DOE/OR/22012--T10

STANDARD REPORT FORM

STATIC RENEWAL TESTS USING ANODONTA IMBECILLIS
(FRESHWATER MUSSELS)

Test Title: Anodonta imbecillis QA Test 2, Clinch River - Environmental Restoration Program (CR-ERP)

Principle Investigator: Damien J. Simbeck

Starting Date: August 24, 1993

Ending Date: September 2, 1993

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 August 14 from Poplar Creek Miles 6.0 and 4.3 was conducted from August 24-September 2, 1993. 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 and 4.3.

2.2 Control and/or Dilution Sediment: Poplar Creek Mile (PCM) 6.0.

2.3 Sample Date: August 13, 1993

2.4 Sampling Method: Samples were collected by TVA Field Engineering personnel. An Eckman dredge was used to obtain the upper fine sediments (5-10 cm) 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 Aquatic Research Laboratory (ARL) 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 ARL by TVA mail.

DISCLAIMER

2.6 Sample Storage/Handling: All samples were stored in a refrigerator at 4°C ± 1°C prior to and during the test.

2.7 Test Treatments: Three treatments, PCM 6.0 (Control), PCM 4.3-100% and PCM 4.3-50% (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 August 23 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, August 9-August 16, 1993, TVA Aquatic Research Laboratory. The gravid adults from which glochidia were extracted were obtained from Taylor's Catfish ponds, Town Creek, Alabama, on June 22 and August 6, 1993. 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. [3]

3.2.3 Temperature of culture: 24°C ± 1°C

3.3 Maintenance of Test Organisms:

3.3.1 Culture water: After transformation of larval mussels, the free-living juveniles were placed in 100 µm filtered 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. [4]

3.3.2 Temperature of culture: 24°C ± 1°C

3.3.3 General maintenance: Cultures were maintained in 1000-mL Nalgene® trays in 24-h dark incubators. From August 16-22, cultures were changed out daily with fresh phytoplankton water and silt. Cultures were fed a concentrated Selenastrum/desmids mixture (10 mL/L) daily through August 19 and concentrated phytoplankton (10 mL/L) daily thereafter. Health and survival of the culture were checked by microscopic examination of animals when culture water was changed.

One day prior to test initiation (August 23) 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 ARL channel water to filtered (100 µm) TR water. Algal nutrients used for Selenastrum cultures were added (1 mL/L) to boost algal blooms. [5] Blooms were centrifuged 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. [6] The alga Selenastrum capricornutum concentrated to 30 x 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 4°C until used.

4.0 TEST METHODS

4.1 Mussels, Anodonta imbecillis, Survival Test, TVA Test Method, SOP-22, solid phase protocol. [5]

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 was placed into dishes 24 hr before use 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 Due to lack of concentrated phytoplankton, the juvenile cultures were changed out daily with fresh phytoplankton water, and fed approximately 10 mL of a Selenastrum/Desmid mixture through Culture Day 3. (See Section 3.3.3)

4.3 Date/Time Test Initiated: August 24, 1993/0800 CDT

4.4 Date/Time Test Terminated: September 2, 1993/0810 CDT

4.5 Age of Test Organisms: 8 days old

4.6 Test Chamber: 50 mm-diameter glass cylinder (75 mm tall) with 100-µm nylon mesh bottom, placed in 250-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 Dilution Sediment: PCM 6.0

4.11 Test Control: PCM 6.0

4.12 Overlying Water: Moderately hard synthetic water

4.13 Test Temperature: 24°C ± 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 840 mg dry weight filtered sediment (3.5 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 (50 mL) were preserved with 1:4 H_2SO_4 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. [7] The decision process followed for testing survival effects is shown in Section 6.2.1. Statistical significance of results was determined following procedures for comparing single treatments versus control. Based on tests for normally distributed data and homogeneous variances, the statistical test used for endpoint determination was the T-Test.

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 ARL Quality Assurance Plan and SOP Manual, and EPA/600/4-89/001. [5][7] 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 ARL 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 ARL 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 DS-42.11. [2]

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 DS-43.6 and DS-42.4, respectively. [2]

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 DS-43.7 and DS-42.8, respectively. [2]

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 DS-43.3 and DS-42.3, respectively. [2]

5.2.7 Alkalinity was measured by titration of 100 mL samples with 0.02 N H_2SO_4 to an end point of 4.5 according to TVA procedure DS-42.1. [2]

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.

5.2.9 Total residual chlorine was determined using the DPD Titrimetric Method according to TVA procedure DS-42.9, Rev. 0. [2]

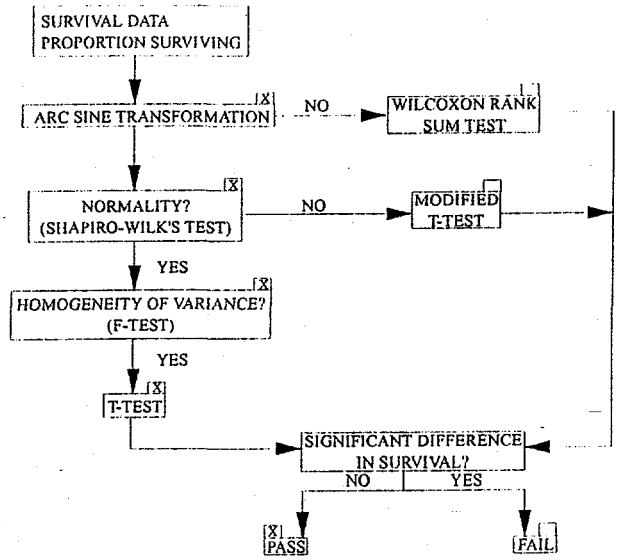
6.0 RESULTS

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 (100 percent) or PCM 4.3 (100 percent and 50 percent).

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, August 24-September 2, 1993.

DETERMINATION OF PASS OR FAIL FROM A
SINGLE-TREATMENT-CONCENTRATION ACUTE TOXICITY TEST



6.2.2 Daily Percent Survival Summary for Anodonta imbecillis, Whole Sediment QA Test 2, CR-ERP, August 24-September 2, 1993.

	Total Daily % Survival								
Treatment	1	2	3	4	5	6	7	8	9
PCM 6.0	100	100	98	98	98	98	95	95	95
PCM 4.3-100%	100	98	98	98	95	95	90	90	90
PCM 4.3-50%	98	98	98	95	95	95	95	95	93
Taylor's Silt Refer.	98	98	98	98	98	98	98	98	98

6.2.3 Nine-day Percent Survival Summary for Anodonta imbecillis, Whole Sediment QA Test 2, CR-ERP, August 24-September 2, 1993.

	Mussel Survival Data (% Survival)										
	Replicate										
Treatment	1	2	3	4	5	6	7	8	9	10	Mean S*
PCM 6.0	90	100	100	90							95
PCM 4.3-100%	100	90	80	90							90
PCM 4.3-50%	90	100	90	90							93

*S-Significant based on T-Test

6.3 Water Chemistry Summary for Anodonta imbecillis, Whole Sediment QA Test 2, CR-ERP, August 24-September 2, 1993.

6.3.1 Test Temperature: 24.2°C (23.1°-24.9°C)

6.3.2 See: Appendix A Water Chemistry Mean Values and Ranges for Anodonta imbecillis, Whole Sediment QA Test 2, CR-ERP, August 24-September 2, 1993.

7.0 CONCLUSION

Testing of sediment samples collected August 13 from Poplar Creek Miles 6.0 and 4.3 was conducted from August 24- September 2, 1993. 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. Field Operations Natural Resource Engineering Procedures Manual, Vol. 1, Division of Natural Resource Operations, Tennessee Valley Authority.
3. 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.
4. 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.
5. Aquatic Research Laboratory Quality Assurance Program and Standard Operating Procedures Manual, Division of Water Resources, Tennessee Valley Authority (October 1992).
6. 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).
7. Weber, C. I. (ed.), Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-90/027 (September 1991).

PLARC501-1797

Appendix A

Water Chemistry Mean Values and Ranges for Anadonta imbecillis,
Whole Sediment QA Test 2, CR-ERP, August 24-September 2, 1993

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 (23.2-24.9)	-	7.4 (7.3-7.7)	-	7.8 (7.7-7.8)	-	361 (345-386)	-	57 (50-63)	-	98.6 (94.1-102.6)	< 0.001 (<0.001-0.005)
PCM 4.3-100%	24.2 (23.7-24.7)	-	7.3 (7.0-7.5)	-	7.7 (7.6-7.7)	-	371 (357-407)	-	60 (53-66)	-	103.6 (100.9-106.0)	< 0.002 (<0.001-0.007)
PCM 4.3-50%	24.1 (23.5-24.4)	-	7.3 (7.1-7.6)	-	7.7 (7.7-7.8)	-	364 (356-374)	-	57 (52-61)	-	100.7 (97.5-111.2)	< 0.002 (<0.001-0.007)
Taylor's Silt Refer.	24.1 (23.1-24.5)	8.1 (8.0-8.2)	7.8 (7.7-8.0)	7.8 (7.7-7.9)	8.0 (8.0-8.1)	336 (331-342)	355 (346-381)	62 (61-64)	65 (63-66)	95.4 (90.6-102.6)	98.2 (95.8-102.6)	< 0.002 (<0.001-0.006)
Moderately Hard Water	-	8.2 (8.1-8.3)	-	8.2 (8.2-8.2)	-	337 (332-343)	-	60 (56-64)	-	97.5 (95.8-99.2)	-	-

* mg/L as $CaCO_3$

PLARC501-1798

ATTACHMENT I

CHAIN OF CUSTODY RECORD - ORIGINAL

FIELD CHAIN OF CUSTODY TVA → B. Ferry

need copy w/sig. or original back

CLINCH RIVER ER PROJECT	SAMPLING DATE: 20 AUG 93	FIELD COC ID: OB20933	PAGE 1 OF 1
TASK: S3	MATRIX: Sediment	KIT CONTAINER ID:	
TEAM LEADER: J. Stockburger	SAMPLING TEAM:		
FIELD CUSTODIAN: J. Stockburger	Phil Clapp		

SAMPLE ID	SAMPLING LOCATION	SAMPLE TYPE	CONTAINER		ANALYSIS	SAMPLING DEVICE	COLLECTION SOP	REMARKS
			TYPE	VOLUME				
5D19	PCM 4.3	FLD	HDPE	4L	mussel	Eckman	—	
5D22	PCM 6	FLD	HDPE	4L	mussel	Eckman	—	

CONTAINER TYPES:

SAMPLE TYPES: *RB* - Rinse Blank; *FB* - Field Blank; *SPK* - Spike; *TB* - Trip Blank; *FLD* - Field Sample; *FD* - Field Duplicate; *SP* - Split; *CP* - Composite; *VCP* - Vertical Composit

ANALYSIS TYPES: *RAD* - Rads; *MET* - Metals; *ORG* - Organics; *INO* - Inorganics; *PHY* - Physical; *PW* - Pore Water

RELINQUISHED BY:	DATE:	TIME:	RELINQUISHED BY:	DATE:	TIME:
Allen F. Stockburger	8-20-93	15:00			
RECEIVED BY: D. Hanaway	DATE: 8-21-93	TIME: 0830	RECEIVED BY:	DATE:	TIME:

FCOC Rev. 4 , 01JUL93

DOCUMENT ID:

ATTACHMENT II

TOXICITY TEST BENCH SHEETS AND STATISTICAL ANALYSES

ARL ACUTE TOXICITY TEST (MUSSEL) MASTER CHECKLIST Study: CR-ERP#2

Date Issued: N/A To: N/A From: N/A

1. Test organism availability: T.L.* DJS C.U.† ___ Date 8-16-93

2. Sample Collection Coordination: Date 8-18-93 By DJS With AA-(illegible)

3. Glassware availability: T.L. DJS Tech ___ Date 8-20-93

4. Silt/Phytoplankton availability: Silt- By DJS Date 8-13-93
Phytoplankton- By N/A Date N/A

5. Glassware prep. complete: Date 8-23-93 By DJS

6. Data Sheet prep. complete: Date 8-20-93 By DJS

7. Test organism availability verification: T.L. DJS

8. Test Initiation: Date/Time 8-24-93/0300

9. Test Renewal:

		Day#: 0	1	2	3	4	5	6	7	8	9
Meter Calib.	T.L.	DH	DH	DJS	DJS	DJS	DJS	DJS	DJS	DJS	DJS
	T.M.#	DJS	DJS	DRH	JPP	N/A	N/A	JPP	JPP	JPP	N/A
Log Samples	T.L.	DJS	N/A	—	—	—	—	—	—	>	N/A
	T.M.	N/A	—	—	—	—	—	—	—	>	N/A
Storage Temp(c		3.4	N/A	—	—	—	—	—	—	>	N/A
4.3		3.3	N/A	—	—	—	—	—	—	>	N/A
Initial Chem.	T.L.	DJS	DJS	—	DJS	DJS	DJS	DJS	DJS	DJS	N/A
	T.M.	N/A	DH	JPP	JPP	N/A	N/A	JPP	JPP	JPP	N/A
Renewal/Counts	T.L.	DJS	DJS	—	DJS	DJS	DJS	DJS	DJS	DJS	DJS
	T.M.	N/A	N/A	JPP	N/A	N/A	N/A	JPP	JPP	JPP	N/A
Final Chem.	T.L.	N/A	DJS	—	—	DJS	DJS	DJS	DJS	DJS	DJS
	T.M.	N/A	DH	JPP	JPP	N/A	N/A	JPP	JPP	JPP	N/A
Meter Recal.	T.L.	DH	DH	—	—	DJS	DJS	DJS	DJS	DJS	DJS
	T.M.	DJS	DJS	JPP	JPP	N/A	N/A	JPP	JPP	JPP	N/A
Paperwork	T.L.	DJS	DJS	—	DJS	DJS	DJS	DJS	DJS	DJS	DJS
reviewed	T.M.	N/A	N/A	JPP	N/A	N/A	N/A	N/A	N/A	N/A	N/A

10. Test Termination: Date/Time 9-2-93/0800 DJS

12. Run Stats: Date 9-2-93 By CCR

13. Report Prep.: Date 9-10-93 By DJS

14. Report Final: Date 9-29-93 By JPP Approved: DRH

*Team Leader †Culture Unit #Team Member

PLARC501-1513

MUSSEL TEST RECORD SHEET
Anodonta imbecillis

Project CR-ERP QA Test 2 August 1993

Beginning Date/Time 08/24/93 / 0800 Ending Date/Time 09/02/93 / 0810

Personnel Simbeck, Posey

Mussels placed in test vessels: Date 08/23/93 Time 0930-1015

Mussels per test vessel: 10

Test Teatments:

1	PCM 6.0 Control	11	
2	PCM 4.3 100%	12	
3	PCM 4.3 50%	13	
4	Taylor's Silt (Reference)	14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

Control/Dilution Water: Fish Medium #'s 1436 , 1443

Source ARL Prepared Date Collected/Prepared

CULTURE HISTORY:

Culture ID	Date Started	Date Transformed
93-X	08/09/93	08/16/93
93-Y	08/09/93	08/16/93

FOOD/SUBSTRATE PREPARATION:

Phytoplankton Started	Phytoplankton Concentrated
08/12/93	8/17/93
08/13/93	8/17/93

Silt Collected: Date/Location 08/01/93 ~~07/09/93~~ // Taylor's Lower Pond

Silt Filtered (Date) 08/13/93 Silt Weighed (Date) 08/19/93

Volume Weighed 5 mL

	Wt. of pan	Wt. of pan and silt	Wt. of silt	
Replicate 1	1.09944 mg	2.307538 mg	1.20814 mg	$\bar{x} = 1.23335$
Replicate 2	1.05005 mg	2.304712 mg	1.25462 mg	
Replicate 3	1.03945 mg	2.276658 mg	1.23723 mg	

Average dry weight ~~0.24~~ 0.25 240. mg/mL PLARC501-130(5)

3 mL = 740.1 mg dry sediment

TREATMENT: Taylor's Silt (Reference)

	DAY:	0	1	2	3	4	5	6	7	8	9
	DATE:	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/01	9/02
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	9	9	9	9	9	9	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	1	1	1	1	1	1	1	1	1
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

TREATMENT: PCM 6.0 (Control)

	DAY:	0	1	2	3	4	5	6	7	8	9
	DATE:	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/01	9/02
Rep 1:	# Alive	10	10	10	9	9	9	9	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	0	0	1	1	1	1	1	1	1
Rep 2:	# Alive	10	11	11	11	11	11	11	11	11	11
	# 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	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	0	0	0	0	0	0	1	1	1

TREATMENT: PCM 4.3 100%

	DAY:	0	1	2	3	4	5	6	7	8	9
	DATE:	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/01	9/02
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	9	9	9	9	9	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	0	1	1	1	1	1	1	1	1
Rep 3:	# Alive	10	10	10	10	10	10	9	8	8	8
	# Stressed	0	0	0	0	0	0	1	0	0	0
	# Dead	0	0	0	0	0	0	0	2	2	2
Rep 4:	# Alive	10	10	10	10	10	9	9	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	0	0	0	0	1	1	1	1	1
		DS	D/S	SPP	D/S	D/S	D/S	DIE	D/S/FS	SPP	D/S

TREATMENT: PCM 4.3 50%

	DAY:	0	1	2	3	4	5	6	7	8	9
	DATE:	8/24	8/25	8/26	8/27	8/28	8/29	8/30	8/31	9/01	9/02
Rep 1:	# Alive	10	10	10	10	10	10	10	10	10	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	0	0	0	0	0	0	0	0	1
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	9	9	9	9	9	9	9
	# Stressed	0	0	0	1	0	0	0	0	0	0
	# Dead	0	0	0	0	1	1	1	1	1	1
Rep 4:	# Alive	10	9	9	9	9	9	9	9	9	9
	# Stressed	0	0	0	0	0	0	0	0	0	0
	# Dead	0	1	1	1	1	1	1	1	1	1
		AD	D/S	SPP	D/S	D/S	D/S	D/S	SPP	SPP	D/S

	REP	ALIVE	DEAD	TOTAL
PCM 6.0 CONTROL	1	9	1	39 ALIVE
	2	11	0	2 DEAD
	3	10	0	
	4	9	1	
PCM 4.3 50%	1	9	1	37 ALIVE
	2	10	0	3 DEAD
	3	9	1	
	4	9	1	
PCM 4.3 100%	1	10	0	36 ALIVE
	2	9	1	4 DEAD
	3	8	2	
	4	9	1	
TAYLOR'S SILT	1	10	0	39 ALIVE
	2	9	1	1 DEAD
	3	10	0	
	4	10	0	

TTEST PROCEDURE

Variable: RESP

TRT	N	Mean	Std Dev	Std Error
PCM 4.3 100%	4	1.25431409	0.12461017	0.06230509
PCM 6.0	4	1.33239284	0.09628892	0.04814446

Variances	T	DF	Prob>|T|
Unequal	-0.9916	5.6	0.3623
Equal	-0.9916	6.0	0.3597

For H0: Variances are equal, F' = 1.67 DF = (3,3) Prob>F' = 0.6822

TTEST PROCEDURE

Variable: RESP

TRT	N	Mean	Std Dev	Std Error
PCM 4.3 50%	4	1.28978836	0.08148517	0.04074258
PCM 6.0	4	1.33239284	0.09628892	0.04814446

Variances	T	DF	Prob>|T|
Unequal	-0.6755	5.8	0.5253
Equal	-0.6755	6.0	0.5245

For H0: Variances are equal, F' = 1.40 DF = (3,3) Prob>F' = 0.7904

07-02-93
Cor

COULTER COUNTER DATA SHEET

Study: Algae (mussel food) Study Dates: Beginning: 8/23/93 End: 8/23/93

Analysis Date: 8/23/93 Counter Calibration Date: 7/27/93

Personnel: Pruitt Calibration Constant: 7.996

SAMPLE ID	REP.	ml SAMPLE	ml ISOTON	NANOH.	TL	CORRECTED COUNT	CELLS/ ml
Bottle		1	19	100	1.122	77	
						89	$\bar{x}$ 85
						91	
Algae	1					9677	
	2					6245	
	3					4542	
	4A					3086	$\bar{x}$ 3103 - 85 =
						3083	3018 x 200 =
						3142	603733.333 x 50
							30186666.67
	4B					3123	$\bar{x}$ 3116 - 85 =
						3102	3031 x 200 =
						3124	606266.6667 x 50
							30313333.33
						3153	$\bar{x}$ 3105 - 85 =
						3080	3020 x 200 =
						3083	604066.6667 x 50
							30203333.33

Comments: 4C

$\bar{x}$ 30234444.44

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-24-93

TREATMENT	F-Med	Taylr Silt						
Temperature	23.8	24.0						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.1						
pH (before air)	—	—						
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	334	334						
Hardness	5.6	5.7						
x 17.1	95.8	97.5						
Alkalinity	6.4	6.3						
x 10	64	63						
Chlorine								
Ammonia								

NOTES: F-MED # 1436

Reviewed by DJS

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-25-93

TREATMENT	F-Med	Taylr Silt						
Temperature	23.5	24.0						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.2						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	335	337						
Hardness		5.5						
x 17.1		94.1						
Alkalinity		6.1						
x 10		61						
Chlorine								
Ammonia								

NOTES: F-MED # 1436

Revised 6 96

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-26-93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.5	24.3						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.1						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.9						
(Aeration time)								
Conductivity	335	333						
Hardness		5.6						
x 17.1		95.8						
Alkalinity		6.2						
x 10		62						
Chlorine								
Ammonia								

NOTES:

Reviewed by cjs

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-27-93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.8	24.2						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.1						
pH (before air)								
(after air)	7.2	7						
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	332	336						
Hardness		5.4						
x 17.1		92.3						
Alkalinity		6.1						
x 10		61						
Chlorine								
Ammonia								

NOTES: F-med #1436

Revised by DJS

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8.28.93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.3	24.4						
D.O. (before air)								
(after air)	8.3							
(w/silt/algae)		8.2						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	333	331						
Hardness		5.5						
x 17.1		94.1						
Alkalinity		6.1						
x 10		61						
Chlorine								
Ammonia								

NOTES: F-MED # 14 36

Reviewed by DJS

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-29-93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.8	24.7						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.0						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	342	338						
Hardness	5.8	6.0						
x 17.1	99.2	102.6						
Alkalinity	5.6	6.3						
x 10	56	63						
Chlorine								
Ammonia								

NOTES: F-MED #1142

Revised 6/95

(PLARC501-130)

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date; September 2, 1993

Date: 8-30-93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.3	24.4						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)	~~8.2~~	8.2						
pH (before air)		—		—				
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	342	339						
Hardness		5.6						
x 17.1		95.8						
Alkalinity		6.3						
x 10		63						
Chlorine								
Ammonia								

NOTES: F-MED #1442

Reviewed by 8/1

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8 31 93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.3	24.0						
D.O. (before air)								
(after air)	8.2							
(w/silt/algae)		8.0						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.7						
(Aeration time)								
Conductivity	343	342						
Hardness		5.3						
x 17.1		90.6						
Alkalinity		60.4						
x 10		64						
Chlorine								
Ammonia								

NOTES: F MED #1442

Revised 6/93 2MS

INITIAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 9-1-93

TREATMENT	F-Med	Taylr Silt						
Temperature	24.2	24.0						
D.O. (before air)								
(after air)	8.1							
(w/silt/algae)		8.2						
pH (before air)								
(after air)	8.2							
(w/silt/algae)		7.8						
(Aeration time)								
Conductivity	337	331						
Hardness		5.6						
x 17.1		95.8						
Alkalinity		6.4						
x 10		64						
Chlorine								
Ammonia								

NOTES: F-mon at 11412

Reviewed by DJS

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-25-93 Replicate: 1

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.5	24.9	24.2 (4 hr)	24.2				
D.O.	~~8.0~~	7.3	7.0	7.1				
pH	~~7.7~~ 8.0	7.7	7.7	7.7				
Conductivity	347	348	357	359				
Hardness	5.6	6.0	6.2	6.5				
x 17.1	95.8	102.6	106.0	111.2				
Alkalinity	6.3	5.6	6.0	6.0				
x 10	63	56	60	60				
Chlorine								
Ammonia	~~0.008~~ 0.004 (4 hr)	0.005	0.007	0.007				

NOTES:

Karen P 4 DJS

(PLARC501-130)

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-26-93 Replicate: 2

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.1	23.8	23.7	23.5				
D.O.	7.9	7.3	7.2	7.3				
pH	8.0	7.7	7.7	7.7				
Conductivity	348	345	357	363				
Hardness	5.6	5.8	6.2	6.0				
x 17.1	95.8	99.2	106.0	102.6				
Alkalinity	6.5	5.0	5.3	5.2				
x 10	65	50	53	52				
Chlorine								
Ammonia	0.001	<0.001	<0.001	<0.001				

NOTES:

Revised 4 DYS

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-27-93 Replicate: 3

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.2	24.3	24.3	24.3				
D.O.	7.9	7.3	7.1	7.2				
pH	8.1	7.7	7.7	7.7				
Conductivity	352	353	363	356				
Hardness	5.9	5.7	6.1	5.8				
x 17.1	100.9	97.5	104.3	99.2				
Alkalinity	6.5	5.2	5.5	5.3				
x 10	65	52	55	53				
Chlorine								
Ammonia	0.006	<0.001	<0.001	<0.001				

NOTES:

Reviewed by DJ

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-28-93 Replicate: 4

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.2	24.4	24.7	24.4				
D.O.	7.8	7.3	7.3	7.3				
pH	8.0	7.8	7.7	7.7				
Conductivity	346	354	365	354				
Hardness	6.0	6.0	6.0	6.0				
x 17.1	102.6	102.6	102.6	102.6				
Alkalinity	6.3	5.4	5.8	5.5				
x 10	63	54	58	55				
Chlorine								
Ammonia	0.002	0.001	<0.001	0.001				

NOTES:

Reviewed by BK

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-29-93 Replicate: 1

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.2	24.4	24.3	24.3				
D.O.	7.8	7.6	7.4	7.4				
pH	8.0	7.8	7.7	7.7				
Conductivity	348	356	368	360				
Hardness	5.8	5.6	5.9	5.8				
x 17.1	99.2	95.8	100.9	99.2				
Alkalinity	6.3	5.5	5.9	5.5				
x 10	63	55	59	55				
Chlorine								
Ammonia	0.002	0.001	<0.001	0.001				

NOTES:

Revised 6/95

(PLARC501-130)

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-30-93 Replicate: 2

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.3	24.3	23.9	24.3				
D.O.	7.8	7.5	7.3	7.3				
pH	8.0	7.8	7.6	7.7				
Conductivity	357	364	~~366~~ 373	368				
Hardness	5.6	5.6	6.2	5.8				
x 17.1	95.8	95.8	106.0	99.2				
Alkalinity	6.06	5.8	6.0	5.8				
x 10	66	58	60	58				
Chlorine								
Ammonia	0.001	0.001	< 0.001	< 0.001				

NOTES:

Reviewed 9/15

(PLARC501-130)

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 8-31-93 Replicate: 3

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.2	24.4	24.3	24.4				
D.O.	7.7	7.4	7.4	7.4				
pH	8.0	7.7	7.7	7.7				
Conductivity	363	368	382	369				
Hardness	5.7	5.5	6.0	5.7				
x 17.1	97.5	94.1	102.6	97.5				
Alkalinity	6.6	5.9	6.3	6.0				
x 10	66	59	63	60				
Chlorine								
Ammonia	<0.001	<0.001	<0.001	0.001				

NOTES:

Received 9/4/93

(PLARC501-130)

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 9-1-93 Replicate: 4

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	23.1	23.2	23.7	23.6				
D.O.	~~8.0~~ 7.8	7.7	7.5	7.6				
pH	8.0	7.8	7.7	7.7				
Conductivity	381	386	407	372				
Hardness	5.7	6.0	~~5.7~~ 6.0	5.7				
x 17.1	97.5	102.6	102.6	97.5				
Alkalinity	6.6	6.3	6.6	6.1				
x 10	66	63	66	61				
Chlorine								
Ammonia	0.001	0.001	0.001	<0.001				

NOTES:

Rennie P 4 DS

FINAL CHEMISTRY

Project: CR-ERP QA Test 2 Aug. 1993 Personnel: Simbeck

Beginning Date: August 24, 1993 Posey

Ending Date: September 2, 1993

Date: 9-2-93 Replicate: 1

TREATMENT	Taylr Silt	M6.0 Cntrl	M4.3 100%	M4.3 50%				
Temperature	24.1	24.2	24.2	24.3				
D.O.	7.7	7.4	7.3	7.4				
pH	8.0	7.8	7.7	7.8				
Conductivity	356	374	371	374				
Hardness	5.8	5.7	5.9	5.7				
x 17.1	99.2	97.5	100.9	97.5				
Alkalinity	6.6	6.2	6.3	6.1				
x 10	66	62	63	61				
Chlorine								
Ammonia	0.001	<0.001	0.001	<0.001				

NOTES:

Lewis Lo D/?

(PLARC501-130)

FINAL CHEMISTRY

PCM 6.0 CONTROL

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.9	7.3	7.7	348	102.6	56	0.005
2	23.8	7.3	7.7	345	99.2	50	< 0.001
3	24.3	7.3	7.7	353	97.5	52	< 0.001
4	24.4	7.3	7.8	354	102.6	54	0.001
5	24.4	7.6	7.8	356	95.8	55	0.001
6	24.3	7.5	7.8	364	95.8	58	0.001
7	24.4	7.4	7.7	368	94.1	59	< 0.001
8	23.2	7.7	7.8	386	102.6	63	0.001
9	24.2	7.4	7.8	374	97.5	62	< 0.001
MEAN	24.2	7.4	7.8	361	98.6	57	< 0.001
MIN	23.2	7.3	7.7	345	94.1	50	< 0.001
MAX	24.9	7.7	7.8	386	102.6	63	0.005

TAYLOR'S SILT

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.5	8.0	8.0	347	95.8	63	0.004
2	24.1	7.9	8.0	348	95.8	65	0.001
3	24.2	7.9	8.1	352	100.9	65	0.006
4	24.2	7.8	8.0	346	102.6	63	0.002
5	24.2	7.8	8.0	348	99.2	63	0.002
6	24.3	7.8	8.0	357	95.8	66	0.001
7	24.2	7.7	8.0	363	97.5	66	<0.001
8	23.1	7.8	8.0	381	97.5	66	0.001
9	24.1	7.7	8.0	356	99.2	66	0.001
MEAN	24.1	7.8	8.0	355	98.2	65	<0.002
MIN	23.1	7.7	8.0	346	95.8	63	<0.001
MAX	24.5	8.0	8.1	381	102.6	66	0.006

PCM 4.3 100%

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.4	7.0	7.7	357	106.0	60	0.007
2	23.7	7.2	7.7	357	106.0	53	< 0.001
3	24.3	7.1	7.7	363	104.3	55	< 0.001
4	24.7	7.3	7.7	365	102.6	58	< 0.001
5	24.3	7.4	7.7	366	100.9	59	< 0.001
6	23.9	7.3	7.6	373	106.0	60	< 0.001
7	24.3	7.4	7.7	382	102.6	63	< 0.001
8	23.7	7.5	7.7	407	102.6	66	0.001
9	24.2	7.3	7.7	371	100.9	63	0.001
MEAN	24.2	7.3	7.7	371	103.6	60	< 0.002
MIN	23.7	7.0	7.6	357	100.9	53	< 0.001
MAX	24.7	7.5	7.7	407	106.0	66	0.007

Test Temperature: 24.2

MIN 23.1

MAX 24.9

Reviewed by: DJ 9-20-93

PCM 4.3 50%

DAY	TEMP	DO	pH	COND	HARD	ALK	AMMONIA
1	24.2	7.1	7.7	359	111.2	60	0.007
2	23.5	7.3	7.7	363	102.6	52	< 0.001
3	24.3	7.2	7.7	356	99.2	53	< 0.001
4	24.4	7.3	7.8	359	102.6	55	0.001
5	24.3	7.4	7.7	360	99.2	55	0.001
6	24.3	7.3	7.7	368	99.2	58	< 0.001
7	24.4	7.4	7.7	369	97.5	60	0.001
8	23.6	7.6	7.7	372	97.5	61	< 0.001
9	24.3	7.4	7.8	374	97.5	61	< 0.001
MEAN	24.1	7.3	7.7	364	100.7	57	< 0.002
MIN	23.5	7.1	7.7	356	97.5	52	< 0.001
MAX	24.4	7.6	7.8	374	111.2	61	0.007

C R - E R P - QA2 -- August 24-September 2, 1993 -- I N I T I A L A N D F I N A L C H E M I S T R Y

I N I T I A L C H E M I S T R Y

TAYLOR'S SILT

DAY	TEMP	DO	pH	COND	HARD	ALK	CHLORINE
0	24.0	8.1	7.8	334	97.5	63	-
1	24.0	8.2	7.8	337	94.1	61	-
2	24.3	8.1	7.9	333	95.8	62	-
3	24.2	8.1	7.8	336	92.3	61	-
4	24.4	8.2	7.8	331	94.1	61	-
5	24.7	8.0	7.8	338	102.6	63	-
6	24.4	8.2	7.8	339	95.8	63	-
7	24.0	8.0	7.7	342	90.6	64	-
8	24.0	8.2	7.8	331	95.8	64	-
MEAN	24.2	8.1	7.8	336	95.4	62	--
MIN	24.0	8.0	7.7	331	90.6	61	--
MAX	24.7	8.2	7.9	342	102.6	64	--

FISH MEDIUM

DAY	TEMP	DO	pH	COND	HARD	ALK	CHLORINE
0	23.8	8.2	8.2	334	95.8	64	-
1	23.5	8.2	8.2	335	-	-	-
2	24.5	8.2	8.2	335	-	-	-
3	24.8	8.2	8.2	332	-	-	-
4	24.3	8.3	8.2	333	-	-	-
5	24.8	8.2	8.2	342	99.2	56	-
6	24.3	8.2	8.2	342	-	-	-
7	24.3	8.2	8.2	343	-	-	-
8	24.2	8.1	8.2	337	-	-	-
MEAN	24.3	8.2	8.2	337	97.5	60	--
MIN	23.5	8.1	8.2	332	95.8	56	--
MAX	24.8	8.3	8.2	343	99.2	64	--

PROJECT REAGENT RECORD SHEET

Project/Study: CR-ERP QA Test 2 (Mussels) Beginning Date: 8-24-93
Personnel: Simbeck Ending Date: 9-2-93

WINKLER TITRATION METHOD

Alkaline-Iodide-Azide:
Brand Fisher
Lot # 910062-24
Exp. 2-93

Manganous Sulfate:
Brand Fisher
Lot # 910067-24
Exp. 4-93

Sodium Thiosulfate:
Brand Ricca
Lot # H267
Exp. 4-94

Sulfuric Acid:
Brand Fisher
Lot # 854507
Exp. NA

Thyodene:
Brand Fisher
Lot # 912254
Exp. NA

pH BUFFER SOLUTIONS

pH 4:
Brand Spectrum
Lot # HH150
Exp. 9193

pH 7:
Brand Mallinckrodt
Lot # 0098 KLPL
Exp. 9194

pH 10:
Brand Mallinckrodt
Lot # 0099 KLBB
Exp. 11 94

pH _____:
Brand _____
Lot # _____
Exp. _____

CONDUCTIVITY STANDARD SOLUTIONS

200 µmhos:
Brand Bio-Rad
Lot # L292A
Exp. 1195

720 µmhos:
Brand Bio-Rad
Lot # E263C
Exp. 6195

_____ µmhos:
Brand _____
Lot # _____
Exp. _____

ALKALINITY TITRATION

Sulfuric Acid Solution N/50:
Brand Mallinckrodt
Lot # H366
Exp. NA

HARDNESS TITRATION

Hardness Titrating Solution:
Brand Calgon
Lot # R2037702
Exp. NA

Hardness Indicator:
Brand Calgon
Lot # 01I9B
Exp. NA

Hardness Buffer Solution:
Brand Calgon
Lot # 26C16B
Exp. NA

CHLORINE TITRATION

DPD Powder Pillows:
Brand _____
Lot # _____
Exp. _____

Potassium Iodide:
Brand _____
Lot # _____
Exp. _____

FAS:
Brand _____
Lot # _____
Exp. _____

Project Instrument Record Sheet

Project Study CR-ERP QA Test 2 Models

Beginning Date 8-24-93

Ending Date 9-2-93

DO Meter

Model YSI Model 57
TVA Tag 557673
Calibration Date 4-28-93

pH Meter(s)

Model Orion Research Model SA250
TVA Tag SVR8147
Calibration Date 4-30-93

Model Orion Research Model 407A
TVA Tag 557674
Calibration Date 4-14-93

Conductivity Meter

Model YSI Model 32
TVA Tag 557780
Calibration Date 4-26-93

Thermometer(s)

Model SAMA CT-KO
TVA Tag IN-253
Calibration Date 12-8-92

Model
TVA Tag
Calibration Date

ATTACHMENT III

AMMONIA ANALYSIS REQUEST AND RESULTS

TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-25-93

Consignor's Number	Specific Description for Each Sample PAGE 1
RO Water	pH: 5.6 24°C preserved 50mL with 0.2mL 1:4 H_2SO_4
RCM 6.0	pH: 7.7 " "
RCM 4.3-50%	pH: 7.7 " "
RCM 4.3-100%	pH: 7.7 " "
Taylors Silt	pH: 8.0 " "

Remarks, method, etc.:

ANALYZE FOR

Lab. No.	Consignor's Number									

Requested by Damien J. Simbeck Notebook page

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-26-93

Consignor's Number	Specific Description for Each Sample PAGE 2
RO Water	pH: 5.7 @25C preserved 50mL with 0.2 mL 1:4 H_2SO_4
PCM 6.0	pH: 7.7 " "
PCM 4.3-50%	pH: 7.7 " "
PCM 4.3-100%	pH: 7.7 " "
Taylors Silt	pH: 8.0 " "

Remarks, method, etc.:

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VA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-27-93

Consignor's Number	Specific Description for Each Sample PAGE 3
RO Water	pH: 5.7 @24°C preserved 50 mL with 0.2 mL 1:4 H_2SO_4
RCM 6.0	pH: 7.7 " "
RCM 4.3-50%	pH: 7.7 " "
RCM 4.3-100%	pH: 7.7 " "
Taylor: S:H	pH: 8.1 " "

Remarks, method, etc.:

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-28-93

Consignor's Number	Specific Description for Each Sample PAGE 4
RO water	pH = 5.8 @24°C preserved 50 mL w/ 0.2 mL 1:4 H_2SO_4
PCM 6.0	pH = 7.8 " "
PCM 4.3-50%	pH = 7.8 " "
PCM 4.3-100%	pH = 7.7 " "
Taylor's SiH	pH 8.0 " "

Remarks, method, etc.:

ANALYZE FOR

Lab. No.	Consignor's Number									

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-29-93

Consignor's Number	Specific Description for Each Sample PAGE 5
RO Water	pH: 5.7 @ 24°C preserved 20mL w/ 0.2mL 1:4 H_2SO_4
ICM 6.0	pH: 7.8 " "
ICM 4.3-50%	pH: 7.7 " "
ICM 4.3-100%	pH: 7.7 " "
Taylor SiH	pH: 8.0 " "

Remarks, method, etc.:

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Lab. No.	Consignor's Number									

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 8-30-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-OL200-85555, 7

GENERAL DESCRIPTION: Ammonia analysis from 8-30-93

Consignor's Number	Specific Description for Each Sample PAGE 6
RO Water	pH: 5.7 @24°C preserved 50 mL w/ 0.2 mL 1:4 H_2SO_4
PCM 6.0	pH: 7.8 " "
PCM 4.3-50%	pH: 7.7 " "
PCM 4.3-100%	pH: 7.6 " "
Taylor's Silt	pH: 8.0 " "

Remarks, method, etc.:

ANALYZE FOR

Lab. No.	Consignor's Number									

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 9-2-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-011200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 8-31-93

Consignor's Number	Specific Description for Each Sample PAGE 1
RO Water	pH = 5.7 @24°C preserved 50 ml w/ 0.2 ml 1:4 H_2SO_4
PCM 6.0	pH = 7.7 " "
PCM 4.3 50%	pH = 7.7 " "
PCM 4.3 100%	pH = 7.7 " "
Taylor's Silt	pH = 8.0 " "

Remarks, method, etc.:

ANALYZE FOR

Lab. No.	Consignor's Number									

LAB BRANCH SEP 3 REC'D

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 9-2-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210-611200-85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 9-1-93

Consignor's Number	Specific Description for Each Sample PAGE 2
RO Water	pH= @ 24°C preserved 50mL w/ 0.2mL 1:4 H_2SO_4
RM 6.0	pH= " "
RM 4.3 50%	pH= " "
RM 4.3 100%	pH= " "
Taylor's S.W.	pH= " "
Remarks, method, etc.:	

ANALYZE FOR

Lab. No.	Consignor's Number									

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TVA 991 (ACD-4-82)

REQUEST FOR AND REPORT OF ANALYSIS

Date submitted 9-2-93 Laboratory No.

Date wanted

Date reported Charge to account No. 4210 01620D 85555 ,7

GENERAL DESCRIPTION: Ammonia analysis from 9-2-93

Consignor's Number	Specific Description for Each Sample PAGE 3
RD Water	pH = @ 24°C preserved & 50 ml w/ 0.2 ml 1:1 H_2SO_4
PCM 6.0	pH = " "
PCM 4.3 5D6	pH = " "
PCM 4.3 10D6	pH = " "
Taylors Silt	pH = " "

Remarks, method, etc.:

ANALYZE FOR

Lab. No.	Consignor's Number									

LABORATORY BRANCH
93 AUG 3 AM 8:
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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
ARL 1A-BFN

DearDAMIEN 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 :93/10697 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10698 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=5.6; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.11	mg/L
00619	Calc UnIon NH3 in Water	0.005	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.13	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.36	mg/L

Lab Sample Number :93/10699 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=5.6; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.11	mg/L
00619	Calc UnIon NH3 in Water	0.005	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.13	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.36	mg/L

Lab Sample Number :93/10700 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 MATRIX SPK(% REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	109. % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	91. % REC	mg/L

Lab Sample Number :93/10701 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.18	mg/L
00619	Calc UnIon NH3 in Water	0.007	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.22	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.32	mg/L

Lab Sample Number :93/10702 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.16	mg/L
00619	Calc UnIon NH3 in Water	0.007	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.20	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.33	mg/L

Lab Sample Number :93/10703 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930825
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.07	mg/L
00619	Calc UnIon NH3 in Water	0.004	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.085	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.09	mg/L

Lab Sample Number :93/10704 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10705 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.30	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 11:22

Lab Sample Number :93/10706 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.30	mg/L

Lab Sample Number :93/10707 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50% PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10708 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50% MATRIX(% REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	110. % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	90. % REC	mg/L

Lab Sample Number :93/10709 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.22	mg/L

Lab Sample Number :93/10710 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930826
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS

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	0.04	mg/L

Lab Sample Number :93/10711 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10712 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.22	mg/L

Lab Sample Number :93/10713 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.23	mg/L

Lab Sample Number :93/10714 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.19	mg/L

Lab Sample Number :93/10715 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100% PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.20	mg/L

Lab Sample Number :93/10716 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100% MATRIX-% REC
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	102. % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	90. % REC	mg/L

Lab Sample Number :93/10717 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930827
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.1; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	0.07	mg/L
00619	Calc UnIon NH3 in Water	0.006	mg NH3/L
NH3NH4'W	Calc NH3+NH4-NH3 Water	0.085	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.09	mg/L

Lab Sample Number :93/10718 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10719 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; 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 :93/10720 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; 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	0.25	mg/L

Lab Sample Number :93/10721 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100%
Sample comments :CR-ERP
Sample type/matrix, :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.22	mg/L

Lab Sample Number :93/10722 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.16	mg/L

Lab Sample Number :93/10723 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.16	mg/L

Lab Sample Number :93/10724 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S MATRIX (% REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930828
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	105. % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	100 % REC	mg/L

Lab Sample Number :93/10725 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930829
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10726 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930829
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; 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	0.28	mg/L

Lab Sample Number :93/10727 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930829
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.27	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93 FINAL DATA REPORT	13:14
Page 1	

Lab Sample Number :93/10728 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930829
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.23	mg/L

Lab Sample Number :93/10729 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930829
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.17	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93 FINAL DATA REPORT	13:14
Page 1	

Lab Sample Number :93/10730 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930830
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10731 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930830
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; 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	0.31	mg/L

Lab Sample Number :93/10732 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930830
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.28	mg/L

Lab Sample Number :93/10733 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930830
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.24	mg/L

Lab Sample Number :93/10734 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930830
Sample login date :930901 Sample received by lab :930831
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.18	mg/L

Lab Sample Number :93/10859 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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 :93/10860 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 - CONTROL
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.32	mg/L

Lab Sample Number :93/10861 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 CONTL - PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=5.7; 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	0.32	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:03
	Page 1

Lab Sample Number :93/10862 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 MATRIX SPK(% REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	113 % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	97 % REC	mg/L

Lab Sample Number :93/10863 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.27	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93 FINAL DATA REPORT	16:03
Page 1	

Lab Sample Number :93/10864 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.012	mg NH3/L
00630	Nitrate-Nitrite Nitrogen	0.24	mg/L

Lab Sample Number :93/10865 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930831
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.17	mg/L

Lab Sample Number :93/10866 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:03

Lab Sample Number :93/10867 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 - CONTROL
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.8; 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	0.32	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:03

Lab Sample Number :93/10868 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.26	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:03

Lab Sample Number :93/10869 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 50% PRECISION
Sample comments :CR-ERP
Sample type/matrix, :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.26	mg/L

Lab Sample Number :93/10870 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-50% MATRIX(% REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	108 % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	92 % REC	mg/L

Lab Sample Number :93/10871 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 100%
Sample comments :CR-ERP
Sample type/matrix, :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.19	mg/L

Lab Sample Number :93/10872 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930901
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.19	mg/L

Lab Sample Number :93/10873 Project Leader :Larry O. Hill

Sample ID Information :ARL/RO WATER
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:04
	Page 1

Lab Sample Number :93/10874 Project Leader :Larry O. Hill

Sample ID Information :PCM 6.0 - CONTROL
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.36	mg/L

Lab Sample Number :93/10875 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 50%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.30	mg/L

Lab Sample Number :93/10876 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 100%
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.27	mg/L

Lab Sample Number :93/10877 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3 - 100% PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: 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	0.27	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:04

Lab Sample Number :93/10878 Project Leader :Larry O. Hill

Sample ID Information :PCM 4.3-100% MATRIX(%REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=7.7; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	95 % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	95 % REC	mg/L

TVA Environmental Chemistry	Chattanooga, Tennessee
09/14/93	FINAL DATA REPORT 16:04
	Page 1

Lab Sample Number :93/10879 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.18	mg/L

Lab Sample Number :93/10880 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT-PRECISION
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; 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	0.18	mg/L

Lab Sample Number :93/10881 Project Leader :Larry O. Hill

Sample ID Information :TAYLOR'S SILT-MATRIX(%REC)
Sample comments :CR-ERP
Sample type/matrix :WATER
Sample collected by :D.J.S.
Sample collection date :930902
Sample login date :930903 Sample received by lab :930903
Sample account number :4210-011200-85555,7.LOHARLDJS
Laboratory comments :ARL: PH=8.0; TEMP=24

Alt. IDC	Analysis Performed	result	units
00610	Ammonia Nitrogen	100 % REC	mg/L
00630	Nitrate-Nitrite Nitrogen	92 % REC	mg/L