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DOE/OR/22007--75

June 15, 1994

Ms. Terry L. Phipps
Environmental Sciences Division
Oak Ridge National Laboratory
Building 1504
Bethal Valley Road
Oak Ridge, Tennessee 37831

Dear Terry:

Enclosed is a copy of the report presenting results from the third whole sediment toxicity test conducted by TVA, May 10-19, 1994, in conjunction with the Clinch River - Environmental Restoration Program (CR-ERP) Study. Attachments to the report include Chain of Custody Form - Original (I), Toxicity Test Bench Sheets (II), Ammonia Analysis Request and Results (III), Meter Calibration Log Sheets (IV), and Training Documentation Forms (V). Exposure of juvenile freshwater mussels to sediment samples collected from Poplar Creek Mile 6.0 and Mile 2.9 on May 5 resulted in no toxicity to test organisms.

Please call Damien Simbeck (205-729-4549) or me (205-729-3340) if you have questions or comments regarding the report or conductance of the study.

Sincerely,

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

Jennifer Moses, Biologist
Toxicity Testing Laboratory

JM:DTH

Enclosures

cc: R. J. Pryor, HB 2D-C
J. D. Milligan, HB 2C-C (w/enclosures)
D. C. Wade, OSA 1B-M (w/enclosures)
Files, WM, HB 2C-C (w/enclosures)

MASTER

Prepared by Damien J. Simbeck

PLARC501-496

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By E. O. O'Neil Date 11/21/97

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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.

- 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	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Final
	(°C)	(mg/L)	(mg/L)	(S.U.)	(S.U.)	(µmhos)	(µmhos)	*	*	*	*	(mg/L)
PCM 6.0	24.2 (23.8-24.6)	-	7.2 (7.0-7.4)	-	7.5 (7.2-7.7)	-	316 (275-331)	-	40 (25-49)	-	77.8 (74.0-82.0)	< 0.001 (<0.001-0.004)
PCM 2.9-100%	24.2 (23.9-24.6)	-	6.9 (6.4-7.1)	-	7.7 (7.5-7.8)	-	361 (350-368)	-	60 (55-63)	-	99.1 (94.0-108.0)	< 0.002 (<0.001-0.008)
PCM 2.9-50%	24.1 (23.8-24.5)	-	7.1 (6.8-7.3)	-	7.6 (7.4-7.7)	-	347 (330-359)	-	52 (42-59)	-	92.0 (90.0-98.0)	< 0.001 (<0.001-0.002)
Taylor's Silt Refer.	24.2 (24.1-24.6)	7.8 (7.3-8.1)	7.8 (7.6-7.9)	7.8 (7.7-7.9)	8.0 (7.9-8.1)	330 (317-339)	343 (327-357)	62 (60-65)	64 (61-66)	88.2 (82.0-92.0)	92.3 (86.0-98.0)	0.008 (0.002-0.013)
Moderately Hard Water	-	8.3 (8.0-8.4)	-	8.2 (8.2-8.3)	-	332 (319-341)	-	64 (63-64)	-	86.0 (84.0-88.0)	-	-

* mg/L as CaCO₃

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ATTACHMENT I

CHAIN OF CUSTODY RECORD - ORIGINAL

TVA - Bferr

FD-302 (Rev. 03-28-79)

Custody seal, intact on cooler

DOCUMENT ID:

ATTACHMENT II

TOXICITY TEST BENCH SHEETS

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

Date Issued: 5-10-94 To: Simble From: JS

1. Test organism availability: T.L.* JS C.U.† JS Date 4-27-94
2. Sample Collection Coordination: Date 4-28-94 By Simble With L Graser
3. Glassware availability: T.L. JS Tech - Date 5-3-94
4. Silt/Phytoplankton availability: Silt- By JPP Date 5-4-94
Phytoplankton- By JPP/JS Date 5-4-94
5. Glassware prep. complete: Date 5-9-94 By JS
6. Data Sheet prep. complete: Date 5-10-94 By JS
7. Test organism availability verification: T.L. JS
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>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</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>NA</u>
Log Samples	T.L.	<u>JS</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>NA</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>NA</u>
Storage Temp		<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>NA</u>
See custody		<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>NA</u>
seal log		<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>NA</u>
Initial Chem.	T.L.	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</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>TS</u>	<u>JPP</u>	<u>NA</u>
Renewal/Counts	T.L.	<u>NA</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</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>NA</u>
Final Chem.	T.L.	<u>NA</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>TS</u>	<u>JS</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>TS</u>	<u>JS</u>	<u>JPP</u>	<u>NA</u>
Meter Recal.	T.L.	<u>NA</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>TS</u>	<u>JS</u>	<u>TS</u>
	T.M.	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>TS</u>	<u>JS</u>	<u>NA</u>
Paperwork	T.L.	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JS</u>	<u>JPP</u>
reviewed	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>NA</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 JS

