reading -15 Sec: <u>7.8</u> STANDARD Reading - 1 Min: <u>7.9</u>
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NOTES:

DATE: <u>5/14/94</u> TIME: <u>1225</u> BY: <u>TS</u> Buffer Temp: <u>20.5</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>98.5%</u> ADDITIONAL Reading -15 Sec: <u>7.75</u> STANDARD Reading - 1 Min: <u>7.85</u>	DATE: <u>5-15-94</u> TIME: <u>0930</u> BY: <u>GS</u> Buffer Temp: <u>22.0</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>99%</u> ADDITIONAL Reading -15 Sec: <u>7.9</u> STANDARD Reading - 1 Min: <u>7.9</u>
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NOTES:

DATE: <u>5-15-94</u> TIME: <u>1155</u> BY: <u>GS</u> Buffer Temp: <u>21.8</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.0</u> Corrected Reading: <u>4.0</u> % Slope: <u>99%</u> ADDITIONAL Reading -15 Sec: <u>7.9</u> STANDARD Reading - 1 Min: <u>7.9</u>	DATE: <u>5-16-94</u> TIME: <u>7:38</u> BY: <u>DA</u> Buffer Temp: <u>21.2</u> pH 7.0 BUFFER Initial Reading: <u>7.0</u> Corrected Reading: <u>7.0</u> pH 4.0/10.0 BUFFER Initial Reading: <u>4.01</u> Corrected Reading: <u>4.0</u> % Slope: <u>99%</u> ADDITIONAL Reading -15 Sec: <u>7.90</u> STANDARD Reading - 1 Min: <u>7.92</u>
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NOTES:

pH METER STANDARDIZATION

36

METER ID: #3 543347

DATE: <u>5-16-94</u>	TIME: <u>1030</u>	BY: <u>GS</u>	DATE: <u>5-17-94</u>	TIME: <u>7:56</u>	BY: <u>DH</u>
	Buffer Temp: <u>22°C</u>			Buffer Temp: <u>21.2</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.01</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.00</u>	
pH 4.0/10.0	Initial Reading: <u>4.0</u>		pH 4.0/10.0	Initial Reading: <u>4.05</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.00</u>	
	% Slope: <u>99%</u>			% Slope: <u>100%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.8</u>		ADDITIONAL	Reading -15 Sec: <u>7.60</u>	
STANDARD	Reading - 1 Min: <u>7.9</u>		STANDARD	Reading - 1 Min: <u>7.62</u>	

NOTES:

DATE: <u>5/17/94</u>	TIME: <u>1450</u>	BY: <u>TS</u>	DATE: <u>5/18/94</u>	TIME: <u>0950</u>	BY: <u>TS</u>
	Buffer Temp: <u>20.2</u>			Buffer Temp: <u>21.2</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.03</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/10.0	Initial Reading: <u>4.0</u>		pH 4.0/10.0	Initial Reading: <u>4.02</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.0</u>	
	% Slope: <u>100%</u>			% Slope: <u>100%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.65</u>		ADDITIONAL	Reading -15 Sec: <u>8.1</u>	
STANDARD	Reading - 1 Min: <u>7.65</u>		STANDARD	Reading - 1 Min: <u>8.15</u>	

NOTES:

DATE: <u>5-18-94</u>	TIME: <u>1900</u>	BY: <u>CR</u>	DATE: <u>5-19-94</u>	TIME: <u>1220</u>	BY: <u>GKK</u>
	Buffer Temp: <u>25.0°C</u>			Buffer Temp: <u>21.7</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.0</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/10.0	Initial Reading: <u>4.0</u>		pH 4.0/10.0	Initial Reading: <u>4.0</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.0</u>	
	% Slope: <u>98%</u>			% Slope: <u>98.5%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.4</u>		ADDITIONAL	Reading -15 Sec: <u>7.5</u>	
STANDARD	Reading - 1 Min: <u>7.5</u>		STANDARD	Reading - 1 Min: <u>7.6</u>	

