P.O. BOX 1373 • OKLAHOMA CITY, OKLAHOMA 73101 • 405-235-4546

EL DORADO
CHEMICAL COMPANY

VIA HAND DELIVERY

July 14, 1999

Mr. Art Riddle
NPDES Enforcement Supervisor
Water Division
Arkansas Department of Environmental Quality
8001 National Drive
Little Rock, Arkansas 72219-8913

RE: Quarterly Report - Second Quarter, 1999, CAO LIS 98-119

Dear Mr. Riddle:

Pursuant to paragraph 2(1) of Consent Administrative Order No. 98-119, enclosed please find the Quarterly Report for the Second Quarter, 1999. Should you have any questions, please feel free to call Byron Smith at (870) 863-1498.

Sincerely,

John M. Carver

John M. Carver
Vice President Safety and
Environmental Compliance

JMC/ymq

Enclosures

cc: Belinda Colby, Enforcement Coordinator, Hazardous Waste Division
Keith Brown, Manager, State Permits, Water Division

jcgc\riddle_99.714

QUARTERLY REPORT
CONSENT ADMINISTRATIVE ORDER
LIS 98-119

Prepared for:

El Dorado Chemical Company
PO Box 1373
Oklahoma City, OK 73101

Prepared by:

GBM^{c} & Associates
219 Brown Lane
Bryant, AR 72022

July 14, 1999

CONTENTS

ATTACHMENTS

1.0 Background

1.1 Objectives

The objective of this document is to provide the Arkansas Department of Environmental Quality (ADEQ) a quarterly report on the progress of the projects associated with Consent Administrative Order (CAO) LIS 98-119, Paragraph 2, dated August 14, 1998. This document is the fourth quarterly report and is for the period from April 1, 1999 through June 30, 1999.

GBM^c & Associates (GBM^c) has prepared this quarterly report on behalf of El Dorado Chemical Company (EDCC). GBM^c is currently providing consulting engineering services associated with the upgrade and improvements for the wastewater collection and treatment systems at the El Dorado plant.

The engineering improvements were initiated by EDCC in anticipation of the new NPDES permit limits. The existing NPDES permit is currently due for renewal and this work will be used to help establish new permit limits.

Various tasks, which will provide the groundwork for the development and implementation of subsequent activities, have already been performed. With the concurrence of ADEQ, a Wastewater Minimization/Stream Segregation (WM/SS) program has been developed and is being implemented at the present time.

This progress report presents brief outlines of the above efforts performed to date and describes the status of the activities currently in progress. A Gantt chart, which presents the overall schedule of activities, is also attached.

2.0 Previous Activities

2.1 Early Work

Initial studies on EDCC's wastewater collection and treatment system were performed by URS Greiner Woodward Clyde (URSGWC) in the spring of 1997. This work indicated that the plant collection system needed improvements with regard to re-routing uncontaminated storm water away from the treatment system and segregating process and contact storm water and routing these flows to treatment. In the existing system, process wastewater, cooling tower blowdown, demineralizer backwash, contact storm water (i.e., rainwater falling within the process areas), and a significant portion of the non-contact storm water (rainwater falling outside of the process areas) are all combined and routed to the treatment system. By segregating these streams according to their characteristics, a more effective and efficient treatment system can be designed.

Cost estimates developed on the basis of this early evaluation work indicated that a new treatment system sized to handle the volumes of wastewater involved would be prohibitively expensive. It was concluded that a necessary initial step would be the development and implementation of a plant-wide stream segregation program to route each wastewater stream to its proper destination, according to its characteristics and composition, coupled with a wastewater minimization program to reduce the volume and contaminant loading of the process wastewaters generated.

Full implementation of the WM/SS program has been temporarily delayed pending procurement of outside funding. However, the wastewater characterization will be completed in time to provide data for the permit application and Basis of Design (BOD) document for the new facility.

The main purpose of such a Wastewater Minimization/Stream Segregation (WM/SS) Program would be to reduce flows and loadings of the wastewater which would need to be processed through the future treatment facility. With these reductions, the design flow for the new facility should be significantly less than existing flows and therefore should result in a smaller and more efficient wastewater treatment system.

The WM/SS program was intended to be completed with sufficient time remaining to perform a wastewater flow and loading characterization study by August 1, 1999. The new flows and loadings were to be incorporated into the NDPES permit renewal application, which is also due to the ADEQ by August 1, 1999. However, since the WM/SS project will not be completed by August 1, 1999, estimates of flow and loading will be used for the permit application and Basis of Design (BOD) document for the new treatment facility. Additional data will be submitted as it is collected.

2.2 Identification of Wastewater and Storm Water Streams

Following the initial studies by URSGWC, implementation of the preliminary phases of the WM/SS program commenced in late spring of 1997. EDCC appointed Mr. Kyle Wimsett, a member of the plant's operations staff, to work full time in coordination with the plant's Environmental Department, on the first phase of the WM/SS program. This phase consisted of a plant-wide, area-by-area characterization of the existing wastewater collection system, including the identification of each of the wastewater streams in the plant and the identification of each stream's point of origin and the specific route to the treatment system.

Dye studies were conducted in each operating area of the plant to develop the information on routing and to delineate the existing system. This phase of the WM/SS program continued through the spring and early summer of 1998. The information developed through these early efforts provided the foundation for defining the next phases of the WM/SS program.

2.3 Development of an Overall Action Plan

The early work performed by plant personnel allowed the formulation and development of a conceptual plan for the remainder of the WM/SS project. This plan is presented in graphical form (Gantt chart in Attachment 1) and shows an overall project schedule and the duration of each specific task.

The duration shown on the second column of the Gantt chart is given in working days (as opposed to calendar days), with the completion of the construction phase originally scheduled for July 1999. However, due to budget constraints, the construction phase of the WM/SS project has been delayed until additional funding can be secured. Estimates of wastewater flows and loadings will be incorporated into the NPDES permit renewal application to be submitted by August 1, 1999. The estimated flows and loadings will also become a part of the Basis of Design (BOD) document for the new treatment facility. Additional data will be submitted as it is collected.

Implementation of the WM/SS program action plan was initiated in June of 1998 and it continues at present, as the attached Gantt chart indicates.

3.0 Current Efforts

3.1 Development of a Preliminary Design for WM/SS

The preparation of a preliminary design required several tasks, as follows:

1. **Topographic Survey**. As a necessary initial step for the definition of the overall approach to develop a WM/SS design package, the services of a surveying contractor were obtained to perform a plant-wide topographic survey with sufficient detail to provide the information that will be necessary later in the detail and layout of the containment and curbed areas, rerouting of existing drain lines or the installation of new ones, and the location and design of collection basins and sumps, pump stations and other such installations. The survey work was initiated in early July and was completed in mid-August, 1998.

2. **Existing Drawing File Search**. At the same time that the topographic survey was in progress, an effort was made to locate all of the existing drawings, documents and records which might be useful during the detail design phase of the project.

3. **Basis of Design (BOD)**. A conceptual Basis of Design (BOD) for the WM/SS project has been developed to establish the scope of the project, outline the overall project approach and list the specific modifications and improvements to be developed and implemented as part of this effort.

4. **Preliminary Design**. On the basis of the BOD document, a preliminary design was developed. The preliminary design was the basis for the WM/SS projects, listed below as Phase I through Phase V.

3.2 Current Status

This section details work accomplished since the April 14, 1999 report. The preliminary design is complete and some phases of the detail design are in progress. The detail design was divided into five phases according to location in the plant. The purpose of developing five design packages was to expedite construction activities for the WM/SS project (i.e., for design activities for one phase to be on-going during construction for another phase). The five detail design phases are as follows:

- Phase I: Northside Outfall Consolidation
- Phase II: Sulfuric Acid and High Density Ammonium Nitrate (AN) Prill Bulk Storage Building Area
- Phase III: Nitric Acid Area
- Phase IV: AN Prilling Areas
- Phase V: Liquid AN Tank Storage and Ammonia Storage Area

The WM/SS project schedule is included as Attachment 1.

3.2.1 Detail Design

Design work is continuing on the WM/SS improvements. The final engineering design for modifications in the Sulfuric Acid and High Density Ammonium Nitrate (AN) Prill Bulk Storage Building Area (Phase II) has been completed and was submitted to EDCC during the second quarter of 1999. Engineering design of the remaining WM/SS improvement phases has been temporarily delayed due to budget constraints.

3.2.2 Northside Outfall Consolidation

Construction was initiated during the first quarter of 1999 and completed June 1999. Due to soil conditions encountered during construction, storm water runoff from the north side of the plant was not consolidated into a single outfall, but segregated into two outfalls. Consolidation of the storm water into two outfalls instead of one should not have any material impact on the future management of non-contact runoff from the facility.

3.2.3 Reverse Osmosis Unit

A reverse osmosis water treatment system at the Boiler House has been installed and operational since early January 1999. The unit has significantly reduced the sulfate loading to the facility's wastewater treatment system.

3.2.4 Third Street Neutralization

The Third Street Sewer pH Neutralization system was completed in mid-June 1999, and is in operation.

3.2.5 Outfall Sampling Results

Quarterly monitoring sampling results for Outfalls 001 and 004 are included in Attachment 2. All sampling required under Attachment A is complete. Analytical results will be submitted with the final report due August 1, 1999.

3.3 Planned Work for Next Quarter

The following tasks are planned for the next quarter (July 1 through September 30, 1999):

1. Receive contractor bids for the sulfuric acid area and high-density ammonium nitrate prill bulk storage building WM/SS improvements. (Pending the procurement of outside funding.)

2. Complete design work for the nitric acid, AN prilling area, and liquid AN tank storage/ammonia storage area WM/SS improvements. (Pending the procurement of outside funding.)

3. Continue sampling per Attachment A of the CAO.

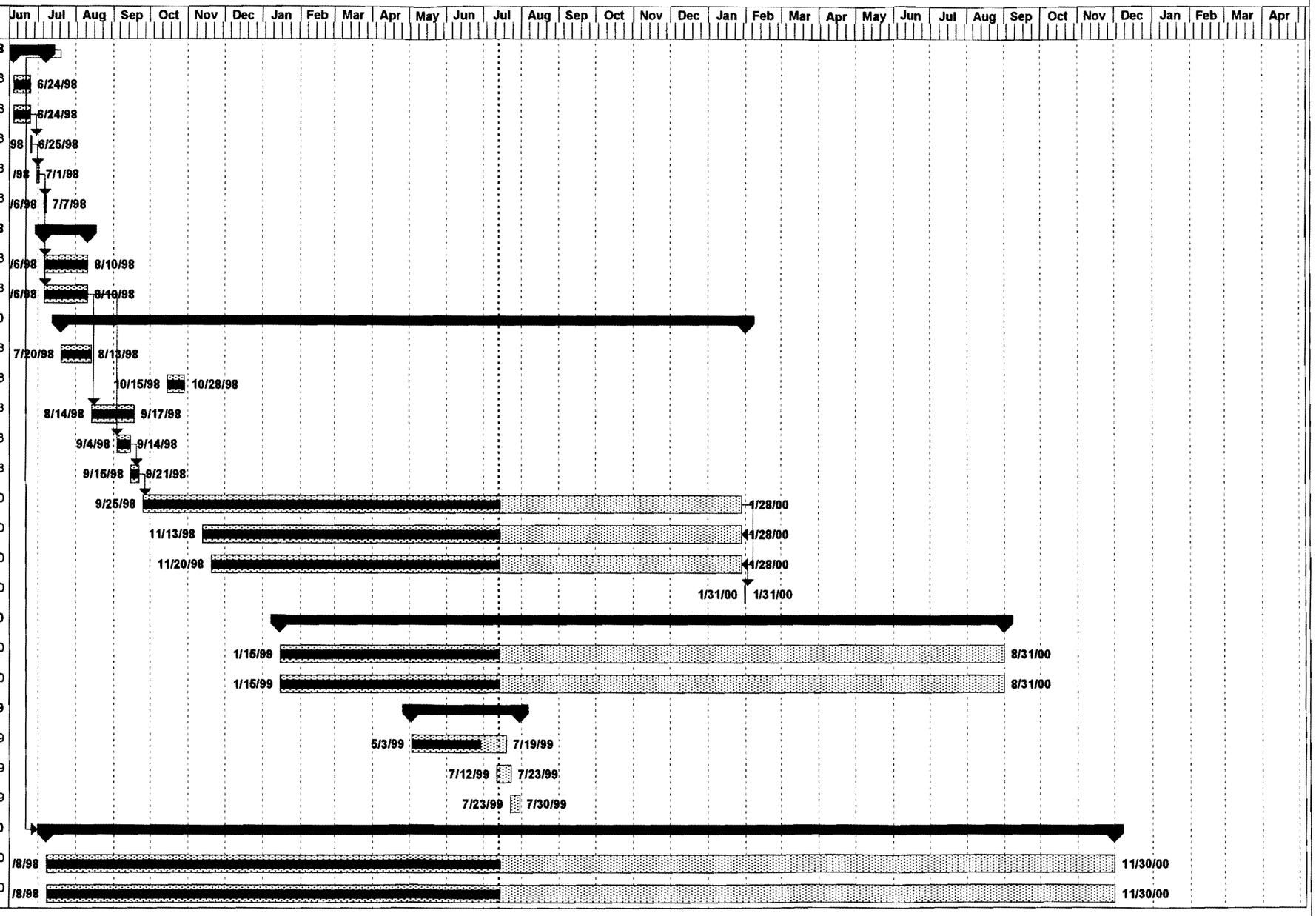
Attachment 1 Wastewater Minimization Project Schedule
Attachment 2 Outfalls 001 and 004 Quarterly Monitoring Sample Results