14. Report Final: Date 6-14-94 By Jm Approved: JS

*Team Leader

†Culture Unit

‡Team Member

TREATMENT: Taylor's Silt (Reference)

Crushed once 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

0.5 MMS MMS 0.5 0.5 0.5 0.5/0.5 0.5 0.5 0.5
 ** only 9 found

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

0.5 0.5 MMS 0.5 0.5 0.5 0.5/0.5 0.5 0.5 0.5
 Reviewed By: 0.5

TREATMENT: PCM 2.9 50%

[illegible]

TREATMENT: PCM 2.9 100%

* One crushed during change-out

[illegible]

AS MFB JS MFB JS Reviewed By: [Signature] JPR
[Signature] / MFB [Signature] D.D. 6/10/19

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	PCm 6.0	50% 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		¹¹⁵⁰ 4590							
Alkalinity		6.3							
x 10		63							
Chlorine									
Ammonia									

NOTES: _____

Reviewed By: D/S
(PLARC50X-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	Taylor 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: Q25
(PLARC501-130)

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

TREATMENT	F-Med	Taylor						
	#1707	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: JS
(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	Taylor							
	# 1707	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: QJ
(PLARC501-130)

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

TREATMENT	F-Med	Taylor						
	#1716	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: AS
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey ^{DS}Ending 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: DS
(PLARC501-130)

INITIAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Posey^{01/}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	M6.0	M2.9	M2.9				
	Silt	Cntrl	50%	100%				
Temperature	24.2	24.1	23.9	24.3				
D.O.	7.9	~~6.0~~ 7.4	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: _____

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^H ^A
4.6, 1.2 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 ^{MXS} 2.4	96 ^{MXS} 92	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, 1994Posey⁰⁷⁵Ending 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: _____

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Reviewed By: JB

(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	0.03	0.001	<0.001	<0.001				

NOTES: _____

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Reviewed By: AS
(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 Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
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: _____

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Reviewed By: AS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994⁰⁵
Posey SesslerEnding Date: May 19, 1994Date: 5-16-94Replicate: 2

TREATMENT	Taylor	M6.0	M2.9	M2.9				
	Silt	Cntrl	50%	100%				
Temperature	24.3	24.3	24.3	24.5				
D.O.	7.8	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	⁰⁵ 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: MS
(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: _____

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Reviewed By: DS
(PLARC501-130)

FINAL CHEMISTRYProject: CR-ERP QA Test 3 May 1994Personnel: SimbeckBeginning Date: May 10, 1994Poséy ⁷³Ending Date: May 19, 1994Date: 5-18-94Replicate: 21

TREATMENT	Taylor Silt	M6.0 Cntrl	M2.9 50%	M2.9 100%				
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} 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	1058	63				
Chlorine								
Ammonia	0.002	0.004	<0.001	<0.001				

NOTES: * 50 ml sampleReviewed By: 95
(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	M6.0	M2.9	M2.9				
	Silt	Cntrl	50%	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 6-1-88

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

3cm 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 KLV5
 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 # 935306
 Exp. NA

HARDNESS TITRATION

Hardness Titrating Solution:

Brand Calgon
 Lot # R1005702
 Exp. NA

Hardness Indicator:

Brand Calgon
 Lot # 01198
 Exp. NA

Hardness Buffer Solution:

Brand Calgon
 Lot # 26668
 Exp. NA

CHLORINE TITRATION

DPD Powder Pillows:

Brand Hach
 Lot # 03CM
 Exp. NA

Potassium Iodide:

Brand Fisher
 Lot # B63484A
 Exp. NA

FAS:

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

Project Instrument Record Sheet

Project Study CR-ERP Mossels 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
6-1-94 3-7-94

531047 64
used ~~543349~~ 55
on 5/10, 11 + 12/94

pH Meter(s)