NOTES:

DATE: <u>5-19-94</u>	TIME: <u>1400</u>	BY: <u>JPP</u>	DATE: <u>5/20/94</u>	TIME: <u>1010</u>	BY: <u>TS</u>
	Buffer Temp: <u>22.0°C</u>			Buffer Temp: <u>21.5</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.0</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/10.0	Initial Reading: <u>4.0</u>		pH 4.0/10.0	Initial Reading: <u>4.0</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.0</u>	
	% Slope: <u>98.5%</u>			% Slope: <u>98.5%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.3</u>		ADDITIONAL	Reading -15 Sec: <u>7.4</u>	
STANDARD	Reading - 1 Min: <u>7.5</u>		STANDARD	Reading - 1 Min: <u>7.5</u>	

NOTES:

DATE: <u>5-21-94</u>	TIME: <u>1020</u>	BY: <u>GKK</u>	DATE: <u>5-21-94</u>	TIME: <u>1410</u>	BY: <u>GKK</u>
	Buffer Temp: <u>21.5°C</u>			Buffer Temp: <u>22.2°C</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.0</u>	
	Corrected Reading: <u>7.0</u>			Corrected Reading: <u>7.0</u>	
pH 4.0/10.0	Initial Reading: <u>4.0</u>		pH 4.0/10.0	Initial Reading: <u>4.0</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.0</u>	
	% Slope: <u>98%</u>			% Slope: <u>98%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.2</u>		ADDITIONAL	Reading -15 Sec: <u>7.3</u>	
STANDARD	Reading - 1 Min: <u>7.5</u>		STANDARD	Reading - 1 Min: <u>7.5</u>	

NOTES:

CONDUCTIVITY METER STANDARDIZATION

METER ID: #2 577779

DATE: ⁵4-10-94 TIME: 0805 BY: JS DATE: ⁵4-11-94 TIME: 0755 BY: JS

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 21.7
METER READING 201
720 μ MHo STD. TEMP 21.7
METER READING 729

75 μ MHo STD. TEMP _____
METER READING JS 4-11-94
200 μ MHo STD. TEMP 200 21.7
METER READING 200
720 μ MHo STD. TEMP 21.8
METER READING 727

NOTES: read w/in one hour

DATE: ⁵4-11-94 TIME: 1040 BY: JS DATE: ⁵4-12-94 TIME: 0804 BY: MAB

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 21.7
METER READING 201
720 μ MHo STD. TEMP 22.0
METER READING 725

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 21.8
METER READING 201
720 μ MHo STD. TEMP 21.8
METER READING 709

NOTES: _____

DATE: ³5-12-94 TIME: 1045 BY: JS DATE: ³5-12-94 TIME: 0800 BY: JS

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 28.5
METER READING 203
720 μ MHo STD. TEMP 28.3
METER READING 724

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 22.6
METER READING 200
720 μ MHo STD. TEMP 22.7
METER READING 724

NOTES: _____

DATE: ⁵5-13-94 TIME: 1340 BY: TS DATE: ⁵5-14-94 TIME: 0720 BY: JS

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 22.5
METER READING 202
720 μ MHo STD. TEMP 23.4
METER READING 724

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 22.6
METER READING 200
720 μ MHo STD. TEMP 22.9
METER READING 724

NOTES: _____

DATE: ⁵5-14-94 TIME: 1010 BY: JS DATE: ⁵5-15-94 TIME: 0750 BY: JS

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 22.9
METER READING 200
720 μ MHo STD. TEMP 22.8
METER READING 728

75 μ MHo STD. TEMP _____
METER READING _____
200 μ MHo STD. TEMP 22.7
METER READING 200
720 μ MHo STD. TEMP 22.6
METER READING 728

NOTES: _____

CONDUCTIVITY METER STANDARDIZATION

METER ID: H2 577779

=====

DATE: 5/15/94 TIME: 1005 BY: TS DATE: 5-16-94 TIME: 0745 BY: JS

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.5
 METER READING 199
 720 μ MHo STD. TEMP 22.8
 METER READING 727

75 μ MHo STD. TEMP _____
 METER READING 45
 200 μ MHo STD. TEMP 22.7
 METER READING 199
 720 μ MHo STD. TEMP 22.2
 METER READING 725

NOTES: _____

=====

DATE: 5-16-94 TIME: 1530 BY: JPP DATE: 5-17-94 TIME: 0720 BY: JS

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.9
 METER READING 202
 720 μ MHo STD. TEMP 23.0
 METER READING 723

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.6
 METER READING 198
 720 μ MHo STD. TEMP 22.3
 METER READING 725

NOTES: _____

=====

DATE: 5/17/94 TIME: 1325 BY: TS DATE: 5-18-94 TIME: 0710 BY: JS

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.7
 METER READING 200
 720 μ MHo STD. TEMP 23.1
 METER READING 731

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.2
 METER READING 199
 720 μ MHo STD. TEMP 22.5
 METER READING 727

NOTES: _____

=====

DATE: 5/18/94 TIME: 1045 BY: TS DATE: 5-19-94 TIME: 0750 BY: JPP

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.8
 METER READING 195
 720 μ MHo STD. TEMP 23.1
 METER READING 727

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.5°C
 METER READING 197
 720 μ MHo STD. TEMP 22.6°C
 METER READING 727

NOTES: _____

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DATE: 5/19/94 TIME: 1345 BY: TS DATE: 5-20-94 TIME: 0750 BY: JS

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 22.3
 METER READING 197
 720 μ MHo STD. TEMP 21.8
 METER READING 728

75 μ MHo STD. TEMP _____
 METER READING _____
 200 μ MHo STD. TEMP 21.3
 METER READING 199
 720 μ MHo STD. TEMP 21.3
 METER READING 722

NOTES: _____

ATTACHMENT V

TRAINING DOCUMENTATION FORMS

Training Record for: MARGARET L BARFIELD Position: EST

I, MARGARET L BARFIELD, have read the "Referenced Chapters" of the ARL Toxicology Laboratory Quality Assurance Program and Standard Operating Procedures Manual.

The trainee will initial the READ column and will sign and date the TRAINEE SIGNATURE AND DATE column after each referenced chapter.

CHAPTER	READ	TRAINEE SIGNATURE AND DATE
CHAPTER 1 Introduction	<i>MLB</i>	<i>Margaret L Barfield 8/3/93</i>
CHAPTER 2 Facility	<i>MLB</i>	<i>Margaret L Barfield 8/3/93</i>
CHAPTER 3 Personnel	<i>MLB</i>	<i>Margaret L Barfield 8/3/93</i>
CHAPTER 4 Health and Safety	<i>MLB</i>	<i>Margaret L Barfield 8/3/93</i>
CHAPTER 5 Quality Assurance	<i>MLB</i>	<i>Margaret L Barfield 8/3/93</i>

PLARC501-975

I, MARGARET L. BARFIELD, have read the ARL Toxicology Laboratory Quality Assurance Program and Standard Operating Procedures Manual.

The trainee will initial the READ and TRAINED columns for the referenced SOP after (1) each applicable Standard Operating Procedure has been read, and (2) after training has been received by the Unit Supervisor or approved trainer.

The Unit Supervisor or approved trainer will initial the PROFICIENT column after the calibrations, procedures, and calculations (if applicable) have been satisfactorily performed by the trainee.

After the READ, TRAINED, and PROFICIENT columns have been initialed, the trainee will sign and date the TRAINEE SIGNATURE AND DATE column.

SOP Section	READ	TRAINED	PROFICIENT	TRAINER (Name)	TRAINEE SIGNATURE AND DATE
SOP-1 Sample Collection and Handling	✓				
SOP-2 Preparation of Reagent Water	✓	✓	✓	Harvey S. Sessler	Margaret L. Barfield 9/10/93
SOP-3 Glassware Preparation					
SOP-4 Fathead Minnow Culture Methods	✓	✓	✓	Sessler	Margaret L. Barfield 9/10/93
SOP-5 Hatching and Preparation of Live Brine Shrimp (Artemia)	✓	✓	✓	Harvey S. Sessler	Margaret L. Barfield 9/10/93
SOP-6 Preparation of Laboratory Reconstituted Water	✓	✓	✓	Harvey S. Sessler	Margaret L. Barfield 9/10/93
SOP-7 <u>Ceriodaphnia dubia</u> Culture Methods	✓	✓	✓	Harvey S. Sessler	Margaret L. Barfield 9/10/93

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SOP Section	READ	TRAINED	PROFICIENT	TRAINER (Name)	TRAINEE SIGNATURE AND DATE
SOP-8 <u>Daphnia pulex</u> Culture Methods	✓				
SOP-9 Algal, <u>Selenastrum capricornutum</u> , Culture, Methods					
SOP-10 Algal Cell Enumeration					
SOP-11 Fathead Minnow, <u>Pimephales</u> <u>promelas</u> , Acute Toxicity Test					
SOP-12 Fathead Minnow, <u>Pimephales</u> <u>promelas</u> , Chronic Toxicity Test					
SOP-13 Fathead Minnow, <u>Pimephales</u> <u>promelas</u> , Embryo Larval Survival and Teratogenicity Test					
SOP-14 Daphnid, <u>Daphnia pulex</u> or <u>Ceriodaphnia dubia</u> , Acute Toxicity Test					
SOP-15 Cladoceran, <u>Ceriodaphnia dubia</u> , Survival and Reproduction Test					
SOP-16 Algal, <u>Selenastrum capricornutum</u> , Growth Test					
SOP-17 Reference Toxicant Testing					

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SOP Section	READ	TRAINED	PROFICIENT	TRAINER (Name)	TRAINEE SIGNATURE AND DATE
SOP-18 Physical/Chemical Analyses	✓	✓	✓	CLR	Margaret J. Engfield 9/20/93
SOP-19 Statistics					
SOP-20 Report Preparation					
SOP-21 Freshwater Mussel Culture Methods	✓	✓	✓	DS	Margaret J. Engfield 4/21/94 JFW 6-14-94
SOP-22 Freshwater Mussel Test Methods	✓	✓	✓	DS	Margaret J. Engfield 5/11/94 JFW 6-14-94
SOP-23 Rotox●					
SOP-24 Microtox (Microbics Corporation)					
SOP-25 Duckweed Toxicity Test (ASTM)					

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LABORATORY TRAINING RECORD

NAME Margaret BarfieldDate Employed (ARL) 8-3-94Related Experience Undergraduate honors research - mussel culture & testing work

Date	Trainer	Studies (include study ID, date, duties, training method, observations, etc.):
4-19-94	WJS	1. Assisted in preparation of Unionid Ringer Solutions. Discussed culture methods, and CO ₂ incubator
4-22-94	WJS	2. Trained and assisted in collection of whole catfish blood using cardiac puncture. MCB had
		3. previous experience using the caudal puncture method. Assisted with centrifugation of blood.
4-21-94	WJS	3A. Assisted in preparation of MEM.
5-9-94	WJS/JOP	4. Assisted with picking mussels for test. Trainers carefully observed trainee's techniques and rechecked
		5. counts of several replicates.
5-10-94	WJS	5A. Trainer instructed trainee of methods for initiating whole sediment test protocol. Trainee
		5B. assisted with several replicates.

Comments: Trainee had previous experience with both mussel culture and test techniques. Trainee's performance was more

Recommendations: than adequate for these duties

I recommend this employee for any related work in these areas.

Date discussed with employee 5-11-94

Jm 6-14-94

Trainer Signature

William J. SmithDate 5-11-94Employee Signature
(PLARC501-35)Margaret BarfieldDate 5-11-94