Attachment 1

Wastewater Minimization Project Schedule

GBMc & Associates

ID	Task Name	Start	Finish
1	**Begin Project**	**6/11/98**	**7/7/98**
2	Review Source ID Study	6/11/98	6/24/98
3	Develop Detail Scope of Work	6/11/98	6/24/98
4	Scoping Meeting	6/25/98	6/25/98
5	Determine Survey Location Site Visit	6/30/98	7/1/98
6	Determine Sample Locations (Waste Charact.)	7/6/98	7/7/98
7	**Topographic Survey**	**7/6/98**	**8/10/98**
8	Plant Survey and Drawing File Search	7/6/98	8/10/98
9	MMLH Plant Topographic Survey	7/6/98	8/10/98
10	**Waste Minimization Design**	**7/20/98**	**1/31/00**
11	Basis of Design Conceptual Development	7/20/98	8/13/98
12	Geotechnical Review	10/15/98	10/28/98
13	Preliminary Design	8/14/98	9/17/98
14	EDCC Review	9/4/98	9/14/98
15	Incorporate EDCC Comments	9/15/98	9/21/98
16	Detail Design	9/25/98	1/28/00
17	EDCC Review/Secure Financing	11/13/98	1/28/00
18	Incorporate EDCC Comments	11/20/98	1/28/00
19	Issue Construction Drawings	1/31/00	1/31/00
20	**Construction Administration**	**1/15/99**	**8/31/00**
21	Engineering Administration	1/15/99	8/31/00
22	CQA and Construction Administration	1/15/99	8/31/00
23	**Wastewater Characterization**	**5/3/99**	**7/30/99**
24	Wastewater Characterization	5/3/99	7/19/99
25	Wastewater Characterization Report	7/12/99	7/23/99
26	NPDES Permit Application	7/23/99	7/30/99
27	**Project Management**	**7/8/98**	**11/30/00**
28	AR Project Management	7/8/98	11/30/00
29	Engineering Project Management	7/8/98	11/30/00



Project: WM/SS
Date: 7/13/99

Task | Milestone | Rolled Up Task | Rolled Up Progress
Progress | Summary | Rolled Up Milestone

El Dorado Chemical Company

Attachment 2

Outfalls 001 and 004 Quarterly Monitoring Sample Results

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EarthNet Laboratories, Inc

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06/24/99

El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/07/99
COLLECTED BY: CLIENT

PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
EL67705	001	Antimony	<50.0	ug/l	50.0	06/10/99	10:00	SL	EPA 200.7	06/07/99	08:25
		Nickel(Freshwater)	13.0	ug/l	10.0	06/10/99	10:00	SL	EPA 200.7		
		Copper	6.0	ug/l	2.0	06/10/99	10:00	SL	EPA 200.7		
		Chromium	3.0	ug/l	3.0	06/10/99	10:00	SL	EPA 200.7		
		Beryllium	<1.0	ug/l	1.0	06/10/99	10:00	SL	EPA 200.7		
		Zinc	84.0	ug/l	4.0	06/10/99	10:00	SL	EPA 200.7		
		Hex Chromium Extraction	Completed	mg/l	0.003	06/07/99	15:00	SL	EPA 218.4		
		Hexavalent Chromium	<0.003	mg/l	0.003	06/07/99	16:00	SL	EPA 218.4		
		Arsenic	<10.0	ug/l	10.0	06/10/99	10:30	SL	EPA 206.2		
		Cadmium	<1.0	ug/l	1.0	06/15/99	10:30	SL	EPA 213.2		
		Lead	<3.0	ug/l	3.0	06/09/99	13:30	SL	EPA 239.2		
		Selenium	<3.0	ug/l	3.0	06/10/99	09:45	SL	EPA 270.2		
		Silver	<2.0	ug/l	2.0	06/09/99	16:45	SL	EPA 272.2		
		Thallium	<2.0	ug/l	2.0	06/09/99	15:45	SL	EPA 279.2		
		Chromium(VI)	<3.0	ug/l	3.0	06/07/99	16:00	SL	EPA 218.4		
		Mercury	<0.2	ug/l	0.2	06/08/99	10:00	SL	EPA 245.1		
		Total Suspended Solids	10.0	mg/l	1.0	06/08/99	10:40	LA	EPA 160.2		
		BOD5	5.0	mg/l	1.0	06/09/99	08:15	LA	EPA 405.1		
		BOD Standard	175.0	mg/l	1.0	06/09/99	08:15	LA	EPA 405.1		
		TOC	10.2	mg/l	1.0	06/08/99	08:25	GL	EPA 415.1		
		COD	44.4	mg/l	3.7	06/09/99	09:30	GL	EPA 410.4		
		Total Dissolved Solids	1500.0	mg/l	1.0	06/11/99	10:35	GL	EPA 160.1		
		Sulfate	485	mg/l	2	06/16/99	11:40	GC	EPA 375.4		
		Cyanide	<5.0	ug/l	5.0	06/14/99	14:00	GC	EPA 335.2		
		Sulfide	0.03	mg/l	0.01	06/21/99	16:00	GC	EPA 376.2		
		Nitrate-N	165.3	mg/l	0.1	06/08/99	07:25	GC	EPA 352.1		
		Ammonia-N Titration	80.5	mg/l	0.3	06/08/99	07:30	EJ	EPA 350.2		
		Chloride	67.6	mg/l	1.0	06/08/99	07:50	GC	EPA 325.3		
		Phenol, Total	<5.0	ug/l	5.0	06/23/99	13:00	EJ	EPA 420.1		
		Sulfite	<2.0	mg/l	2.0	06/08/99	14:45	GC	EPA 377.1		
		Nitrite-N	2.2	mg/l	0.005	06/08/99	13:00	GC	EPA 354.1		
Volatile Compounds											
		Acrolein	<MDL	ug/L	50	06/10/99	12:07	CH	EPA 624		
		Acrylonitrile	<MDL	ug/L	50						
		Benzene	<MDL	ug/L	10						

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Ruston, LA 71270

EarthNet Laboratories, Inc

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318-251-5614 FAX
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06/24/99

El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/07/99
COLLECTED BY: CLIENT

PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Volatile Compounds											
EL67705	001	Bromodichloromethane	<MDL	ug/L	10	06/10/99	12:07	CH	EPA 624	06/07/99	08:25
		Bromoform	<MDL	ug/L	10						
		Bromomethane	<MDL	ug/L	50						
		Carbon Tetrachloride	<MDL	ug/L	10						
		Chlorobenzene	<MDL	ug/L	50						
		Chloroethane	<MDL	ug/L	10						
		2-Chloroethylvinylether	<MDL	ug/L	50						
		Chloroform	<MDL	ug/L	10						
		Chloromethane	<MDL	ug/L	50						
		Dibromochloromethane	<MDL	ug/L	10						
		1,1-Dichloroethane	<MDL	ug/L	10						
		1,2-Dichloroethane	<MDL	ug/L	10						
		1,1-Dichloroethene	<MDL	ug/L	10						
		trans-1,2-Dichloroethene	<MDL	ug/L	10						
		1,2-Dichloropropane	<MDL	ug/L	10						
		cis-1,3-Dichloropropene	<MDL	ug/L	10						
		trans-1,3-Dichloropropene	<MDL	ug/L	10						
		Ethylbenzene	<MDL	ug/L	10						
		Methylene chloride	<MDL	ug/L	20						
		1,1,2,2-Tetrachloroethane	<MDL	ug/L	10						
		Tetrachloroethene	<MDL	ug/L	10						
		Toluene	<MDL	ug/L	10						
		Trichloroethene	<MDL	ug/L	10						
		1,1,2-Trichloroethane	<MDL	ug/L	10						
		1,1,1-trichloroethane	<MDL	ug/L	10						
		Vinyl chloride	<MDL	ug/L	10						
		Bis (Chloro-methyl) Ether	<MDL	ug/L	10						
		Dichlorodifluoromethane	<MDL	ug/L	10						
		Trichlorofluoromethane	<MDL	ug/L	10						
Volatile Surrogates											
		Dibromofluoromethane	97	% Rec	76-144	06/10/99	12:07	CH			
		Toluene d8	102	% Rec	88-110						
		4-Bromofluorobenzene	98	% Rec	86-115						
Pesticides/PCB Compounds											

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PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	BEGIN DATE	BEGIN TIME	ANL	METHOD	COLLECTION DATE	COLLECTION TIME
Pesticides/PCB Compounds											
EL67705	001	Aldrin	<MDL	ug/L	0.05	06/10/99	13:00	CH	EPA 608	06/07/99	08:25
		alpha-BHC	<MDL	ug/L	0.05						
		beta-BHC	<MDL	ug/L	0.05						
		delta-BHC	<MDL	ug/L	0.05						
		gamma-BHC (Lindane)	<MDL	ug/L	0.05						
		Chlordane	<MDL	ug/L	0.20						
		4,4'-DDD	<MDL	ug/L	0.10						
		4,4'-DDE	<MDL	ug/L	0.10						
		4,4'-DDT	<MDL	ug/L	0.10						
		Dieldrin	<MDL	ug/L	0.10						
		Endosulfan I	<MDL	ug/L	0.10						
		Endosulfan II	<MDL	ug/L	0.10						
		Endosulfan Sulfate	<MDL	ug/L	0.10						
		Endrin	<MDL	ug/L	0.10						
		Endrin aldehyde	<MDL	ug/L	0.10						
		Heptachlor	<MDL	ug/L	0.05						
		Heptachlor epoxide	<MDL	ug/L	0.05						
		Methoxychlor	<MDL	ug/L	0.05						
		Toxaphene	<MDL	ug/L	5.0						
		Aroclor 1016	<MDL	ug/L	1.0						
		Aroclor 1221	<MDL	ug/L	1.0						
		Aroclor 1232	<MDL	ug/L	1.0						
		Aroclor 1242	<MDL	ug/L	1.0						
		Aroclor 1248	<MDL	ug/L	1.0						
		Aroclor 1254	<MDL	ug/L	1.0						
		Aroclor 1260	<MDL	ug/L	1.0						
Pesticide/PCB Surrogates											
		TCMX	85	% Rec	40-150	06/09/99	13:00	CH			
Herbicide Compounds											
		2,4-Dichlorophenoxy acetic aci	<MDL	ug/L	10	06/10/99	16:00	CH	EPA 615		
		2,4,5-TP (Silvex)	<MDL	ug/L	4						
Semi Volatile Priority Pollutant											
		Acenaphthene	<MDL	ug/l	10	06/10/99	11:58	CH	EPA 625		
		Acenaphthylene	<MDL	ug/l	10						

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DATE RECEIVED: 06/07/99
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PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	BEGIN DATE	BEGIN TIME	ANL	METHOD	COLLECTION DATE	COLLECTION TIME
Semi Volatile Priority Pollutant											
EL67705	001	Anthracene	<MDL	ug/l	10	06/10/99	11:58	CH	EPA 625	06/07/99	08:25
		Benzidine	<MDL	ug/l	50						
		Benzo-(a) Anthracene	<MDL	ug/l	10						
		Benzo (a) Pyrene	<MDL	ug/l	10						
		Benzo (b) Fluoranthene	<MDL	ug/l	10						
		Benzo (ghi) Perylene	<MDL	ug/l	20						
		Benzo (k) Fluoranthene	<MDL	ug/l	10						
		Bis (2-Chloroethoxy) Methane	<MDL	ug/l	10						
		Bis (2-Chloroethyl) Ether	<MDL	ug/l	10						
		Bis (2-Chloroisopropyl) Ether	<MDL	ug/l	10						
		Bis (2-Ethlhexyl) Phthalate	<MDL	ug/l	10						
		4-Bromophenyl-phenylether	<MDL	ug/l	10						
		Butylbenzylphthalate	<MDL	ug/l	10						
		4-Chloro-3-Methylphenol	<MDL	ug/l	10						
		4-Chlorophenyl-2-Methylphenol	<MDL	ug/l	10						
		2-Chloronaphthalene	<MDL	ug/l	10						
		2-Chlorophenol	<MDL	ug/l	10						
		3-Chlorophenol	<MDL	ug/l	10						
		4-Chlorophenol	<MDL	ug/l	10						
		Chrysene	<MDL	ug/l	10						
		Dibenz (a,h) Anthracene	<MDL	ug/l	20						
		1,2-Dichlorobenzene	<MDL	ug/l	10						
		1,3-Dichlorobenzene	<MDL	ug/l	10						
		1,4-Dichlorobenzene	<MDL	ug/l	10						
		2,3-Dichlorophenol	<MDL	ug/l	10						
		2,4-Dichlorophenol	<MDL	ug/l	10						
		2,5-Dichlorophenol	<MDL	ug/l	10						
		2,6-Dichlorophenol	<MDL	ug/l	10						
		3,3-Dichlorobenzidine	<MDL	ug/l	50						
		3,4-Dichlorophenol	<MDL	ug/l	10						
		3,5-Dichlorophenol	<MDL	ug/l	10						
		Diethylphthalate	<MDL	ug/l	10						
		2,4-Dimethylphenol	<MDL	ug/l	10						
		Dimethyl Phthalate	<MDL	ug/l	10						

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Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/07/99
COLLECTED BY: CLIENT

PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Semi Volatile Priority Pollutant											
EL67705	001	Di-n-Butylphthalate	<MDL	ug/l	10	06/10/99	11:58	CH	EPA 625	06/07/99	08:25
		4,6-Dinitro-2-Methylphenol	<MDL	ug/l	50						
		2,4-Dinitrophenol	<MDL	ug/l	50						
		2,4-Dinitrotoluene	<MDL	ug/l	10						
		2,6-Dinitrotoluene	<MDL	ug/l	10						
		Di-n-Octyl Phthalate	<MDL	ug/l	10						
		1,2-Diphenylhydrazine	<MDL	ug/l	20						
		Fluoranthene	<MDL	ug/l	10						
		Fluorene	<MDL	ug/l	10						
		Hexachlorobenzene	<MDL	ug/l	10						
		Hexachlorobutadiene	<MDL	ug/l	10						
		Hexachlorocyclopentadiene	<MDL	ug/l	10						
		Hexachloroethane	<MDL	ug/l	20						
		Indeno (1,2,3-cd) Pyrene	<MDL	ug/l	20						
		Isophorone	<MDL	ug/l	10						
		Naphthalene	<MDL	ug/l	10						
		Nitrobenzene	<MDL	ug/l	10						
		2-Nitrophenol	<MDL	ug/l	20						
		4-Nitrophenol	<MDL	ug/l	50						
		N-nitrosodimethylamine	<MDL	ug/l	50						
		N-Nitrosodi-n-Propylamine	<MDL	ug/l	20						
		N-Nitrosodiphenylamine	<MDL	ug/l	20						
		Pentachlorophenol	<MDL	ug/l	50						
		Phenanthrene	<MDL	ug/l	10						
		Phenol	<MDL	ug/l	10						
		Pyrene	<MDL	ug/l	10						
		1,2,4-Trichlorobenzene	<MDL	ug/l	10						
		2,4,6-Trichlorophenol	<MDL	ug/l	10						
		4-Chlorophenyl Phenylether	<MDL	ug/l	10						
		2,3,7,8-Tetra-Chlorodibenzo-P-	<MDL	ug/l	5						
Semi-volatile Surrogates											
		Nitrobenzene	39	% Rec	35-115	06/10/99	11:58	CH			
		2-Fluorobiphenyl	53	% Rec	43-116						
		Terphenyl d14	53	% Rec	33-141						

414 West California Ave
Ruston, LA 71270

EarthNet Laboratories, Inc

318-255-0060
318-251-5614 FAX
800-256-4362

Quality People Working For A Quality Environment

06/24/99

El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/07/99
COLLECTED BY: CLIENT

PRESERVED?: Y
TIME RECEIVED: 10:55
BROUGHT IN BY : C

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Semi-volatile Surrogates											
EL67705	001	Phenol d6	42	% Rec	10-110	06/10/99	11:58	CH		06/07/99	08:25
		2-Fluorophenol	39	% Rec	20-110						
		2,4,6-Tribromophenol	10	% Rec	10-123						

Certified By QA Director/QC Manager

Analyses conducted in accordance with the list of Approved Test Procedures, published in 40 CFR--Parts 60, 136, and 261. Test procedures are from the 18/19th edition of Standard Methods for the Examination of Water and Wastewater, Methods for Chemical Analysis of Water and Wastes, 1979 (EPA) ASTM (Annual Book of Standards, Part 31, Water, 1985), or Test Methods for Evaluating Solid Waste (SW-846).

The duplicate analyses and/or spiked samples indicate all methodologies are in control.
Retain records for three years.

* Indicates out of compliance limits established by client and/or regulatory agencies. See permit for regulatory reporting requirements.

(318) 255-8666
Ruston, LA 71270
(800) 256-4362

545092

CHAIN OF CUSTODY Rush Standard ✓

Client		Delivered By:			
Name: El Dorado Chemical	Attn: Wes Morgan	Client ✓	EarthNet	Delivery Service	Bus
Address: 4500 N. W AVE					
City, State, Zip: El Dorado AR 71731		Project Name/Location			
Phone Number: 870 863-1484	Fax Number: 870 863-1499				

Lab Use	Sample Collection				All Samples to be Cooled to 4°C				
Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Container	Preservative	Matrix	Special Instructions
67705	6/7/99	825A	Comp	001	~~Sulfide~~ TSS, NO_3-N, SO_4, ~~Chloride~~, ~~EC~~	1P	4°C	W	
	"	"	"	"	Chronic Biomonitoring	4P	4°C	W	
	"	"	Grab	"	Cyanide	1G	NaOH	W	
	"	"	Comp	"	NH_3-N	1G	H_2SO_4	W	
	"	"	"	"	COD	1G	H_2SO_4	W	
	"	"	"	"	Metals	1P	HNO_3	W	
	"	"	Comp	"	HEX CHROMIUM	1P	—	W	
	"	"	Comp	"	TOC	1G	HCL	W	
	"	"	Comp	"	SULFIDE	1G	NaOH	W	
	"	"	GRAB	"	PHENOL	1G	H_2SO_4	W	

All samples will be collected and preserved according to USEPA established protocols.

Additional Remarks:

Sampled by:

Relinquished by:	**Date:** 6/7/99	**Time:** 1055	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received for Laboratory by:**	**Date:** 6-7-99	**Time:** 1055

414 West California
(318) 255-0060
Ruston, LA 71270
(800) 256-4362

EarthNet Laboratories Inc.

P.O. #_____

CHAIN OF CUSTODY Rush ☐ Standard ✓

Client		Delivered By:
Name: El Dorado Chemical	Attn: Wes Morgan	Client ☐ EarthNet ✓ Delivery Service ☐ Bus ☐
Address: 4500 N.W. Ave		
City, State, Zip: El Dorado, AR 71731		Project Name/Location
Phone Number: 870 - 863-1484	Fax Number:	

Lab Use	Sample Collection				All Samples to be Cooled to 4°C				
Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Cont	Preservative	Matrix	Special Instructions
	6-7-99	08:25	Comp	001	Pest PCP	1G	—	W	
	"	"	"	"	Dioxin	"	—	W	
	"	"	"	"	BNA	"	—	W	

All samples will be collected and preserved according to USEPA established protocols.

Additional Remarks:

Sampled by: W. Morgan

Relinquished by: W. Morgan	**Date:** 6/7/99	**Time:** 1055	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received for Laboratory by:** Tony Cox	**Date:** 6-7-99	**Time:** 1055

The Results of Two 7-day Chronic Definitive Toxicity Tests for El Dorado Chemical Company

(NPDES Permit #AR0000752)

June 16, 1999

Prepared by:

John M. Wakeman, Ph.D.
Biomonitoring Supervisor
EarthNet Laboratories
414 West California
Ruston, Louisiana 71270

TABLE OF CONTENTS

1.0 Introduction

EarthNet Laboratories (ENL), Ruston, Louisiana, conducted two 7-day chronic definitive tests for El Dorado Chemical Company (EDCC), El Dorado, Arkansas, to fulfill the quarterly NPDES permit requirements. The test organisms used were the cladoceran, Ceriodaphnia dubia, and the fathead minnow, Pimephales promelas.

2.0 Methods and Materials

2.1 Test Methods

All test procedures and methods followed were according to "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (EPA600/89).

2.2 Test Organisms

The cladocerans (Ceriodaphnia dubia) were obtained from ENL cultures and were less than 24 hours old at test initiation. The neonates were collected from the same 8-hour time period.

The fathead minnows (Pimephales promelas) were obtained from Aquatox Inc, and were less than 24 hours old at test initiation.

2.3 Dilution Water

Due to receiving water toxicity documented in previous testing, the dilution water used for the Ceriodaphnia dubia and fathead minnow 7-day chronic test was moderately hard reconstituted water (EPA600/89).

2.4 Test Concentrations

The test concentrations used were 100, 50, 25, 12.5 and 6.25 percent effluent from outfall 001, and a laboratory control.

The fathead minnow 7-day chronic test contained 4 replicates of 10 organisms for a total of 40 organisms per concentration. The Ceriodaphnia dubia 7-day chronic test contained 10 replicates of one organism for a total of 10 organisms per concentration.
Forty-eight hour reference toxicant tests using sodium chloride (NaCl) were conducted concurrently with the 7-day chronic tests in order to document organism sensitivity.

2.5 Sample Collection

Three consecutive 24-hour composite samples were collected by EDCC's personnel on June 7, 9, 11, 1999. Upon completion of each composite, the samples were iced to 4°C and immediately shipped to ENL's laboratory in Ruston, Louisiana (See Appendix B - Chain-of-Custody).

2.6 Sample Preparation

Upon receipt, the samples were logged, labeled with identification numbers and warmed to 25±1°C. Total Residual Chlorine (TRC) levels were measured and recorded, if present. (See Appendix A - Raw Data Sheets). Initial dissolved oxygen, pH, conductivity and temperature measurements were also recorded.

2.7 Monitoring of Chronic Tests

Monitoring of the 7-day chronic tests consisted of daily solution renewal, pre and post renewal dissolved oxygen measurements, pH, and conductivity measurements. Organism survival/mortality was also recorded on a daily basis.

A temperature of 25±1°C was kept constant using a Remcor liquid circulator and water bath combination for the fathead minnow 7-day chronic test, and a Model 818 Precision dual programmable incubator for the Ceriodaphnia dubia test. Test temperatures were monitored diurnally for the 7-day period.

2.8 Data Analysis

Ceriodaphnia dubia survival and reproduction data and fathead minnow survival and growth data were analyzed using the appropriate statistical tests (Fisher's Test, Dunnett's Test or Steel's Many-One Test) from the Toxstat statistical software package. Reference toxicant LC50 values were generated using an USEPA Epistat software package.

3.0 Results and Discussion

Ceriodaphnia dubia survival and reproduction data are summarized in Table 1. The Ceriodaphnia dubia experienced no significant (P=0.05) mortality in the 100% effluent concentration (critical dilution) or at any other dilution tested.

No significant sublethal effects on cladoceran reproduction were observed at any tested effluent concentration, including the 100% concentration. Ceriodaphnia dubia reproduction averaged 19.0 neonates per female in the control and 18.9 in the 100% effluent.

****

Table 1. Summary of Ceriodaphnia dubia 7-day Chronic Survival and Reproduction Data.

Concentration	Percent Survival	Average Reproduction per female
Control	100	19.0
6 percent	100	19.8
12 percent	90	20.6
25 percent	100	19.6
50 percent	100	20.3
100 percent	90	18.9

** Significant difference when compared to the control (P=.05)*

****

Fathead minnow survival and growth data are summarized in Table 2. The fathead minnows experienced no significant (P = 0.05) lethal toxicity at any tested effluent concentration. The minnows showed 97.5% survival in the controls and 90% survival in the 100% concentration.

No sublethal effects on fathead minnow growth were observed. Minnow growth over the 7-day period averaged 0.403 mg in the control and 0.400 mg in the 100% effluent concentration.

****

Table 2. Summary of Fathead Minnow 7-day Chronic Survival and Growth Data

Concentration	Percent Survival	Average Growth (mg)
Control	97.5	0.403
6 percent	100	0.432
12 percent	97.5	0.405
25 percent	100	0.443
50 percent	100	0.398
100 percent	90	0.400

** Significantly different from Control (p = 0.05)*

****

The NaCl reference toxicant test results are summarized in Table 3. The reference toxicant tests indicated that the test organisms were within their normal sensitivity ranges.

****

Table 3. NaCl Reference Toxicant Test Results.

	48-Hour LC50 *(ppt)	95% Confidence Intervals
Pimephales promelas	*8.42*	*6.0 - 10.0*
Ceriodaphnia dubia	*2.45*	*2.0 - 3.0*

Parts Per Thousand (Salinity)

****

4.0 Conclusions

The three composite samples collected at EDCC's NPDES discharge site were found to show no significant lethal or sub-lethal toxicity to either test species.

5.0 References

U.S. EPA. 1994. Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. 2nd Edition, Cincinnati, Ohio. EPA/600/4-91/002, July 1994.

APPENDIX A
RAW DATA SHEETS

EARTHNET LABORATORIES, INC.

CERIODAPHNIA 7-DAY WATER QUALITY DATA

EML # 67705 67852 67998

Client EL DORADO CHEM Initiation: Date 6/8/99 Time 4:30 PM Adults Isolated: Date 6/7/99 Time 11:30 pm

Sample Description GUTFALL 001 Terminated: Date 6/15/99 Time 12:30 Neonates Collected: Date 6/15/99 Time 2:30 PM

Same ID #

Technician:	Day 0 JW	1 JW	2 JW	3 JW	4 JW	5 JW	6 JW	7 JW
Time:	Day 0 8:30 AM	1 9:30	2 11:00	3 12:30 pm	4 9:30	5 12:00	6 11:90	7 12:00

Percent Effluent	Dissolved Oxygen (mg/l) Day 0	1	2	3	4	5	6	7	8
CONTROL	8.5	8.4 / 8.4	8.5 / 8.5	8.5 / 8.6	6.7 / 6.5	6.5 / 6.6	6.3 / 6.4	8.4	
6.25	8.5	8.4 / 8.5	8.5 / 8.5	8.4 / 8.6	6.7 / 6.8	8.5 / 8.6	8.3 / 8.4	8.4	
12.5	8.4	8.4 / 8.5	8.5 / 8.4	8.4 / 8.6	8.5 / 8.4	8.5 / 8.6	8.4 / 8.4	8.4	
25	8.3	8.4 / 8.4	8.5 / 8.4	8.4 / 8.6	8.8 / 8.7	8.5 / 8.6	8.4 / 8.4	8.4	
50	8.3	8.4 / 8.4	8.5 / 8.3	8.4 / 8.6	8.8 / 8.6	8.5 / 8.6	8.5 / 8.4	8.4	
100	8.3	8.4 / 8.3	8.5 / 8.3	8.4 / 8.6	8.8 / 8.5	8.5 / 8.6	8.5 / 8.4	8.4	
		/	/	/	/	/	/	/	
		/	/	/	/	/	/	/	

Percent Effluent	pH Day 0	1	2	3	4	5	6	7	8
CONTROL	/	7.1 / 7.4	7.4 / 7.4	7.2 / 7.4	7.2 / 7.3	7.3 / 7.4	7.3 / 7.4	7.3	
6.25	/	7.2 / 7.1 / 7.4	7.3 / 7.6	7.2 / 7.7	7.4 / 7.5	7.3 / 7.5	7.4 / 7.5	7.5	
12.5	/	7.6 / 7.3 / 7.5	7.3 / 7.8	7.2 / 7.7	7.3 / 7.6	7.3 / 7.6	7.6 / 7.6	7.5	
25	/	7.8 / 7.3 / 7.7	7.6 / 7.9	7.3 / 7.8	7.3 / 7.5	7.4 / 7.7	7.6 / 7.7	7.6	
50	/	7.9 / 7.4 / 7.9	7.6 / 8.0	7.5 / 7.9	7.4 / 7.5	7.5 / 7.8	7.6 / 7.9	7.6	
100	/	7.6 / 8.0	7.8 / 8.0	7.8 / 8.1	7.6 / 7.8	7.7 / 7.8	7.9 / 7.9	7.7	

Percent Effluent	Conductivity (µmhos/cm) Day 0	1	2	3	4	5	6	7	8
CONTROL	169	271	272	274	276	275	279		
6.25	441	398	455	438	474	453	478		
12.5	495	482	551	505	616	592	603		
25	645	650	625	638	644	651	670		
50	887	892	843	856	867	897	884		
100	1759	1780	1769	1783	1994	1986	1989		

Percent Effluent	Total Hardness (mg/L $CaCO_3$) Day 0	1	2	3	4	5	6	7	8
100%	130	130	136	136	126	126	126		

Percent Effluent	Alkalinity (mg/L $CaCO_3$) Day 0	1	2	3	4	5	6	7	8
100%	17	17	19	19	16	16	16		

Comments: _____

EARTHNET LABORATORIES, INC.

CERIODAPHNIA 7 - DAY SURVIVAL AND REPRODUCTION DATA

ENL# 67705 67852 67998 Test Beginning 6/8/99

Client: EL DORADO CHEM. Test Ending 6/15/99 Time 1200

Source OUTFALL 001 ID # 67705 67998

Dilution Water : MH ID # MH 712

Technician : Day 0 JW 1 JW 2 JW 3 JW 4 JW 5 JW 6 JW 7 JW 8 ____

Time : Day 0 9:30 1 9:30 2 1030 3 1230 4 1030 5 1200 6 1130 7 1200 8 ____

Tempture : Day 0 25° 1 25°C 2 25 3 25 4 25 5 25 6 25 7 25 8 ____

Percent Concentration	Day	REPLICATES A	B	C	D	E	F	G	H	I	J	# of Live Adults	Total Live Neonates
CONTROL	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	0
	3	0	0	0	0	0	0	0	0	0	0	10	0
	4	5	6	3	4	5	4	6	5	3	6	10	47
	5	3	4	4	2	3	5	4	4	5	4	10	39
	6	0	0	0	0	0	0	2	0	1	3	10	3
	7	10	11	12	9	9	12	12	10	10	9	10	104
	8												
6.25 %	1	0	0	0	0	0	0	0	0	0	0	10	0
	2	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	0	0	0	0	0	0	10	
	4	3	4	6	5	6	4	8	4	5	6	10	51
	5	5	4	4	4	3	4	3	4	5	3	10	39
	6	1	0	0	0	0	0	0	2	0	1	10	4
	7	9	12	11	13	9	12	9	9	12	8	10	104
	8												
12.5 %	1	0	0	0	0	0	0	0	0	0	0	10	
	2	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	0	0	0	0	0	0	10	
	4	5	8	6	7	6	4	5	4	4	5	10	54
	5	3	2	3	0	2	3	3	5	5	3	9	31
	6	0	0	0	0	0		1	0	0	0	9	3
	7	13	12	10	14	11		12	8	11	13	9	104
	8												
25 %	1	0	0	0	0	0	0	0	0	0	0	10	
	2	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	0	0	0	0	0	0	10	
	4	4	3	5	4	4	5	4	4	5	3	10	44
	5	3	3	2	2	5	4	4	3	2	3	10	31
	6	2	1	1	1	0	0	0	0	0	1	10	5
	7	12	14	11	11	12	9	13	12	11	11	10	116
	8												
50 %	1	0	0	0	0	0	0	0	0	0	0	10	
	2	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	0	0	0	0	0	0	10	
	4	3	4	6	5	5	7	6	5	4	8	10	53
	5	5	4	3	7	4	4	8	3	4	2	10	44
	6	0	0	0	0	0	0	0	1	1	0	10	2
	7	12	13	11	10	11	11	9	13	10	9	10	108
	8												
100 %	1	0	0	0	0	0	0	0	0	0	0	10	
	2	0	0	0	0	0	0	0	0	0	0	10	
	3	0	0	0	0	X	0	0	0	0	0	9	
	4	7	5	6	7		3	5	5	3	4	9	47
	5	3	4	2	2		4	3	4	3	2	9	27
	6	0	0	1	0		1	2	0	0	0	9	4
	7	9	10	11	9		9	11	10	11	12	9	92
	8												

EARTHNET LABORATORIES, INC.

NUMBER OF NEONATES PER BROOD CERIODAPHNIA

Client: ELDORADO CHEM. Date: 6/15/99

ENL#: 67705 .67852 67998

Replicate (Organism)	Effluent Concentration (%)						
	CONTROL	6.25	12.5	25	50	100%	
A	18	18	21	22	20	19	
B	21	20	22	22	21 ...	19	
C	19	21	19	19	20	20	
D	15	22	23	18	22	18	
E	17	18	21	21	20	DEAD	
F	21	20	DEAD	18	22	17	
G	22	20	21	21	23	18	
H	19	19	17	19	22	19	
I	19	22	20	18	15	20	
J	19	18	21	18	18	20	
MEAN							

EARTHNET LABORATORIES, INC.

LARVAL MINNOW DATA SHEET

EML # 67705 67852 67998 Initiation: Date 6/8/99 Time 1300

Client EL DORADO CHEM CO Terminated: Date 6/15/99 Time 1230

Sample Description OUTFALL 001 Technician(s): JW

Sample ID # _____ Species P. promelas Age <24h ID# _____

Shipper _____ Test Temperature Range 25 ± 1

Sample Type: Grab ____ Composite ✓ Other ____ Test Salinity ____ Artificial Salts Used ____

Dilution Water: ID# 7.2 Description MH Aeration _____

Comments _____

	Effluent				Dilution Water	
Day	Total Alkalinity (mg/L as $CaCO_3$)	Total Hardness (mg/L as $CaCO_3$)	Total Residual Chlorine (mg/L)	De-chlorinated (Yes or No)	Total Alkalinity (mg/L as $CaCO_3$)	Total Hardness (mg/L as $CaCO_3$)
0	17	130				
1	17	130				
2	19	136				
3	19	136				
4	16	126				
5	16	126				
6	16	126				
7	-					

EARTHNET LABORATORIES, INC.

LARVAL MINNOW 7-DAY SURVIAL AND WATER QUALITY DATA

l 67705 67852 67998

t EL DORADO CHEM CO Date Initiated 6/8/99 Time 1300

l Description OUTFALL 001 Date Terminated 6/15/99 Time 1230

nician: Day 0 JW 1 JW 2 JW 3 JW 4 JW 5 JW 6 JW 7 JW

: Day 0 1300 1 9:30 2 10:00 3 1300 4 1030 5 1030 6 1030 7 1230

x ture: Day 0 25° 1 25°C 2 25 3 25 4 25 5 25 6 25 7 25

CENT CENT	Day	NUMBER OF LIVE ORGANISMS A	B	C	D	DISSOLVED OXYGEN (mg/l) PER RENEWAL	POST RENEWAL	PH		SPECIFIC CONDUCTANCE (µmho/cm)
	0	10	10	10	10		8.5		7.3	269
	1	10	10	10	10	7.4	8.4	7.1	7.4	271
	2	10	10	10	10	7.3	8.4	7.0	7.4	272
	3	10	10	10	10	7.2	8.6	7.1	7.4	274
	4	10	10	10	10	7.3	8.8	7.1	7.3	276
	5	10	10	10	10	7.2	8.6	7.2	7.4	275
	6	9	10	10	10	7.1	8.4	7.2	7.4	279
	7	9	10	10	10	7.0				
	0	10	10	10	10		8.5		7.5	441
	1	10	10	10	10	7.4	8.4	7.1	7.4	398
	2	10	10	10	10	7.3	8.4	7.0	7.6	455
	3	10	10	10	10	7.2	8.6	7.2	7.7	438
	4	10	10	10	10	7.3	8.8	7.1	7.5	474
	5	10	10	10	10	7.2	8.6	7.2	7.5	453
	6	10	10	10	10	7.1	8.4	7.2	7.5	478
	7	10	10	10	10	7.0				
	0	10	10	10	10		8.4		7.6	495
	1	10	10	10	10	7.4	8.4	7.1	7.4	482
	2	9	10	10	10	7.3	8.4	7.0	7.8	551
	3	9	10	10	10	7.1	8.6	7.2	7.7	505
	4	9	10	10	10	7.3	8.8	7.3	7.6	616
	5	9	10	10	10	7.2	8.6	7.4	7.6	592
	6	9	10	10	10	7.1	8.4	7.3	7.6	603
	7	9	10	10	10	7.0				
	0	10	10	10	10		8.4		7.9	645
	1	10	10	10	10	7.3	8.3	7.3	7.6	650
	2	10	10	10	10	7.2	8.3	7.4	7.9	685
	3	10	10	10	10	7.0	8.6	7.3	7.8	633
	4	10	10	10	10	7.2	8.7	7.4	7.8	644
	5	10	10	10	10	7.2	8.6	7.4	7.7	651
	6	10	10	10	10	7.3	8.4	7.5	7.7	680
	7	10	10	10	10	7.0				
	0	10	10	10	10		8.4		7.9	657
	1	10	10	10	10	7.6	8.3	7.6	7.8	892
	2	10	10	10	10	7.1	8.3	7.6	8.0	943
	3	10	10	10	10	7.0	8.6	7.5	7.9	456
	4	10	10	10	10	7.2	8.6	7.5	7.8	867
	5	10	10	10	10	7.1	8.6	7.4	7.8	992
	6	10	10	10	10	7.2	8.4	7.5	7.9	884
	7	10	10	10	10	7.0				
	0	10	10	10	10		8.3		8.1	1759
	1	10	10	10	10	7.6	8.2	7.7	8.0	1790
	2	10	10	10	10	7.1	8.2	7.6	8.0	1762
	3	9	10	9	9	7.0	8.6	7.5	8.0	1783
	4	9	10	9	9	7.1	8.5	7.6	7.8	1994
	5	9	10	9	9	7.0	8.6	7.7	7.8	1956
	6	9	10	9	9	7.0	8.4	7.6	7.9	1989
	7	9	10	9	9	6.9				

EARTHNET LABORATORIES, INC.

FATHEAD MINNOW GROWTH DATA SHEET

Client: EL DORADO CHEMICAL

Date of Test: 6/8/99 — 6/15/99

Percent Effluent	REP.	Pan Tare Wt.	Pan Fish Wt.	Wt. of Fish	# of Fish	Avg. Wt. of each Fish
CONT	A	1.3534	1.3568	.0034	9	.37
	B	1.3460	1.3500	.0040	10	.40
	C	1.3410	1.3452	.0042	10	.42
	D	1.3470	1.3512	.0042	10	.42
	E					
6.25%	A	1.3522	1.3562	.0040	10	.40
	B	1.3454	1.3498	.0044	10	.44
	C	1.3464	1.3506	.0042	10	.42
	D	1.3404	1.3447	.0047	10	.47
	E					
12.5%	A	1.3286	1.3326	.0040	9	.44
	B	1.3256	1.3298	.0043	10	.43
	C	1.3227	1.3269	.0042	10	.42
	D	1.3369	1.3402	.0033	10	.33
	E					
25%	A	1.3396	1.3444	.0048	10	.48
	B	1.3397	1.3440	.0043	10	.48
	C	1.3317	1.3359	.0042	10	.42
	D	1.3320	1.3359	.0039	10	.39
	E					
50%	A	1.3467	1.3507	.0040	10	.40
	B	1.3547	1.3590	.0043	10	.43
	C	1.3228	1.3270	.0042	10	.42
	D	1.3554	1.3588	.0034	10	.34
	E					
100%	A	1.3514	1.3548	.0034	8	.42
	B	1.3524	1.3564	.0040	10	.40
	C	1.3438	1.3471	.0033	9	.37
	D	1.3520	1.3555	.0037	9	.41
	E					
	A					
	B					
	C					
	D					
	E					

EARTHNET LABORATORIES, INC.

REFERENCE TOXICANT DATA SHEET

EHL # 67705 67852 67998
Client EL DORADO CHEM
Test Organism P. promelas
Source AQUATOX
ID # 651 Age <24 hr

Reference Toxicant NACL
Stock Solution NaCl 100 ppt
Dilution Water MH
Total Hardness as CaCO, _____
Conductivity/Salinity _____
Technician 0 hr JW 24 hr JW 48 hr JW 72 hr _____ 96 hr _____
Temperature 0 hr 1230 / 25 24 hr 1030 / 25 48 hr 25° 72 hr _____ 96 hr _____

Test Begin Date 6/9/99 Time 1230
Test End Date 6/10/99 Time 1145
ID # 712
Total Alkalinity as CaCO, _____

Toxicant Concentration mg/l - g/l	Test Replicate Number	Number Surviving					Dissolved Oxygen (mg/L)					pH					Conductivity (µmhos/cm)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
4		10	10	10			8.5		8.3			7.4		7.2			7130				
6		10	10	10			8.5		8.2			7.4		7.2			9100				
8		10	8	7			8.5		8.2			7.4		7.2			11210				
10		10	1	0			8.5		8.2			7.4		7.2			12980				
12		10	0	0			8.5	8.3				7.8	7.2				13760				

Dilution Water Code

- Recon • reconstituted water
- VS • very soft
- S • soft
- MH • moderately hard
- H • hard
- VH • very hard
- DMW • diluted mineral water
- Aged • aged water

Statistical Result

48 h LC50 8.42
95% conf. int. 6 — 10
Statistical Method Binomial
Statistician JW

We verify this data is true and correct.

Technician JW
Laboratory Manager _____
QA Officer _____

EARTHNET LABORATORIES, INC.

REFERENCE TOXICANT DATA SHEET

EML # 67755 67852 67998
Client EL DORADO CHEM
Test Organism CERIODAPHNIA DUBIA
Source ENL
ID # 650 Age <24h

Reference Toxicant NACl
Stock Solution 100 ppt
Dilution Water MH
Total Hardness as CaCO, _____
Conductivity/Salinity _____
Technician 0 hr JW 24 hr JW 48 hr _____ 72 hr _____ 96 hr _____
Temperature 0 hr 25 24 hr 25 48 hr _____ 72 hr _____ 96 hr _____

Test Begin Date 6/9/99 Time 1330
Test End Date 6/10/99 Time 1245
ID # 712
Total Alkalinity as CaCO, _____

Toxicant Concentration mg/l - g/l	Test Replicate Number	Number Surviving					Dissolved Oxygen (mg/L)					pH					Conductivity (µmhos/cm)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
1		10	6	10				8.5		8.3		7.5		7.3			1680				
2		10	10	10				8.5		8.3		7.5		7.3			3360				
3		10	2	0				8.5		8.3		7.5		7.3			4570				
4		10	0	0				8.5	8.4			7.5	7.4				6820				
5		10	0	0				8.5	8.4			7.5	7.4				8010				

Dilution Water Code
Recon • reconstituted water
VS • very soft
S • soft
MH • moderately hard
H • hard
VH • very hard
DMW • diluted mineral water
Aged • aged water

Statistical Result
48 h LC50 2.45
95% conf. int. 2 – 3
Statistical Method Binomial
Statistician JW

We verify this data is true and correct.
Technician JW
Laboratory Manager _____
QA Officer _____

APPENDIX B
CHAIN-OF-CUSTODY

(800) 256-4362

CHAIN OF CUSTODY

Rush Standard

Client		Delivered By:
Name: El Dorado Chemical	Attn: Wes Morgan	Client ✓ EarthNet ✓ Delivery Service Bus
Address: 4500 N.W. AVE		
City, State, Zip: El Dorado AR 71731		Project Name/Location
Phone Number: 870 863-1484	Fax Number: 870 863-1499	

Lab Use	Sample Collection				All Samples to be Cooled to 4°C				
Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Container	Preservative	Matrix	Special Instructions
67765	6/7/99	8:25A	Comp	001	~~Sulfide~~ TSS, NO_3-N, SO_4, Chloride, ~~Fluoride~~ COD.	1P	4°C	W	
67769	"	"	"	"	Chronic Biomonitoring	4P	4°C	W	67769
	"	"	Grab	"	Cyanide	1G	NaOH	W	
	"	"	Comp	"	NH_3-N	1G	H_2SO_4	W	
	"	"	"	"	COD	1G	H_2SO_4	W	
	"	"	"	"	Metals	1P	HNO_3	W	
	"	"	Comp	"	HEX CHROMIUM	1P	—	W	
	"	"	Comp	"	TOC	1G	HCL	W	
	"	"	Comp	"	SULFIDE	1G	NAOH	W	
	"	"	GRAB	"	PHENOL	1G	H_2SO_4	W	

All samples will be collected and preserved according to USEPA established protocols.

Additional Remarks:

Sampled by:

Relinquished by:	**Date:** 6/7/99	**Time:** 10:55	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**
Relinquished by:	**Date:**	**Time:**	**Received for Laboratory by:**	**Date:** 6-7-99	**Time:** 10:55

Ruston, LA 71270
(800) 256-4362

CHAIN OF CUSTODY

Rush Standard ✓

Client		Delivered By:			
Name:	El Dorado Chemical Company	Client ✓	EarthNet ✓	Delivery Service	Bus
Address:	4500 Northwest Avenue	Refrigerate to 4°C			
City, State, Zip:	El Dorado, AR 71731	Project Name/Location			
Phone Number:	870-863-1484	Fax Number: 870-863-1499			

Sample Collection

Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Cont	Pres	Matrix	Special Instructions
~~67998~~	6/11/99	8:25	Comp	Outfall 001	TSS, Nitrate-N, Sulfate	1 P	4°C	W	
67999	"	"	"	"	Ammonia-N	1 G	H_2SO_4	W	
	"	"	"	"	Bromide	6P	4°C	W	

All samples will be collected and preserved according to USEPA and/orEarthNet Laboratories, Inc. established protocols.

Additional Remarks:

Sampled by:		Relinquished by:	Date: 6/11/99	Time: 845	Received by:	
Relinquished by:	Date: 6-11-99	Time: 1055	Received by:		Date:	Time:
Relinquished by:	Date:	Time:	Received by:		Date:	Time:
Relinquished by:	Date:	Time:	Received by:		Date:	Time:
Relinquished by:	Date:	Time:	Received for Laboratory by:		Date: 6-11-99	Time: 1055

Ruston, LA 71270
(800) 256-4362

CHAIN OF CUSTODY Rush Standard ✓

Client	Delivered By:
Name: El Dorado Chemical Company	Client ✓ EarthNet ✓ Delivery Service Bus
Address: 4500 Northwest Avenue	Refrigerate to 4°C
City, State, Zip: El Dorado, AR 71731	Project Name/Location
Phone Number: 870-863-1484 Fax Number: 870-863-1499	

Sample Collection									
Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Cont	Pres	Matrix	Special Instructions
67852	6/9/99	825A	Comp	Outfall 001	TSS, Nitrate-N, Sulfate	1 P	4°C	W	
	"	"	"	"	Ammonia-N	1 G	H_2SO_4	W	
	"	"	"	"	Biomonitor	4P	4°C	W	

All samples will be collected and preserved according to USEPA and/orEarthNet Laboratories, Inc. established protocols.

Additional Remarks:

Sampled by: W. Hy	Relinquished by: W. Hy	Date: 6/9/99	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received for Laboratory by:	Date: 6-9-99	Time: 10:10

APPENDIX C
DATA ANALYSIS

: dorado fhminnow-growth
File: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

(P	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	0.370	0.420	0.403
	6%	4	0.400	0.470	0.432
	12%	4	0.330	0.440	0.405
4	25%	4	0.390	0.480	0.443
5	50%	4	0.340	0.430	0.398
	100%	4	0.370	0.420	0.400

eldorado fhminnow-growth
File: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

C..P	IDENTIFICATION	VARIANCE	SD	SEM
	Control	0.001	0.024	0.012
	6%	0.001	0.030	0.015
3	12%	0.003	0.051	0.025
4	25%	0.002	0.045	0.023
	50%	0.002	0.040	0.020
6	100%	0.000	0.022	0.011

e'dorado fhminnow-growth
F le: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
E tween	5	0.007	0.001	1.000
W'thin (Error)	18	0.024	0.001	
Total	23	0.032		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

el'dorado fhminnow-growth
F le: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	0.403	0.403		
2	6%	0.432	0.432	-1.342	
3	12%	0.405	0.405	-0.112	
4	25%	0.443	0.443	-1.789	
5	50%	0.398	0.398	0.224	
6	100%	0.400	0.400	0.112	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

eldorado fhminnow-growth
ile: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	4			
2	6%	4	0.054	13.4	-0.030
3	12%	4	0.054	13.4	-0.003
4	25%	4	0.054	13.4	-0.040
5	50%	4	0.054	13.4	0.005
6	100%	4	0.054	13.4	0.003

eldorado fathead survival
File: eldorado.fhs Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
	control	1.371				
2	6.25	1.412	20.00	10.00	4.00	
3	12.5	1.371	18.00	10.00	4.00	
	25	1.412	20.00	10.00	4.00	
	50	1.412	20.00	10.00	4.00	
6	100	1.254	13.50	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

eldorado fathead survival
File: eldorado.fhs Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

RP	IDENTIFICATION	N	MIN	MAX	MEAN
1	control	4	1.249	1.412	1.371
2	6.25	4	1.412	1.412	1.412
3	12.5	4	1.249	1.412	1.371
4	25	4	1.412	1.412	1.412
5	50	4	1.412	1.412	1.412
6	100	4	1.107	1.412	1.254

eldorado fathead survival
File: eldorado.fhs Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

RP	IDENTIFICATION	VARIANCE	SD	SEM
1	control	0.007	0.081	0.041
2	6.25	0.000	0.000	0.000
3	12.5	0.007	0.081	0.041
4	25	0.000	0.000	0.000
5	50	0.000	0.000	0.000
6	100	0.016	0.125	0.062

eldorado fathead survival
File: eldorado.fhs Transform: ARC SINE(SQUARE ROOT(Y))

eldorado fhminnow-growth
File: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	9	9	0

Calculated Chi-Square goodness of fit test statistic = 4.9797
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

eldorado fhminnow-growth
File: C:\EPA\TOXSTAT\ELDORADO.FHG Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 3.06
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is
used to calculate the B statistic (see above).

eldorado ceriodaphnia reproduction
File: C:\EPA\TOXSTAT\ELDOCD.REP Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	3.886	14.036	22.156	14.036	3.886
OBSERVED	4	13	22	19	0

Calculated Chi-Square goodness of fit test statistic = 5.7225
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

eldorado ceriodaphnia reproduction
File: C:\EPA\TOXSTAT\ELDOCD.REP Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 5.01
Closest, conservative, Table H statistic = 12.1 (alpha = 0.01)
Used for Table H ==> R (# groups) = 6, df (# reps-1) = 9
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 8.67
(average df used)

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal
but do not differ greatly, the Hartley test may still be used
as an approximate test (average df are used).

eldorado ceriodaphnia reproduction
File: C:\EPA\TOXSTAT\ELDOCD.REP Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	21.203	4.241	1.303
Within (Error)	52	169.211	3.254	
Total	57	190.414		

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

eldorado ceriodaphnia reproduction
File: C:\EPA\TOXSTAT\ELDOCD.REP Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	19.000	19.000		
2	6%	19.800	19.800	-0.992	
3	12%	20.556	20.556	-1.877	
4	25%	19.600	19.600	-0.744	
5	50%	20.300	20.300	-1.611	
6	100%	18.889	18.889	0.134	

Bonferroni T table value = 2.40 (1 Tailed Value, P=0.05, df=50,5)

eldorado ceriodaphnia reproduction
File: C:\EPA\TOXSTAT\ELDOCD.REP Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	10			
	6%	10	1.939	10.2	-0.800
	12%	9	1.993	10.5	-1.556
4	25%	10	1.939	10.2	-0.600
5	50%	10	1.939	10.2	-1.300
	100%	9	1.993	10.5	0.111

ONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
~	10	10	100	9.765625E-02
10	10	10	100	9.765625E-02
	10	3	30	17.1875
	10	0	0	9.765625E-02
1	10	0	0	9.765625E-02

'1 BINOMIAL TEST SHOWS THAT 6 AND 10 CAN BE
'ED AS STATISCALLY SOUND CONSERVATIVE 95 PERCENT
)NFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL
:S)CIATED WITH THESE LIMITS IS 99.80469 PERCENT.
/ APPROXIMATE LC50 FOR THIS SET OF DATA IS 8.418062

'1 I THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT
:AD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE
:C'BIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

ONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(%)
5	10	10	100	9.765625E-02
4	10	10	100	9.765625E-02
3	10	10	100	9.765625E-02
2	10	0	0	9.765625E-02
1	10	0	0	9.765625E-02

H BINOMIAL TEST SHOWS THAT 2 AND 3 CAN BE
SED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
ONFIDENCE LIMITS SINCE THE ACTUAL CONFIDENCE LEVEL
S OCIATED WITH THESE LIMITS IS 99.80469 PERCENT.
N APPROXIMATE LC50 FOR THIS SET OF DATA IS 2.449489

H N THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE PERCENT
EAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE NOR THE
R^BIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

APPENDIX E
AGENCY DATA FORMS

SUMMARY REPORTING FORMS CHRONIC BIOMONITORING (CON'T)

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

ermittee Eldorado Chem. Co. NPDES NO. _____

	Time	Date		Time	Date
omposite 1 Collected From	8:25	6/6	To	8:25	6/7
posite 2 Collected From	8:25	6/8	To	8:25	6/9
composite 3 Collected From	8:25	6/10	To	8:25	6/11

est initiated: 1300 am/pm 6/8 date

t terminated: 1230 am/pm 6/15 date

ution water used: _____ Receiving ✓ Reconstituted

DATA TABLE FOR SURVIVAL

Effluent Conc. %	Percent Survival In Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7days	
Con	100	100	100	100		100	100	100	0
6.25	100	100	100	100		100	100	100	0
12.5	100	100	100	100		100	100	100	0
25	100	100	100	100		100	100	100	0
50	100	100	100	100		100	100	100	0
100	80	100	90	90		100	100	90	10.0

* coefficient of variation = standard deviation x 100/mean

DATA TABLE FOR GROWTH

Effluent Conc. %	Average Dry Weight in milligrams in replicate chambers					Mean Dry Weight (mg)	CV%*
	A	B	C	D	E		
Con	0.37	0.40	0.42	0.42		0.403	6.0
6.25	0.40	0.44	0.42	0.47		0.432	6.9
12.5	0.44	0.43	0.42	0.33		0.405	12.6
25	0.48	0.48	0.42	0.39		0.443	10.2
50	0.43	0.40	0.42	0.34		0.398	10.0
100	0.42	0.40	0.37	0.41		0.400	5.5

* coefficient of variation = standard deviation x 100/mean

Ceriodaphnia dubia
SURVIVAL AND REPRODUCTION (con't)

1. Fisher's Exact Test:

   Is the mean survival at 7 days significantly different (p=0.05) than the control survival for the % effluent corresponding to (lethality):

a.) LOW FLOW OR CRITICAL DILUTION (100 %): _____ YES ___✓___ NO
b.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (100 %): _____ YES ___✓___ NO

2. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:

   Is the mean number of young produced per female significantly different (p=0.05) than the control's number of young per female for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION (100 %): _____ YES ___✓___ NO
b.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (100 %): _____ YES ___✓___ NO

3. If you answered NO to 1.a) and 2.a) enter [0] otherwise enter [1]: ___0___

4. If you answered NO to 1.b) and 2.b) enter [0] otherwise enter [1]: ___0___

5. Enter response to item 3 on DMR Form, parameter #TEP3B.

6. Enter response to item 4 on DMR Form, parameter #TFP3B.

7. Enter percent effluent corresponding to each NOEL below and circle lowest number:

   a.) NOEL survival = ___100___ % effluent
   b.) NOEL reproduction = ___100___ % effluent

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL(con't)
(Pimephales promelas)

1. Dunnett's Procedure or Steel's Many-One Rank Test as appropriate:

   Is the mean survival at 7 days significantly different (p=0.05) than the control survival for the % effluent corresponding to:

a.) LOW FLOW OR CRITICAL DILUTION (100%): _____ YES ✓ NO
b.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (100%): _____ YES ✓ NO

2. Dunnett's Procedure:

   Is the mean dry weight (growth) at 7 days effluent significantly different (p=0.05) than the control's dry weight (growth) for the % effluent corresponding to (significant non-lethal effects):

a.) LOW FLOW OR CRITICAL DILUTION (100%): _____ YES ✓ NO
B.) 1/2 LOW FLOW OR 2 X CRITICAL DILUTION (100%): _____ YES ✓ NO

3. If you answered NO to 1.a) and 2.a) enter [0] otherwise enter [1]: 0

4. If you answered NO to 1.b) and 2.b) enter [0] otherwise enter [1]: 0

5. Enter response to item 3 on DMR Form, parameter # TEP6C.

6. Enter response to item 4 on DMR Form, parameter #TFP6C.

7. Enter percent effluent corresponding to each NOEL below and circle lowest number:

   a.) NOEL survival = 100 % effluent
   b.) NOEL growth = 100 % effluent

SUMMARY REPORTING FORMS
CHRONIC BIOMONITORING

Ceriodaphnia dubia SURVIVAL AND REPRODUCTION

Permittee: Eldorado Chem Co **NPDES NO.** _____

		Time	Date		Time	Date
Composite 1	Collected From	8:25	6/6	To	8:25	6/7
Composite 2	Collected From	8:25	6/8	To	8:25	6/9
Composite 3	Collected From	8:25	6/10	To	8:25	6/11

Test initiated: 0830 am/pm 6/8 date
Test terminated: 1200 am/pm 6/15 date
Dilution water used: _____ Receiving _____ Reconstituted

PERCENT SURVIVAL

Percent Effluent

Time of Reading	0%	6.25%	12.5%	25%	50%	100%
24h	100	100	100	100	100	100
48h	100	100	100	100	100	100
7 day	100	100	90	100	100	90

NUMBER OF YOUNG PRODUCED PER FEMALE @ 7 DAYS

PERCENT EFFLUENT (%)

REP	0%	6.25%	12.5%	25%	50%	100%
A	18	18	21	22	20	19
B	21	20	22	22	21	19
C	19	21	19	19	20	20
D	15	22	23	18	22	18
E	17	18	21	21	20	Dead
F	21	20	Dead	18	22	17
G	22	20	21	21	23	18
H	19	19	17	19	22	19
I	19	22	20	18	15	20
J	19	18	21	18	18	20
CV%*	10.8	7.8	8.5	8.7	11.6	5.6

* coefficient of variation = standard deviation x 100/mean

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07/14/99

El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/23/99
COLLECTED BY: MS

PRESERVED?: Y
TIME RECEIVED: 15:00
BROUGHT IN BY : E

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
EL68710	004	Antimony	<50.0	ug/l	50.0	06/28/99	10:00	SL	EPA 200.7	06/22/99	19:28
		Nickel(Freshwater)	35.0	ug/l	10.0	06/28/99	10:00	SL	EPA 200.7		
		Copper	<2.0	ug/l	2.0	06/28/99	10:00	SL	EPA 200.7		
		Chromium	3.0	ug/l	3.0	06/28/99	10:00	SL	EPA 200.7		
		Beryllium	<1.0	ug/l	1.0	06/28/99	10:00	SL	EPA 200.7		
		Zinc	303.0	ug/l	4.0	06/28/99	10:00	SL	EPA 200.7		
		Magnesium	106.0	mg/l	0.015	06/28/99	10:00	SL	EPA 200.7		
		Hex Chromium Extraction	Completed	mg/l	0.003	06/23/99	16:20	SL	EPA 218.4		
		Arsenic	<10.0	ug/l	10.0	06/28/99	09:15	SL	EPA 206.2		
		Cadmium	4.5	ug/l	1.0	06/28/99	15:15	SL	EPA 213.2		
		Lead	<3.0	ug/l	3.0	06/30/99	08:00	SL	EPA 239.2		
		Selenium	<3.0	ug/l	3.0	06/25/99	14:15	SL	EPA 270.2		
		Silver	<2.0	ug/l	2.0	06/28/99	14:00	SL	EPA 272.2		
		Thallium	<2.0	ug/l	2.0	06/28/99	15:45	SL	EPA 279.2		
		Chromium(VI)	<3.0	ug/l	3.0	06/23/99	16:00	SL	EPA 218.4		
		Mercury	<0.2	ug/l	0.2	06/29/99	06:00	SL	EPA 245.1		
		BOD5	20.0	mg/l	1.0	06/24/99	08:00	GL	EPA 405.1		
		BOD Standard	194.0	mg/l	1.0	06/24/99	08:00	GL	EPA 405.1		
		COD	47.3	mg/l	3.7	06/24/99	09:40	LA	EPA 410.4		
		TOC	13.7	mg/l	1.0	06/27/99	12:00	GL	EPA 415.1		
		Total Suspended Solids	528.0	mg/l	1.0	06/24/99	10:15	LA	EPA 160.2		
		Total Dissolved Solids	4192.0	mg/l	1.0	06/29/99	10:00	GL	EPA 160.1		
		Phosphorus, Total	<0.1	mg/l	0.1	07/07/99	14:00	GC	EPA 365.3		
		Sulfide	PENDING	mg/l		/ /			EPA 376.2		
		Sulfate	122	mg/l	2	07/06/99	14:00	GC	EPA 375.4		
		Cyanide	<5.0	ug/l	5.0	06/30/99	12:00	GC	EPA 335.2		
		Nitrate + Nitrite	751.8	mg/l	0.1	07/06/99	10:00	GC	EPA352.1-354		
		TKN	868.0	mg/l	0.3	06/30/99	07:30	EJ	EPA 351.3		
		Sulfite	<2.0	mg/l	2.0	07/08/99	15:30	GC	EPA 377.1		
		Oil & Grease	<1.0	mg/l	1.0	07/02/99	09:00	RB	EPA 1664		
		Chloride	53.8	mg/l	1.0	06/28/99	13:45	GC	EPA 325.3		
		Phenol, Total	16.0	ug/l	5.0	07/09/99	07:30	EJ	EPA 420.1		
		Ammonia-N Titration	1066.6	mg/l	0.3	07/13/99	07:30	EJ	EPA 350.2		
Volatile Compounds											
		Acrolein	<MDL	ug/L	50	06/30/99	17:22	CH	EPA 624		

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El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/23/99
COLLECTED BY: MS

PRESERVED?: Y
TIME RECEIVED: 15:00
BROUGHT IN BY : E

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Volatile Compounds											
EL68710	004	Acrylonitrile	<MDL	ug/L	50	06/30/99	17:22	CH	EPA 624	06/22/99	19:28
		Benzene	<MDL	ug/L	10						
		Bromodichloromethane	<MDL	ug/L	10						
		Bromoform	<MDL	ug/L	10						
		Bromomethane	<MDL	ug/L	50						
		Carbon Tetrachloride	<MDL	ug/L	10						
		Chlorobenzene	<MDL	ug/L	50						
		Chloroethane	<MDL	ug/L	10						
		2-Chloroethylvinylether	<MDL	ug/L	50						
		Chloroform	<MDL	ug/L	10						
		Chloromethane	<MDL	ug/L	50						
		Dibromochloromethane	<MDL	ug/L	10						
		1,1-Dichloroethane	<MDL	ug/L	10						
		1,2-Dichloroethane	<MDL	ug/L	10						
		1,1-Dichloroethene	<MDL	ug/L	10						
		trans-1,2-Dichloroethene	<MDL	ug/L	10						
		1,2-Dichloropropane	<MDL	ug/L	10						
		cis-1,3-Dichloropropene	<MDL	ug/L	10						
		trans-1,3-Dichloropropene	<MDL	ug/L	10						
		Ethylbenzene	<MDL	ug/L	10						
		Methylene chloride	<MDL	ug/L	20						
		1,1,2,2-Tetrachloroethane	<MDL	ug/L	10						
		Tetrachloroethene	<MDL	ug/L	10						
		Toluene	<MDL	ug/L	10						
		Trichloroethene	<MDL	ug/L	10						
		1,1,2-Trichloroethane	<MDL	ug/L	10						
		1,1,1-trichloroethane	<MDL	ug/L	10						
		Vinyl chloride	<MDL	ug/L	10						
		Bis(chloro-methyl) ether	<MDL	ug/L	10						
		Dichlorodifluoromethane	<MDL	ug/L	10						
		Trichlorofluoromethane	<MDL	ug/L	10						
Volatile Surrogates											
		Dibromofluoromethane	94	% Rec	76-144	06/30/99	17:22	CH			
		Toluene d8	113	% Rec	88-110						

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El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/23/99
COLLECTED BY: MS

PRESERVED?: Y
TIME RECEIVED: 15:00
BROUGHT IN BY : E

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Volatile Surrogates											
EL68710	004	4-Bromofluorobenzene	115	% Rec	86-115	06/30/99	17:22	CH		06/22/99	19:28
Semi Volatile Priority Pollutant											
		Acenaphthene	<MDL	ug/l	10	07/01/99	10:47	CH	EPA 625		
		Acenaphthylene	<MDL	ug/l	10						
		Anthracene	<MDL	ug/l	10						
		Benzidine	<MDL	ug/l	50						
		Benzo-(a) Anthracene	<MDL	ug/l	10						
		Benzo (a) Pyrene	<MDL	ug/l	10						
		Benzo (b) Fluoranthene	<MDL	ug/l	10						
		Benzo (ghi) Perylene	<MDL	ug/l	20						
		Benzo (k) Fluoranthene	<MDL	ug/l	10						
		Bis (2-Chloroethoxy) Methane	<MDL	ug/l	10						
		Bis (2-Chloroethyl) Ether	<MDL	ug/l	10						
		Bis (2-Chloroisopropyl) Ether	<MDL	ug/l	10						
		Bis (2-Ethlhexyl) Phthalate	<MDL	ug/l	10						
		4-Bromophenyl-phenylether	<MDL	ug/l	10						
		Butylbenzylphthalate	<MDL	ug/l	10						
		4-Chloro-3-Methylphenol	<MDL	ug/l	10						
		4-Chlorophenyl-2-Methylphenol	<MDL	ug/l	10						
		2-Chloronaphthalene	<MDL	ug/l	10						
		2-Chlorophenol	<MDL	ug/l	10						
		3-Chlorophenol	<MDL	ug/l	10						
		4-Chlorophenol	<MDL	ug/l	10						
		Chrysene	<MDL	ug/l	10						
		Dibenz (a,h) Anthracene	<MDL	ug/l	20						
		1,2-Dichlorobenzene	<MDL	ug/l	10						
		1,3-Dichlorobenzene	<MDL	ug/l	10						
		1,4-Dichlorobenzene	<MDL	ug/l	10						
		2,3-Dichlorophenol	<MDL	ug/l	10						
		2,4-Dichlorophenol	<MDL	ug/l	10						
		2,5-Dichlorophenol	<MDL	ug/l	10						
		2,6-Dichlorophenol	<MDL	ug/l	10						
		3,3-Dichlorobenzidine	<MDL	ug/l	50						
		3,4-Dichlorophenol	<MDL	ug/l	10						

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Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/23/99
COLLECTED BY: MS

PRESERVED?: Y
TIME RECEIVED: 15:00
BROUGHT IN BY : E

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Semi Volatile Priority Pollutant											
EL68710	004	3,5-Dichlorophenol	<MDL	ug/l	10	07/01/99	10:47	CH	EPA 625	06/22/99	19:28
		Diethylphthalate	<MDL	ug/l	10						
		2,4-Dimethylphenol	<MDL	ug/l	10						
		Dimethyl Phthalate	<MDL	ug/l	10						
		Di-n-Butylphthalate	<MDL	ug/l	10						
		4,6-Dinitro-2-Methylphenol	<MDL	ug/l	50						
		2,4-Dinitrophenol	<MDL	ug/l	50						
		2,4-Dinitrotoluene	<MDL	ug/l	10						
		2,6-Dinitrotoluene	<MDL	ug/l	10						
		Di-n-Octyl Phthalate	<MDL	ug/l	10						
		1,2-Diphenylhydrazine	<MDL	ug/l	20						
		Fluoranthene	<MDL	ug/l	10						
		Fluorene	<MDL	ug/l	10						
		Hexachlorobenzene	<MDL	ug/l	10						
		Hexachlorobutadiene	<MDL	ug/l	10						
		Hexachlorocyclopentadiene	<MDL	ug/l	10						
		Hexachloroethane	<MDL	ug/l	20						
		Indeno (1,2,3-cd) Pyrene	<MDL	ug/l	20						
		Isophorone	<MDL	ug/l	10						
		Naphthalene	<MDL	ug/l	10						
		Nitrobenzene	<MDL	ug/l	10						
		2-Nitrophenol	<MDL	ug/l	20						
		4-Nitrophenol	<MDL	ug/l	50						
		N-nitrosodimethylamine	<MDL	ug/l	50						
		N-Nitrosodi-n-Propylamine	<MDL	ug/l	20						
		N-Nitrosodiphenylamine	<MDL	ug/l	20						
		Pentachlorophenol	<MDL	ug/l	50						
		Phenanthrene	<MDL	ug/l	10						
		Phenol	<MDL	ug/l	10						
		Pyrene	<MDL	ug/l	10						
		1,2,4-Trichlorobenzene	<MDL	ug/l	10						
		2,4,6-Trichlorophenol	<MDL	ug/l	10						
		4-Chlorophenyl Phenylether	<MDL	ug/l	10						
		1,2-Diphenylhydrazine	<MDL	ug/l	10						

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07/14/99

El Dorado Chemical Company
Wes Morgan
P.O. Box 231
El Dorado, AR 71730
870-863-1484 FAX#870-863-1499

SAMPLE--(G)rab/(C)omp: C
DATE RECEIVED: 06/23/99
COLLECTED BY: MS

PRESERVED?: Y
TIME RECEIVED: 15:00
BROUGHT IN BY : E

SAMPLE ID	SOURCE	PARAMETER	SAMPLE CONC.	UNITS	MDL	--BEGIN-- DATE	TIME	ANL	METHOD	COLLECTION DATE	TIME
Semi Volatile Priority Pollutant											
EL68710	004	2,3,7,8-Tetrachlorodibenzo-p-di	<MDL	ug/l	5	07/01/99	10:47	CH	EPA 625	06/22/99	19:28
Semi-volatile Surrogates											
		Nitrobenzene	79	% Rec	35-115	07/01/99	10:47	CH			
		2-Fluorobiphenyl	69	% Rec	43-116						
		Terphenyl d14	92	% Rec	33-141						
		Phenol d6	81	% Rec	10-110						
		2-Fluorophenol	78	% Rec	20-110						
		2,4,6-Tribromophenol	42	% Rec	10-123						

Certified By QA Director/QC Manager

Analyses conducted in accordance with the list of Approved Test Procedures, published in 40 CFR--Parts 60, 136, and 261. Test procedures are from the 18/19th edition of Standard Methods for the Examination of Water and Wastewater, Methods for Chemical Analysis of Water and Wastes, 1979 (EPA) ASTM (Annual Book of Standards, Part 31, Water, 1985), or Test Methods for Evaluating Solid Waste (SW-846).

The duplicate analyses and/or spiked samples indicate all methodologies are in control.
Retain records for three years.

* Indicates out of compliance limits established by client and/or regulatory agencies. See permit for regulatory reporting requirements.

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Ruston, LA 71270
(318) 255-0060
(800) 256-4362

Refrigerate to 4°C

P.O. # 595092

PAGE 18

Chain-of-Custody

Rush ☐ Standard ☐

Client	Delivered By:
Name: El Dorado Chemical Attn: Wes Morgan	Client ☑ EarthNet ☐ Delivery Service ☐ Bus ☐
Address: 4500 N.W. AVE P.O. Box 231	
City, State, Zip: El Dorado AR 71731	Project Name/Location
Phone Number: 870 863-1484 Fax Number: 870 863-1499	

Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Cont	Pres	Special Instructions
28716	6/22/99	7:24	Comp	004	Acute Biomonitor	2P	4°C	W
	"	"	"	"	TSS, NO3-N, SO4, chloride, BOD, PO4T	1P	4°C	W
	"	"	"	"	Metals*	1P	HNO3	W
	"	4:05	Grab	"	Oil & Grease	1G	H2SO4	W
	"	7:25	Comp	"	NH3-N, TOC	1G	H2SO4	W
	"	"	"	"	Chromium Hex	1P	4°C	W
	"	"	"	"	COD	1G	H2SO4	W
	"	4:25	Grab	"	Cyanide	1G	NaOH	W
	"	7:25	Comp	"		2P	4°C	W

All samples will be collected and preserved according to USEPA and/or EarthNet Laboratories, Inc. established protocols.

Additional Remarks: * Antimony T, Arsenic T, Beryllium T, Cadmium T, Chromium T, Copper T, Lead T, Mercury T, Nickel T, Selenium T, Silver T, Thallium T Zinc Phenols

Sampled by:	Relinquished by:	Date: 6/22/99	Time:	Received by:	
Relinquished by:	Date: 6-23-99	Time: 1500	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received for Laboratory by:	Date: 6/23/99	Time: 1500

EARTHNET LAB 318-251-5614 07/14/1999 16:18

414 West California Ave
Ruston, LA 71270

EarthNet Laboratories, Inc

318-255-0060
318-251-5614 FAX
800-256-4362

July 14, 1999

Mr. Wes Morgan
El Dorado Chemical Co.
4500 North West Ave.
P.O. Box 231
El Dorado, AR 71731

Dear Mr. Morgan,

Enclosed are the results of two 24-hr screening toxicity tests which were conducted for El Dorado Chemical Co. on June 23-24, 1999, using stormwater effluent collected from Outfall 004. The test species used in the 24-hour acute toxicity tests were the fathead minnow (Pimephales promelas) and the cladoceran, Daphnia pulex.

The effluent sample collected from Outfall 004 was found to show acute 24-hour toxicity to both test species, with 100% mortality occurring within 24 hours. The observed mortality was probably due to the high conductivity of the effluent sample (over 11,000 mhos/cm). Conductivity this high could result in the death of the organisms even in the absence of any toxic compounds.

If you have any questions concerning these biomonitoring tests, please do not hesitate to call us at 1-800-256-4362. Thank you for choosing EarthNet Laboratories for your biomonitoring needs.

Sincerely,

John Wakeman

John M. Wakeman, Ph.D.
Biomonitoring Supervisor

THE RESULTS OF TWO 24-HOUR ACUTE SCREENING TOXICITY TESTS

Conducted for

EL DORADO CHEMICAL CO.

(Stormwater from Outfall 004)

July 14, 1999

PREPARED BY:

John M. Wakeman, Ph.D.
Supervisor of Biomonitoring
EarthNet Laboratories, Inc.
414 W. California
Ruston, Louisiana 71270

TABLE OF CONTENTS

1.0 Introduction

EarthNet Laboratories, Ruston, Louisiana, conducted two 24-hour acute screening toxicity tests for El Dorado Chemical Co in June 1999 using effluent samples collected from Outfall. The species tested were the fathead minnow, Pimephales promelas, and the cladoceran, Daphnia pulex.

2.0 Methods and Materials

2.1 Test Methods

All test procedures and methods followed were according to "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA 600/4-90/027F).

2.2 Test Organisms

The fathead minnows were obtained from Aquatox Inc. and were one day old at test initiation. The minnows were fed with live brine shrimp prior to test initiation, but not during testing.

The cladocerans were obtained from ENL cultures and were less than 24 hours old at test initiation. The cladocerans were fed 0.2 ml/100 ml of standard YCT/algae diet prior to test initiation.

2.3 Control Water

Control water used in the 24-hour acute toxicity screening tests was moderately hard laboratory water.

2.4 Test Concentrations

For each test species, the test concentrations were 100 percent of the stormwater effluent, and a laboratory water control. In each concentration, the test species were tested in four replicates of 10 organisms each for a total of 40 organisms per concentration.

2.5 Sample Collection

An effluent grab sample was collected from Outfall 004 on June 22, 1999 by El Dorado Chemical Co. personnel. The sample was immediately iced to 4° C, and delivered to ENL's Ruston Laboratory (see Appendix B - Chain of Custody).

2.6 Sample Preparation

Upon receipt, the sample was logged in, labelled with appropriate identification number, and warmed to 20° C. Initial dissolved oxygen, pH, and conductivity measurements were recorded.

2.7 Monitoring of Toxicity Tests

Monitoring of the 24-hour acute definitive toxicity tests consisted of pre and post dissolved oxygen measurements, pH, and conductivity measurements. Survival was also recorded at the end of the 24-hour exposure period. A temperature of 20±1°C was kept constant with a Remcor liquid circulator and monitored diurnally.

2.8 Data Analysis

A T-test was used to compare survival in the prepared effluent with survival in the controls.

3.0 Results and Discussion

The Outfall 004 data is summarized in Table 1. Both species (fathead minnows and cladocerans) experienced 100% mortality in the 100% effluent sample, while no deaths occurred in the controls. Thus the stormwater effluent sample collected from Outfall 004 was found to show acute 24-hour toxicity to both test species. The raw data sheets can be found in Appendix A.

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Table 1. Summary of 24-hour Acute Screening Toxicity Test Data for stormwater effluent collected from Outfall 004.

Percent Effluent	Percent Survival	
	Pimephales promelas	Daphnia pulex
Control	100	0 *
100 percent	100	0 *

* survival significantly different from control (p = 0.05)

****

4.0 Conclusions

The effluent sample collected from Outfall 004 was found to be acutely toxic to both test species within the 24-hour test period.

5.0 References

U.S. EPA. 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. 4th Edition, Cincinnati, Ohio EPA/600/4-90/027F. August 1993.

APPENDIX A
RAW DATA SHEETS

EARTHNET LABORATORIES, INC.

ACUTE TEST SURVIVAL AND WATER QUALITY DATA

EML # 68716
Client Eldorado Chem
Sample Description eod
Sample ID# 68716
Test Species D. pulex

Beginning: Date 6/23/99 Time 1645
Ending: Date 6/24/99 Time 1630
Technician: 0 hr CS 24 hr CS 48 hr ___ 72 hr ___ 96 hr ___
Time: 0 hr 1630 24 hr 1630 48 hr ___ 72 hr ___ 96 hr ___
Temperature: 0 hr 20 24 hr 20 48 hr ___ 72 hr ___ 96 hr ___

Percent Effluent	Test Replicate	Test Salinity (mg/mL)	Number of Live Organisms					Dissolved Oxygen (mg/L)					pH					Conductivity (µmhos/cm)				
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Con	A		10	10				8.6	8.5				7.2	7.3				298	298			
	B		10	10				8.6	8.5				7.2	7.3				298	298			
	C		10	10				8.6	8.5				7.2	7.3				298	298			
	D		10	10				8.6	8.5				7.2	7.3				298	298			
100	A		0	0				8.6	8.2				6.3	6.2				1149	1131			
	B		10	0				8.6	8.2				6.3	6.2				1149	1131			
	C		10	0				8.6	8.2				6.3	6.2				1149	1131			
	D		10	0				8.6	8.2				6.3	6.2				1149	1131			

EARTHNET LABORATORIES, INC.

ACUTE TEST SURVIVAL AND WATER QUALITY DATA

EHL # 68716
Client EL DORADO CHEM
Sample Description 004
Sample ID# 68716
Test Species P. PROMOLAS

Beginning: Date 6/23/99 Time 1645
Ending: Date 6/24/99 Time 1645
Technician: 0 hr CS 24 hr CS 48 hr ___ 72 hr ___ 96 hr ___
Time: 0 hr 1645 24 hr 1645 48 hr ___ 72 hr ___ 96 hr ___
Temperature: 0 hr 20 24 hr 20 48 hr ___ 72 hr ___ 96 hr ___

Percent Effluent	Test Replicate	Test Salinity (mg/ml)	Number of Live Organisms					Dissolved Oxygen (mg/L)					pH					Conductivity (µmhos/cm)				
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
CONT	A		10	10				8.6	8.1				7.4	7.2				295	299			
	B		10	10				8.6	8.1				7.4	7.2				298	299			
	C		10	10				8.6	8.1				7.4	7.2				298	299			
	D		10	10				8.6	8.1				7.4	7.2				298	299			
100	A		10	0				8.6	7.8				6.3	6.1				1498	1492			
	B		10	0				8.6	7.8				6.3	6.1				1498	1492			
	C		10	0				8.6	7.8				6.3	6.1				1498	1492			
	D		10	0				8.6	7.8				6.3	6.1				1498	1492			

EARTHNET LABORATORIES, INC.

ACUTE TEST SURVIVAL AND WATER QUALITY DATA

ENL # 68716, 68715, 68714, 68713 Test Initiation: Date 6/23 Time 1200 Test Termination: Date 6/27 Time 1200

Client Eldorado Chem Technician CS

Project # 68716, 68715, 68714 68713 Test Species/I.D. # P. promelas 1655 1

Sample Description 004, 005 006 006 D. pulex 1656 1

Sample Information									Test Species Information	ID# 655	ID# 656	ID#	ID#
Sample ID Number	Collected Date	Collected Time	Total Residual Chlorine (mg/L)	De-chlorinated (Yes or No)	Sodium Thiosulfate (mg/L)	Salinity (ppt)	Hardness mg/L as $CaCO_3$	Alkalinity mg/L as $CaCO_3$	Age or Size	1 week	<24hr		
004 → 68716	6/22	7/28	None	—			760	5	Loading Rate (gm/L)	10g/L	10g/L		
68715	6/22	7/35	None	—			840	20	Test Container Size	250	250		
68714	6/22	4/23	None	—			320	4	Test Volume (L)	0.2	0.2		
68713	6/22	4/50	None	—			640	11	Feeding: Type	Brine shrimp	YCT		
									Amount	1drop	7ml/L		
									Aeration: Began	Prior	Prior		
									Amount	feed			
									Dilution Water ID#				
									Acclimation Period	2hr	2hr		
									Condition of Survivors				
					ID #	pH	Hardness mg/L as $CaCO_3$	Alkalinity mg/L as $CaCO_3$	Comments				
					748	7.4	98	96					

APPENDIX B

CHAIN OF CUSTODY

414 West California Avenue
Ruston, LA 71270
(318) 255-0060
(800) 256-4362

Refrigerate to 4°C

P.O. # 59509 2

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Chain-of-Custody

Rush ☐ Standard ☐

Client	Delivered By:
Name: ElDorado Chemical Attn: Wes Mingo	Client ☑ EarthNet ☐ Delivery Service ☐ Bus ☐
Address: 4500 N.W. AVE P.O. Box 231	
City, State, Zip: ElDorado AR 71731	Project Name/Location
Phone Number: 870 863-1484 Fax Number: 870 863-1499	

EARTHNET LAB

Sample Collection								
Sample No.	Date	Time	Comp/Grab	Source	Analysis Required	Cont	Pres	Special Instructions
28716	6/22	7:24	Comp	004	Acute Biomonitoring	2-P	4°C	W
	"	"	"	"	TSS, NO_3-N, SO_4, chloride, BOD, PO_4T	1 P	4°C	W
	"	"	"	"	Metals	1P	HNO_3	W
	"	9:00	Grab	"	Oil & Grease	1G	H_2SO_4	W
	"	7:25	Comp	"	NH_3-N, TOC	1G	H_2SO_4	W
	"	"	"	"	Chromium Hex	1P	4°C	W
	"	"	"	"	COD	1G	H_2SO_4	W
	"	9:25	Grab	"	Cyanide	1G	NaOH	W
	"	7:25	Comp	"		2P	4°C	W

All samples will be collected and preserved according to USEPA and/or EarthNet Laboratories, Inc. established protocols.

Additional Remarks: * Antimony T, Arsenic T, Beryllium T, Cadmium T, Chromium T, Copper T, Lead T, Mercury T, Nickel T, Selenium T, Silver T, Thallium T Zinc Phenols

Sampled by:		Relinquished by:		Date 6/23/99	Time:	Received by	
Relinquished by:		Date: 6-23-99	Time: 1500	Received by:		Date:	Time
Relinquished by:		Date:	Time:	Received for Laboratory by:		Date: 6/23/99	Time 1500

318-251-5614

07/14/1999 16:18