Model Drison Research Model SA250
TVA Tag ~~814783~~ 7413
Calibration Date ~~3-2-94~~ 5-5-94
6-1-94
Model Drison Research Model 407A
TVA Tag 543347
Calibration Date 11-16-93

Conductivity Meter

Model YSI Model 32 6-1-94
TVA Tag ~~9361177905~~ 577779
Calibration Date ~~2-8-94~~ 3-29-94

Thermometer(s)

Model SAMA-CD 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

Pcm 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 S.H 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 Danien J. Simbeck

Notebook page _____

Address TTL 1A-BFN

Analyzed by _____

Request approved by [Signature]

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>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 - JS</u>	

ANALYZE FOR

Lab. No.	Consignor's Number										

Requested by Damen J. Simebeck Notebook page _____
 Address TTL 1A-BFN Analyzed by _____
 Request approved by Damen J. Simebeck 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 Danien J. Sumbek

Notebook page _____

Address TTL 1A RFN

Analyzed by _____

Request approved by D. J. Sumbek

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. DDO 9687GENERAL DESCRIPTION: Ammonia Analyses

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

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel J. Simbala

Notebook page _____

Address TTL 1A - BEN

Analyzed by _____

Request approved by D. J. Simbala

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		
	Sample from 5-15-94		
	R.D. Blank	pH: 5.5	@24°C
	Taylor's S.H	pH: 8.1	"
	PCM 6.0	pH: 7.6	"
	PCM 2.9 50%	pH: 7.7	"
	PCM 2.9 100%	pH: 7.8	"
Remarks, method, etc.:			

ANALYZE FOR

Lab. No.	Consignor's Number										

Requested by Danien J. Smbeck

Notebook page _____

Address TTL 1A BEN

Analyzed by _____

Request approved by Dan J. Sil

Laboratory _____

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727 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 for 5-16-94</u>
	<u>R.O. Blank pH = 5.8 @ 24°C</u>
	<u>Taylor's 5.14 pH = 8.0</u>
	<u>PCM 62 pH = 7.6 "</u>
	<u>PCM 29 50% pH = 7.7 "</u>
	<u>PCM 29 100% pH = 7.7 "</u>
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Daniel J. Sankel

Notebook page _____

Address ITL 14-DEM

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. 0009687

GENERAL DESCRIPTION: Ammonia Analysis Samples from 5-17-94

Consignor's Number	Specific Description for Each Sample
TS-(5-17-94)	Taylor's 5.14 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. Blank pH- 5.5
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Danien J. Simbeck Notebook page _____
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 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. 6009687GENERAL DESCRIPTION: Ammonia Analyses samples from 5-18-94

Consignor's Number	Specific Description for Each Sample
TS(5-18-94)	Taylor's SH, H = 7.9 @ 24°C
6.0(5-18-94)	PCM 6.0 pH = 7.6 "
2.9-50(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 Debra J. Simbeck

Notebook page _____

Address 771 1A REN

Analyzed by _____

Request approved by [Signature]

Laboratory _____

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724-1549

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 5-19-94 Laboratory No. _____
 Date wanted ASAP _____
 Date reported _____ Charge to account No. D009687

GENERAL DESCRIPTION: Ammonia analyses samples from 5-19-94

Consignor's Number	Specific Description for Each Sample		
TS-(5-19-94)	Taylor's 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.D. Blank	pH: 5.7	"
Remarks, method, etc.: _____			

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Doreen J. 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 O 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

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 0 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

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

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

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

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

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

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

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

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

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

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

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

```

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

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

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

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

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

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 :94/05232   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

Lab Sample Number : 94/05379   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 : 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

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

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

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

```

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

```

05/27/94

FINAL DATA REPORT

07:59 |

Page

1

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

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 O 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

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

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

```

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

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: Cur
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: Cur
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: Cur
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: Cur
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: 8.2 #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: 20.8 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: 21.5
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: GS
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: 483
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: 21.2°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: TS/MS
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: GS
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: Cer
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: Cer
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: Cer
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: Cer
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 AM

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

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

NOTES: not used will not hold next time

DATE: 5-13-94 TIME: 0745 BY: U6
INITIAL READING: 8.4
WATER TEMP: 21.5
WINKLER #1: 7.7 #2: 7.7
X: 7.7
CORRECTED READING: 7.7

DATE: 5-13-94 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

METER ID: #3 557673

DATE: 5-14-94 TIME: 0710 BY: 8/5
 INITIAL READING: 21.3 8.0
 WATER TEMP: 21.3 75.4
 WINKLER #1: 8.8 #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: 0956 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: 8/5
 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: 8.4

NOTES: _____

DO METER STANDARDIZATION

METER ID:

H83 557673

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
TS
5/19/94

DATE: 5-26-94 TIME: 0740 BY: JS
 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: JS
 INITIAL READING: 6.9
 WATER TEMP: 21.9°C
 WINKLER #1: 6.9 #2: 6.9
 X: 6.9
 CORRECTED READING: 6.9

used within one hour

DATE: 6-7-94 TIME: 0830 BY: JS
 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: JS
 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: JS
 INITIAL READING: 7.6
 WATER TEMP: 21.1
 WINKLER #1: 7.6 #2: 7.6
 X: 7.6
 CORRECTED READING: 7.6

NOTES: _____

DATE: 6-7-94 TIME: 0815 BY: JS
 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: JS
 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: JS
 INITIAL READING: 8.2
 WATER TEMP: 21.2
 WINKLER #1: 8.1 #2: 9.2
 X: 8.15
 CORRECTED READING: 8.15

used within one hour

pH METER STANDARDIZATION

78

METER ID: 56 7413

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

NOTES:

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

NOTES:

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

GKK-4-20-94

DATE: <u>5-10-94</u> TIME: <u>0810</u> BY: <u>MS</u> Buffer Temp: <u>21.1</u> pH 7.0 BUFFER Initial Reading: <u>7.00</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 BUFFER Initial Reading: <u>9.98</u> Corrected Reading: <u>10.00</u> % Slope: <u>100.0%</u> ADDITIONAL Reading -15 Sec: <u>7.70</u> STANDARD Reading - 1 Min: <u>7.81</u>	DATE: <u>5-11-94</u> TIME: <u>0803</u> BY: <u>MJB</u> Buffer Temp: <u>20.9</u> pH 7.0 BUFFER Initial Reading: <u>6.98</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 BUFFER Initial Reading: <u>9.93</u> Corrected Reading: <u>10.00</u> % Slope: <u>100.00</u> ADDITIONAL Reading -15 Sec: <u>8.31</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>MJB</u> Buffer Temp: <u>21.5</u> pH 7.0 BUFFER Initial Reading: <u>6.99</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 BUFFER Initial Reading: <u>9.92</u> Corrected Reading: <u>10.00</u> % Slope: <u>97.4</u> ADDITIONAL Reading -15 Sec: <u>8.34</u> STANDARD Reading - 1 Min: <u>8.34</u>	DATE: <u>5-12-94</u> TIME: <u>0755</u> BY: <u>MJB</u> Buffer Temp: <u>25.2</u> pH 7.0 BUFFER Initial Reading: <u>6.99</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 BUFFER Initial Reading: <u>9.98</u> Corrected Reading: <u>10.00</u> % Slope: <u>97.4</u> ADDITIONAL Reading -15 Sec: <u>8.45</u> STANDARD Reading - 1 Min: <u>8.45</u>

NOTES:

pH METER STANDARDIZATION

METER ID: #6 7413

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DATE: <u>5-12-94</u>	TIME: <u>1040</u>	BY: <u>95</u>	DATE: <u>5-13-94</u>	TIME: <u>0755</u>	BY: <u>95</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>7.87</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: _____					

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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>95</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: _____					

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DATE: <u>5/14/94</u>	TIME: <u>1015</u>	BY: <u>91</u>	DATE: <u>5-15-94</u>	TIME: <u>0755</u>	BY: <u>95</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>97.9%</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: _____					

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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>95</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: _____					

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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>95</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: <u>cleaned probe</u>					

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pH METER STANDARDIZATION

80

METER ID: #6 7413

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

NOTES:

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

NOTES:

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

NOTES:

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

NOTES:

DATE: <u>6-1-94</u> TIME: <u>0925</u> BY: <u>MTB</u> Buffer Temp: <u>21.1</u> pH 7.0 BUFFER Initial Reading: <u>7.08</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 Initial Reading: <u>9.99</u> BUFFER Corrected Reading: <u>10.00</u> % Slope: <u>99.4</u> ADDITIONAL Reading -15 Sec: <u>8.25</u> STANDARD Reading - 1 Min: <u>8.26</u>	DATE: <u>06-02-94</u> TIME: <u>0649</u> BY: <u>CAR</u> Buffer Temp: <u>20.6°C</u> pH 7.0 BUFFER Initial Reading: <u>6.94</u> Corrected Reading: <u>7.00</u> pH 4.0/10.0 Initial Reading: <u>10.01</u> BUFFER Corrected Reading: <u>10.00</u> % Slope: <u>100.3%</u> ADDITIONAL Reading -15 Sec: <u>7.44</u> STANDARD Reading - 1 Min: <u>7.54</u>

NOTES:

pH METER STANDARDIZATION

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	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>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:					

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	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>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> <u>Used within 1 hr of Standard</u> 05-06-94 cer					

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	Initial Reading: <u>3.97</u>		pH 4.0/10.0	Initial Reading: <u>4.0</u>	
BUFFER	Corrected Reading: <u>4.00</u>		BUFFER	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:					

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>cer</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	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>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> <u>used w/in 1 hour cer</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	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>97.5%</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 w/in 1 hr</u> <u>Used within 1 hr</u>					

PH METER STANDARDIZATION

METER ID: #3 543347

DATE: <u>05-11-94</u>	TIME: <u>0646</u>	BY: <u>CU</u>	DATE: <u>5-11-94</u>	TIME: <u>1030</u>	BY: <u>GKK</u>
	Buffer Temp: <u>25.0°C</u>			Buffer Temp: <u>21.1</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 <u>4.0</u> /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>7.5</u>		ADDITIONAL	Reading -15 Sec: <u>7.6</u>	
STANDARD	Reading - 1 Min: <u>7.6</u>		STANDARD	Reading - 1 Min: <u>7.8</u>	
NOTES:					

DATE: <u>5-12-94</u>	TIME: <u>0907</u>	BY: <u>MSB</u>	DATE: <u>5-13-94</u>	TIME: <u>8:43</u>	BY: <u>DK</u>
	Buffer Temp: <u>heated to 25.0</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>3.9</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>7.4</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:					

DATE: <u>5-13-94</u>	TIME: <u>1250</u>	BY: <u>GKK</u>	DATE: <u>5-14-94</u>	TIME: <u>7:51</u>	BY: <u>DK</u>
	Buffer Temp: <u>21.3</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>4.01</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>7.7</u>		ADDITIONAL	Reading -15 Sec: <u>7.8</u>	
STANDARD	Reading - 1 Min: <u>7.9</u>		STANDARD	Reading - 1 Min: <u>7.9</u>	
NOTES:					

DATE: <u>5-14-94</u>	TIME: <u>1225</u>	BY: <u>TS</u>	DATE: <u>5-15-94</u>	TIME: <u>0930</u>	BY: <u>GS</u>
	Buffer Temp: <u>20.5</u>			Buffer Temp: <u>22.0</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	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>99%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.75</u>		ADDITIONAL	Reading -15 Sec: <u>7.9</u>	
STANDARD	Reading - 1 Min: <u>7.85</u>		STANDARD	Reading - 1 Min: <u>7.9</u>	
NOTES: <u>used water one hour</u>					

DATE: <u>5-15-94</u>	TIME: <u>1155</u>	BY: <u>GS</u>	DATE: <u>5-16-94</u>	TIME: <u>7:38</u>	BY: <u>DK</u>
	Buffer Temp: <u>21.8</u>			Buffer Temp: <u>21.2</u>	
pH 7.0 BUFFER	Initial Reading: <u>7.0</u>		pH 7.0 BUFFER	Initial Reading: <u>7.0</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>4.01</u>	
BUFFER	Corrected Reading: <u>4.0</u>		BUFFER	Corrected Reading: <u>4.0</u>	
	% Slope: <u>99%</u>			% Slope: <u>99%</u>	
ADDITIONAL	Reading -15 Sec: <u>7.9</u>		ADDITIONAL	Reading -15 Sec: <u>7.90</u>	
STANDARD	Reading - 1 Min: <u>7.9</u>		STANDARD	Reading - 1 Min: <u>7.92</u>	
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>DN</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>05-18-94</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: <u>used within 1 hr.</u>					

DATE: <u>5-19-94</u>	TIME: <u>1400</u>	BY: <u>JPP</u>	DATE: <u>5/20/94</u>	TIME: <u>1000</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: <u>used within 1 hr.</u>					

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>7.4</u>		STANDARD	Reading - 1 Min: <u>7.5</u>	
NOTES:					

CONDUCTIVITY METER STANDARDIZATION

METER ID: #2 57777.9

DATE: 5-10-94 TIME: 0805 BY: JS   DATE: 5-11-94 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: std w/in 2 hr

DATE: 5-11-94 TIME: 1040 BY: JS   DATE: 5-12-94 TIME: 0804 BY: MZB

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: 5-12-94 TIME: 1045 BY: JS   DATE: 5-12-94 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: 5-13-94 TIME: 1340 BY: TS   DATE: 5-14-94 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: 5-14-94 TIME: 1010 BY: JS   DATE: 5-15-94 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: _____

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>

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	✓				
X SOP-2 Preparation of Reagent Water	✓	✓	✓	Haraway S.H. Sessler JCB	Margaret L. Barfield 9/10/93
→ SOP-3 Glassware Preparation					
✓ → SOP-4 Fathead Minnow Culture Methods	✓	✓	✓	Sessler JCB	Margaret L. Barfield 9/10/93
✓ SOP-5 Hatching and Preparation of Live Brine Shrimp (Artemia)	✓	✓	✓	Haraway S.H.	Margaret L. Barfield 9/10/93
X SOP-6 Preparation of Laboratory Reconstituted Water	✓	✓	✓	Haraway S.H.	Margaret L. Barfield 9/10/93
X SOP-7 <u>Ceriodaphnia dubia</u> Culture Methods	✓	✓	✓	Haraway S.H.	Margaret L. Barfield 9/10/93

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SOP Section	READ	TRAINED	PROFICIENT	TRAINER (Name)	TRAINEE SIGNATURE AND DATE
X 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 promelas</u> , Acute Toxicity Test					
✓ SOP-12 Fathead Minnow, <u>Pimephales promelas</u> , Chronic Toxicity Test					
SOP-13 Fathead Minnow, <u>Pimephales 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					

SOP Section	READ	TRAINED	PROFICIENT	TRAINER (Name)	TRAINEE SIGNATURE AND DATE
✓ X SOP-18 Physical/Chemical Analyses	✓	✓	✓	CLR ut	Margaret L. Benfield 9/20/93
SOP-19 Statistics					
SOP-20 Report Preparation					
✓ SOP-21 Freshwater Mussel Culture Methods	✓	✓	✓	JS	Margaret L. Benfield 4/21/94 Jm 6-14-94
✓ SOP-22 Freshwater Mussel Test Methods	✓	-	-	JS	Margaret L. Benfield 5/11/94 Jm 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 Barfield

Date Employed (ARL) 8-3-94

Related Experience Undergraduate honors research - mussel culture & testing work

<u>Date</u>	<u>Trainer</u>	<u>Studies (include study ID, date, duties, training method, observations, etc.):</u>
<u>4-19-94</u>	<u>ojs</u>	1. <u>Assisted in preparation of Unionid Ringer Solutions. Discussed culture methods, and CO₂ incubator</u>
<u>4-22-94</u>	<u>ojs</u>	2. <u>Trained and assisted in collection of whole catfish blood using cardiac puncture. MCB had</u>
		<u>previous experience using the caudal puncture method. Assisted with centrifugation of blood.</u>
<u>4-21-94</u>	<u>ojs</u>	3. <u>Assisted in preparation of MEM.</u>
<u>5-9-94</u>	<u>ojs/jop</u>	4. <u>Assisted with picking mussels for test. Trainers carefully observed trainee's techniques and rechecked</u>
		<u>counts of several replicates.</u>
<u>5-10-94</u>	<u>ojs</u>	5. <u>Trainer instructed trainee of methods for initiating whole sediment test protocol. Trainee</u>
		<u>assisted with several replicates.</u>

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

Trainer Signature Wm. J. Smith

Date 5-11-94

Employee Signature Margaret Barfield
(PLARC501-35)

Date 5-11-94

LABORATORY TRAINING RECORD
(Continued)

NAME Margaret Barfield

Studies (include study ID, date, duties, training method, observations, etc.):

[illegible]

Comments: _____

Recommendations: