The City of Fort Smith ARKANSAS

July 24, 2012

Ms. Nancy Williams
EPA, Region 6
Compliance Assurance and Enforcement Division
1445 Ross Avenue
Dallas, TX 75202-2733

Re: AR0021750

Dear Ms. Williams:

The following violations were noted for the above referenced permit for June 2012.

Ammonia Nitrogen, 30 day average – 6.9 mg/l (Permit Limit – 5 mg/l)
Ammonia Nitrogen, 7 day average – 3 (May 2012)

No harmful effects were reported by the public or noted by utility personnel in the receiving stream.

As noted in previous correspondence, the Massard facility has experienced difficulty cultivating the necessary organisms responsible for nitrogen removal. However, during the period June 20-30, 2012 the treatment system stabilized and the ammonia nitrogen levels averaged 4.4 mg/l. The system continues to achieve ammonia nitrogen reductions to levels below permit limits.

For additional information, please contact Mr. Steve Floyd at 479-784-2331.

Sincerely,

Steve Parke
Director of Utilities

Pc: ADEQ, NPDES Section, Water Division
Steve Floyd, Superintendent-Water/Wastewater Operations

Utility Department • 3900 Kelley Hwy.
Fort Smith, Arkansas 72904
(479) 784-2231 • FAX (479) 784-2358

AR0021750
2ND QUARTER

AMERICAN INTERPLEX CORPORATION
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City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

SAMPLE INFORMATION

Project Description:
Two (2) water and one (1) sludge sample(s) received on April 26, 2012
Massard Table III Priority Pollutants

Receipt Details:
A Chain of Custody was provided. The samples were delivered in one (1) ice chest.
Ice chest #1 was delivered with shipping documentation.

Each sample container was checked for proper labeling, including date and time sampled. Sample containers were reviewed for proper type, adequate volume, integrity, temperature, preservation, and holding times. Any exceptions are noted below:

Sample Identification:

Laboratory ID	Client Sample ID	Sampled Date/Time	Notes
157274-1	Massard Influent 4/25/12 0800	25-Apr-2012 0800	
157274-2	Massard Effluent 4/25/12 1300	25-Apr-2012 1300	
157274-3	Massard Raw Biosolid 4/25/12 0815	25-Apr-2012 0815	

Qualifiers:
D Result is from a secondary dilution factor
Q Analyte is not within quality control limits

Case Narrative:
Matrix spike for batch S32318 was not performed on any sample associated with AIC Control No. 157274. Matrix spike for batch S32347 was not performed on any sample associated with AIC Control No. 157274.

Analysis of soils/sludges are reported on a dry-weight basis unless otherwise specified.

References:
"Methods for Chemical Analysis of Water and Wastes", EPA/600/4-79-020 (Mar 1983) with updates and supplements EPA/600/5-91-010 (Jun 1991), EPA/600/R-92-129 (Aug 1992) and EPA/600/R-93-100 (Aug 1993).
"Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)", Third Edition.
"Standard Methods for the Examination of Water and Wastewaters", 20th edition, 1998.
"American Society for Testing and Materials" (ASTM).
"Association of Analytical Chemists" (AOAC).

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ANALYTICAL RESULTS

AIC No. 157274-1
Sample Identification: Massard Influent 4/25/12 0800

Analyte		Result	RL	Units	Qualifier
Total Recoverable Phenolics		**0.12**	0.005	mg/l	
EPA 420.1	Prep: 30-Apr-2012 1002 by 306	Analyzed: 30-Apr-2012 1615 by 306		Batch: W39681	
Total Cyanide		**< 0.01**	0.01	mg/l	
SM4500-CN C,E	Prep: 08-May-2012 1439 by 302	Analyzed: 08-May-2012 2137 by 302		Batch: W39772	
Mercury, low level		**160**	18	ng/l	D
EPA 245.7	Prep: 15-May-2012 0801 by 271	Analyzed: 15-May-2012 2241 by 270		Batch: S32402	Dil: 10
Total Recoverable Antimony		**< 60**	60	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Arsenic		**0.91**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Beryllium		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Cadmium		**0.52**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Chromium		**< 10**	10	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Copper		**14**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Lead		**5.5**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Molybdenum		**12**	8	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Nickel		**8.8**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Selenium		**6.7**	5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Silver		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Thallium		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	
Total Recoverable Zinc		**160**	20	ug/l	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0001 by 270		Batch: S32331	

AIC No. 157274-2
Sample Identification: Massard Effluent 4/25/12 1300

Analyte		Result	RL	Units	Qualifier
Total Recoverable Phenolics		**0.015**	0.005	mg/l	
EPA 420.1	Prep: 30-Apr-2012 1002 by 306	Analyzed: 30-Apr-2012 1615 by 306		Batch: W39681	
Total Cyanide		**< 0.01**	0.01	mg/l	
SM4500-CN C,E	Prep: 08-May-2012 1439 by 302	Analyzed: 08-May-2012 2139 by 302		Batch: W39772	

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ANALYTICAL RESULTS

AIC No. 157274-2 (Continued)
Sample Identification: Massard Effluent 4/25/12 1300

Analyte		Result	RL	Units	Qualifier
Mercury, low level		**8.2**	1.8	**ng/l**	
EPA 245.7	Prep: 15-May-2012 0801 by 271	Analyzed: 15-May-2012 1820 by 270		Batch: S32402	
Total Recoverable Antimony		**< 60**	60	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Arsenic		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Beryllium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Cadmium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Chromium		**< 10**	10	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Copper		**3.2**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Lead		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Molybdenum		**9.6**	8	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Nickel		**6.0**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Selenium		**< 5**	5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Silver		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Thallium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	
Total Recoverable Zinc		**32**	20	**ug/l**	
EPA 200.8	Prep: 30-Apr-2012 1102 by 271	Analyzed: 09-May-2012 0007 by 270		Batch: S32331	

AIC No. 157274-3
Sample Identification: Massard Raw Biosolid 4/25/12 0815

Analyte		Result	RL	Units	Qualifier
Total Cyanide		**< 7**	7	**mg/Kg**	
EPA 9010C, 9014	Prep: 02-May-2012 1455 by 306	Analyzed: 04-May-2012 1605 by 306		Batch: W39703	
Total Recoverable Phenolics		**450**	40	**mg/Kg**	
EPA 9065	Prep: 26-Apr-2012 1359 by 306	Analyzed: 27-Apr-2012 0950 by 306		Batch: W39662	
Total Solids		**1.6**	0.01	**%**	
SM 2540G	Prep: 07-May-2012 0905 by 285	Analyzed: 07-May-2012 1528 by 285		Batch: W39740	
Antimony		**< 3**	3	**mg/Kg**	
EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	Analyzed: 02-May-2012 0912 by 297		Batch: S32318	

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ANALYTICAL RESULTS

AIC No. 157274-3 (Continued)
Sample Identification: Massard Raw Biosolid 4/25/12 0815

Analyte		Result	RL	Units	Qualifier
Arsenic EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**< 5** Analyzed: 02-May-2012 0912 by 297	5	**mg/Kg** Batch: S32318	
Beryllium EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**< 0.03** Analyzed: 02-May-2012 0912 by 297	0.03	**mg/Kg** Batch: S32318	
Cadmium EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**3.7** Analyzed: 02-May-2012 0912 by 297	0.4	**mg/Kg** Batch: S32318	
Chromium EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**30** Analyzed: 02-May-2012 0912 by 297	0.7	**mg/Kg** Batch: S32318	
Copper EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**340** Analyzed: 02-May-2012 0912 by 297	0.6	**mg/Kg** Batch: S32318	
Lead EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**49** Analyzed: 02-May-2012 0912 by 297	4	**mg/Kg** Batch: S32318	
Nickel EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**190** Analyzed: 02-May-2012 0912 by 297	1	**mg/Kg** Batch: S32318	
Selenium EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**< 7** Analyzed: 02-May-2012 0912 by 297	7	**mg/Kg** Batch: S32318	
Silver EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**5.8** Analyzed: 02-May-2012 0912 by 297	0.7	**mg/Kg** Batch: S32318	
Thallium EPA 3051A, 6010C	Prep: 27-Apr-2012 0946 by 100	**< 4** Analyzed: 02-May-2012 0912 by 297	4	**mg/Kg** Batch: S32318	
Zinc EPA 3051A, 6010C	Prep: 02-May-2012 1448 by 100	**540** Analyzed: 03-May-2012 0735 by 270	0.2	**mg/Kg** Batch: S32347	
Mercury EPA 7471B	Prep: 27-Apr-2012 1503 by 100	**0.84** Analyzed: 01-May-2012 1941 by 271	0.1	**mg/Kg** Batch: S32326	

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DUPLICATE RESULTS

Analyte		AIC No.	Result	RPD	RPD Limit	Preparation Date	Analysis Date	Dil	Qual
Total Solids		157257-1	13 %			07May12 0905 by 285	07May12 1528 by 285		
	Batch: W39740	Duplicate	13 %	2.76	10.0	07May12 0905 by 285	07May12 1528 by 285		

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LABORATORY CONTROL SAMPLE RESULTS

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	0.1 mg/l	100	85.0-115			W39681	30Apr12 1003 by 306	30Apr12 1615 by 306		
Total Cyanide	0.1 mg/l	95.3	85.0-115			W39772	08May12 1439 by 302	08May12 2128 by 302		
Mercury, low level	10 ng/l	98.1	71.2-129			S32402	15May12 0801 by 271	15May12 2216 by 270		
Total Recoverable Antimony	0.05 mg/l	97.8	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Arsenic	0.05 mg/l	94.2	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Beryllium	0.05 mg/l	97.1	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Cadmium	0.05 mg/l	101	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Chromium	0.05 mg/l	96.1	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Copper	0.05 mg/l	101	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Lead	0.05 mg/l	97.7	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Molybdenum	0.05 mg/l	102	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Nickel	0.05 mg/l	102	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Selenium	0.05 mg/l	93.6	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Silver	0.02 mg/l	105	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Thallium	0.05 mg/l	97.3	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Recoverable Zinc	0.05 mg/l	102	85.0-115			S32331	30Apr12 1103 by 271	08May12 2320 by 270		
Total Cyanide	0.1 mg/Kg	95.3	85.0-115			W39703	02May12 1456 by 306	04May12 1555 by 306		
Total Recoverable Phenolics	0.1 mg/Kg	94.1	85.0-115			W39662	26Apr12 1400 by 306	27Apr12 0950 by 306		
Antimony	5 mg/Kg	100	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Antimony	5 mg/Kg	103	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Arsenic	5 mg/Kg	106	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Arsenic	5 mg/Kg	98.6	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Beryllium	0.5 mg/Kg	100	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Beryllium	0.5 mg/Kg	99.3	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Cadmium	5 mg/Kg	102	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Cadmium	5 mg/Kg	98.1	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Chromium	0.5 mg/Kg	104	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Chromium	0.5 mg/Kg	96.6	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Copper	0.5 mg/Kg	99.3	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Copper	0.5 mg/Kg	96.8	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Lead	5 mg/Kg	95.4	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Lead	5 mg/Kg	94.2	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Nickel	0.5 mg/Kg	99.1	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Nickel	0.5 mg/Kg	96.2	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Selenium	5 mg/Kg	107	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Selenium	5 mg/Kg	98.9	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Silver	0.1 mg/Kg	95.2	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Silver	0.1 mg/Kg	94.7	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Thallium	5 mg/Kg	106	85.0-115			S32318	27Apr12 0947 by 100	02May12 0824 by 297		
Thallium	5 mg/Kg	103	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		
Zinc	0.5 mg/Kg	94.9	85.0-115			S32347	02May12 1115 by 100	03May12 1413 by 297		

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LABORATORY CONTROL SAMPLE RESULTS

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
Mercury	0.0025 mg/Kg	98.4	85.0-115			S32326	27Apr12 1504 by 100	01May12 1921 by 271		

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MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	157274-2	0.1 mg/l	91.7	80.0-120	W39681	30Apr12 1003 by 306	30Apr12 1615 by 306		
	157274-2	0.1 mg/l	102	80.0-120	W39681	30Apr12 1003 by 306	30Apr12 1615 by 306		
	Relative Percent Difference:		8.98	10.0	W39681				
Total Cyanide	157379-3	0.1 mg/l	79.8	75.0-125	W39772	08May12 1439 by 302	08May12 2131 by 302		
	157379-3	0.1 mg/l	77.7	75.0-125	W39772	08May12 1439 by 302	08May12 2133 by 302		
	Relative Percent Difference:		2.55	20.0	W39772				
Mercury, low level	157584-1	10 ng/l	107	50.8-143	S32402	15May12 0801 by 271	15May12 2221 by 270		
	157584-1	10 ng/l	109	50.8-143	S32402	15May12 0801 by 271	15May12 2226 by 270		
	Relative Percent Difference:		1.69	20.0	S32402				
Total Recoverable Antimony	157276-1	0.05 mg/l	97.9	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	95.2	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		2.77	20.0	S32331				
Total Recoverable Arsenic	157276-1	0.05 mg/l	93.7	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	92.5	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		1.24	20.0	S32331				
Total Recoverable Beryllium	157276-1	0.05 mg/l	95.8	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	95.0	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		0.854	20.0	S32331				
Total Recoverable Cadmium	157276-1	0.05 mg/l	99.8	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	97.9	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		1.94	20.0	S32331				
Total Recoverable Chromium	157276-1	0.05 mg/l	95.1	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	92.2	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		3.16	20.0	S32331				
Total Recoverable Copper	157276-1	0.05 mg/l	98.6	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	98.4	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		0.212	20.0	S32331				
Total Recoverable Lead	157276-1	0.05 mg/l	98.3	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	95.9	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		2.54	20.0	S32331				
Total Recoverable Molybdenum	157276-1	0.05 mg/l	101	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	98.7	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		2.51	20.0	S32331				
Total Recoverable Nickel	157276-1	0.05 mg/l	99.5	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	98.1	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		1.36	20.0	S32331				
Total Recoverable Selenium	157276-1	0.05 mg/l	92.0	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	89.4	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		2.82	20.0	S32331				
Total Recoverable Silver	157276-1	0.02 mg/l	91.0	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.02 mg/l	90.8	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		0.241	20.0	S32331				
Total Recoverable Thallium	157276-1	0.05 mg/l	94.3	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	92.2	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		2.25	20.0	S32331				
Total Recoverable Zinc	157276-1	0.05 mg/l	95.1	75.0-125	S32331	30Apr12 1103 by 271	08May12 2325 by 270		
	157276-1	0.05 mg/l	94.0	75.0-125	S32331	30Apr12 1103 by 271	08May12 2331 by 270		
	Relative Percent Difference:		1.17	20.0	S32331				
Total Cyanide	157200-2	0.1 mg/Kg	84.6	75.0-125	W39703	02May12 1456 by 306	04May12 1559 by 306		
	157200-2	0.1 mg/Kg	82.3	75.0-125	W39703	02May12 1456 by 306	04May12 1601 by 306		
	Relative Percent Difference:		2.76	20.0	W39703				

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	157200-2	0.1 mg/Kg	88.0	80.0-120	W39662	26Apr12 1400 by 306	27Apr12 0950 by 306		
	157200-2	0.1 mg/Kg	95.7	80.0-120	W39662	26Apr12 1400 by 306	27Apr12 0950 by 306		
	Relative Percent Difference:		7.46	10.0	W39662				
Antimony	157302-1	500 mg/Kg	83.2	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	84.7	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		1.82	20.0	S32318				
Antimony	157366-1	499 mg/Kg	91.8	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	92.4	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.668	20.0	S32347				
Arsenic	157302-1	500 mg/Kg	89.6	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	90.7	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		1.19	20.0	S32318				
Arsenic	157366-1	499 mg/Kg	89.4	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	89.6	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.260	20.0	S32347				
Beryllium	157302-1	50.0 mg/Kg	89.6	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	50.0 mg/Kg	91.0	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		1.52	20.0	S32318				
Beryllium	157366-1	49.9 mg/Kg	91.1	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	50.0 mg/Kg	91.7	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.548	20.0	S32347				
Cadmium	157302-1	500 mg/Kg	84.2	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	87.5	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		3.74	20.0	S32318				
Cadmium	157366-1	499 mg/Kg	89.3	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	91.0	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		1.77	20.0	S32347				
Chromium	157302-1	50.0 mg/Kg	86.2	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	50.0 mg/Kg	88.4	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		1.32	20.0	S32318				
Chromium	157366-1	49.9 mg/Kg	85.2	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	50.0 mg/Kg	86.3	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.710	20.0	S32347				
Copper	157302-1	50.0 mg/Kg	85.3	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	50.0 mg/Kg	89.0	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		3.00	20.0	S32318				
Copper	157366-1	49.9 mg/Kg	90.7	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	50.0 mg/Kg	93.4	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		2.06	20.0	S32347				
Lead	157302-1	500 mg/Kg	80.2	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	82.7	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		2.90	20.0	S32318				
Lead	157366-1	499 mg/Kg	91.9	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	92.2	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.381	20.0	S32347				
Nickel	157302-1	50.0 mg/Kg	83.6	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	50.0 mg/Kg	84.9	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		0.992	20.0	S32318				
Nickel	157366-1	49.9 mg/Kg	89.6	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	50.0 mg/Kg	90.7	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.633	20.0	S32347				

City of Fort Smith
3900 Kelley Highway
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MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Selenium	157302-1	500 mg/Kg	79.5	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	79.2	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		0.483	20.0	S32318				
Selenium	157366-1	499 mg/Kg	80.6	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	81.4	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		1.00	20.0	S32347				
Silver	157302-1	9.99 mg/Kg	60.4	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		Q
	157302-1	10.0 mg/Kg	60.5	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		Q
	Relative Percent Difference:		0.131	20.0	S32318				
Silver	157366-1	9.97 mg/Kg	48.2	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		Q
	157366-1	10.0 mg/Kg	52.1	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		Q
	Relative Percent Difference:		7.49	20.0	S32347				
Thallium	157302-1	500 mg/Kg	88.6	75.0-125	S32318	27Apr12 0947 by 100	02May12 0827 by 297		
	157302-1	500 mg/Kg	90.0	75.0-125	S32318	27Apr12 0947 by 100	02May12 0831 by 297		
	Relative Percent Difference:		1.55	20.0	S32318				
Thallium	157366-1	499 mg/Kg	93.8	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	500 mg/Kg	94.6	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.770	20.0	S32347				
Zinc	157366-1	49.9 mg/Kg	88.3	75.0-125	S32347	02May12 1115 by 100	03May12 1416 by 297		
	157366-1	50.0 mg/Kg	90.0	75.0-125	S32347	02May12 1115 by 100	03May12 1420 by 297		
	Relative Percent Difference:		0.759	20.0	S32347				
Mercury	157210-3	1.25 mg/Kg	101	70.0-130	S32326	27Apr12 1504 by 100	01May12 1926 by 271		
	157210-3	1.25 mg/Kg	102	70.0-130	S32326	27Apr12 1504 by 100	01May12 1931 by 271		
	Relative Percent Difference:		0.857	20.0	S32326				

AMERICAN INTERPLEX CORPORATION
LABORATORIES

1972 40 2012

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

LABORATORY BLANK RESULTS

Analyte	Result	RL	PQL	QC Sample	Preparation Date	Analysis Date	Qual
Total Recoverable Phenolics	< 0.005 mg/l	0.005	0.005	W39681-1	30Apr12 1003 by 306	30Apr12 1615 by 306	
Total Cyanide	< 0.01 mg/l	0.01	0.01	W39772-1	08May12 1439 by 302	08May12 2126 by 302	
Mercury, low level	< 1.8 ng/l	1.8	5.0	S32402-1	15May12 0801 by 271	15May12 1759 by 270	
Total Recoverable Antimony	< 30 ug/l	30	30	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Arsenic	< 0.5 ug/l	0.5	0.5	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Beryllium	< 0.3 ug/l	0.3	0.3	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Cadmium	< 0.1 ug/l	0.1	0.1	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Chromium	< 7 ug/l	7	7	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Copper	< 0.5 ug/l	0.5	0.5	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Lead	< 0.5 ug/l	0.5	0.5	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Molybdenum	< 8 ug/l	8	8	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Nickel	< 0.5 ug/l	0.5	0.5	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Selenium	< 2 ug/l	2	2	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Silver	< 0.2 ug/l	0.2	0.2	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Thallium	< 0.5 ug/l	0.5	0.5	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Recoverable Zinc	< 2 ug/l	2	2	S32331-1	30Apr12 1103 by 271	08May12 2314 by 270	
Total Cyanide	< 0.01 mg/Kg	0.01	0.01	W39703-1	02May12 1456 by 306	04May12 1554 by 306	
Total Recoverable Phenolics	< 0.005 mg/Kg	0.005	0.005	W39662-1	26Apr12 1400 by 306	27Apr12 0950 by 306	
Total Solids	< 0.01 %	0.01	0.01	W39740-1	07May12 0905 by 285	07May12 1528 by 285	
Antimony	< 3 mg/Kg	3	3	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Arsenic	< 5 mg/Kg	5	5	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Beryllium	< 0.03 mg/Kg	0.03	0.03	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Cadmium	< 0.4 mg/Kg	0.4	0.4	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Chromium	< 0.7 mg/Kg	0.7	0.7	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Copper	< 0.6 mg/Kg	0.6	0.6	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Lead	< 4 mg/Kg	4	4	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Nickel	< 1 mg/Kg	1	1	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Selenium	< 7 mg/Kg	7	7	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Silver	< 0.7 mg/Kg	0.7	0.7	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Thallium	< 4 mg/Kg	4	4	S32318-1	27Apr12 0947 by 100	02May12 0822 by 297	
Zinc	< 0.2 mg/Kg	0.2	0.2	S32347-1	02May12 1115 by 100	03May12 1410 by 297	
Mercury	< 0.1 mg/Kg	0.1	0.1	S32326-1	27Apr12 1504 by 100	01May12 1916 by 271	

AMERICAN INTERPLEX CORPORATION LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: CITY OF FORT SMITH
Project Reference: MASSARD TABLE III PRIORITY POLLUTANTS
Project Manager: RANDY EASLEY
Sampled By: JOHN HANCOCK / Kristy Cantu

PO No.

SAMPLE MATRIX: WATER, SOIL

NO OF BOTTLES

ANALYSES REQUESTED[1]: T. CYANIDE; PHENOLICS; PP METALS; TABLE III 13 PP Metals, CNT, Phenolics, T. Sulfide; MD; MD

AIC CONTROL NO: 157274
AIC PROPOSAL NO:
Carrier/Tracking No. Fed-Ex
Received Temperature C: 2.2

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	T. CYANIDE	PHENOLICS	PP METALS	TABLE III 13 PP Metals, CNT, Phenolics, T. Sulfide	MD	MD
1	MASSARD INFLUENT	4/25/12 0800	X		X		1	X					
1	MASSARD INFLUENT	4/25/12 0800	X		X		1		X				
1	MASSARD INFLUENT	4/25/12 0800	X		X		1			X		X	
2	MASSARD EFFLUENT	4/25/12 1300	X		X		1	X					
2	MASSARD EFFLUENT	4/25/12 1300	X		X		1		X				
2	MASSARD EFFLUENT	4/25/12 1300	X		X		1			X		X	
3	MASSARD RAW BIOSOLID	4/25/12 0815	X		X		1				X		X
		Container Type						P	G	P	G	P	G
		Preservative						0	6	N	NO	N	NO

Field pH calibration on _____ @ _____ Buffer:

G = Glass, P = Plastic, V = VOA vials, H = HCl to pH2, T = Sodium Thiosulfate
NO = none, S = Sulfuric acid pH2, N = Nitric acid pH2, B = NaOH to pH12, Z = Zinc acetate

Turnaround Time Requested: (Please circle)
(NORMAL) or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: RANDY EASLEY
Phone: 479-784-2337 Fax: _____
Report Attention to:
Report Address to: RANDY EASLEY

Relinquished By:	Date/Time	Received By:	Date/Time
Kristy Cantu	4/25/12 1345		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
			4-26-12 8:45 am

Comments: [1] Required Reporting Limit for Metals must be identified on back of COC.
FedEx Tracking # 8770-9989-2240

19-Oct-09

FORM 0060

AMERICAN INTERPLEX CORPORATION
LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: City of Fort Smith
Project Reference: Mascard Table III Priority Pollutants (Ag)
Project Manager: Randy Easley
Sampled By: John Hancock / Kristy Cantu

PO No.

SAMPLE MATRIX

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	ANALYSES REQUESTED[1] HG, LL (245.7)
1	Mascard Influent	4/25/12 0800	X		X		1	X
2	Mascard Effluent	4/25/12 1300	X		X		1	X
		Container Type					G	
		Preservative					NO	

AIC CONTROL NO: 152274
AIC PROPOSAL NO:
Carrier/Tracking No. Fedex
Received Temperature C 2°C
Remarks
Field pH calibration on ____ @ ____ Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate

Turnaround Time Requested: (Please circle)
(NORMAL) or EXPEDITED IN ____ DAYS
Expedited results requested by: ____
Who should AIC contact with questions: Randy Easley
Phone: 479-784-2337 Fax: ____
Report Attention to:
Report Address to: Randy Easley

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	4/25/12 1345		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
		[signature]	4-26-12 8:45am

Comments: [1] Required Reporting Limit for Metals must be identified on back of COC.
Fedex Tracking # 8770-9989-2240

19-Oct-09

FORM 0060

AR0033278
2nd Quarter

AMERICAN INTERPLEX CORPORATION
LABORATORIES

1972 40 2012

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

SAMPLE INFORMATION

Project Description:
Two (2) water and one (1) sludge sample(s) received on June 15, 2012
P Street Table III Priority Pollutants

Receipt Details:
A Chain of Custody was provided. The samples were delivered in one (1) ice chest.
Ice chest #1 was delivered with shipping documentation.

Each sample container was checked for proper labeling, including date and time sampled. Sample containers were reviewed for proper type, adequate volume, integrity, temperature, preservation, and holding times. Any exceptions are noted below:

Sample Identification:

Laboratory ID	Client Sample ID	Sampled Date/Time	Notes
158628-1	P Street Influent 6/14/12 0958	14-Jun-2012 0958	
158628-2	P Street Effluent 6/14/12 1458	14-Jun-2012 1458	
158628-3	P Street Raw Biosolid 6/14/12 1428	14-Jun-2012 1428	

Qualifiers:
Q Analyte is not within quality control limits

Case Narrative:
The matrix spike recovery for Total Recoverable Phenolics failed to meet acceptance criteria due to matrix interference.

Analysis of soils/sludges are reported on a dry-weight basis unless specified.

References:
"Methods for Chemical Analysis of Water and Wastes", EPA/600/4-79-020 (Mar 1983) with updates and supplements EPA/600/5-91-010 (Jun 1991), EPA/600/R-92-129 (Aug 1992) and EPA/600/R-93-100 (Aug 1993).
"Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846)", Third Edition.
"Standard Methods for the Examination of Water and Wastewaters", 20th edition, 1998.
"American Society for Testing and Materials" (ASTM).
"Association of Analytical Chemists" (AOAC).

AMERICAN INTERPLEX CORPORATION
LABORATORIES

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

ANALYTICAL RESULTS

AIC No. 158628-1
Sample Identification: P Street Influent 6/14/12 0958

Analyte		Result	RL	Units	Qualifier
Total Recoverable Phenolics		**0.10**	0.005	mg/l	
EPA 420.1	Prep: 20-Jun-2012 0831 by 306	Analyzed: 21-Jun-2012 1200 by 306		Batch: W40185	
Total Cyanide		**0.018**	0.01	mg/l	
SM4500-CN C,E	Prep: 19-Jun-2012 0858 by 306	Analyzed: 19-Jun-2012 1513 by 306		Batch: W40165	
Mercury		**< 0.2**	0.2	ug/l	
EPA 245.2	Prep: 18-Jun-2012 1511 by 100	Analyzed: 19-Jun-2012 1657 by 297		Batch: S32611	
Total Recoverable Antimony		**< 60**	60	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Arsenic		**1.3**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Beryllium		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Cadmium		**0.62**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Chromium		**130**	10	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Copper		**39**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Lead		**12**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Molybdenum		**< 8**	8	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Nickel		**120**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Selenium		**< 5**	5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	
Total Recoverable Silver		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 19-Jun-2012 1846 by 270		Batch: S32603	
Total Recoverable Thallium		**< 0.5**	0.5	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 19-Jun-2012 1846 by 270		Batch: S32603	
Total Recoverable Zinc		**660**	20	ug/l	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1938 by 297		Batch: S32603	

AIC No. 158628-2
Sample Identification: P Street Effluent 6/14/12 1458

Analyte		Result	RL	Units	Qualifier
Total Recoverable Phenolics		**0.013**	0.005	mg/l	
EPA 420.1	Prep: 18-Jun-2012 0901 by 306	Analyzed: 18-Jun-2012 1500 by 306		Batch: W40155	
Total Cyanide		**< 0.01**	0.01	mg/l	
SM4500-CN C,E	Prep: 19-Jun-2012 0858 by 306	Analyzed: 19-Jun-2012 1515 by 306		Batch: W40165	

AMERICAN INTERPLEX CORPORATION
LABORATORIES

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

ANALYTICAL RESULTS

AIC No. 158628-2 (Continued)
Sample Identification: P Street Effluent 6/14/12 1458

Analyte		Result	RL	Units	Qualifier
Mercury		**< 0.2**	0.2	**ug/l**	
EPA 245.2	Prep: 18-Jun-2012 1511 by 100	Analyzed: 26-Jun-2012 0844 by 271		Batch: S32611	
Total Recoverable Antimony		**< 60**	60	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Arsenic		**0.51**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Beryllium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Cadmium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Chromium		**< 10**	10	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Copper		**3.8**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Lead		**1.3**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Molybdenum		**< 8**	8	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Nickel		**11**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Selenium		**< 5**	5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	
Total Recoverable Silver		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 19-Jun-2012 1852 by 270		Batch: S32603	
Total Recoverable Thallium		**< 0.5**	0.5	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 19-Jun-2012 1852 by 270		Batch: S32603	
Total Recoverable Zinc		**56**	20	**ug/l**	
EPA 200.8	Prep: 15-Jun-2012 1337 by 100	Analyzed: 17-Jun-2012 1921 by 297		Batch: S32603	

AIC No. 158628-3
Sample Identification: P Street Raw Biosolid 6/14/12 1428

Analyte		Result	RL	Units	Qualifier
Total Cyanide		**< 20**	20	**mg/Kg**	
EPA 9010C, 9014	Prep: 27-Jun-2012 0830 by 306	Analyzed: 27-Jun-2012 1654 by 306		Batch: W40260	
Total Recoverable Phenolics		**< 70**	70	**mg/Kg**	
EPA 9065	Prep: 21-Jun-2012 1001 by 306	Analyzed: 21-Jun-2012 1530 by 306		Batch: W40204	
Total Solids		**0.79**	0.01	**%**	
SM 2540G	Prep: 18-Jun-2012 0911 by 285	Analyzed: 18-Jun-2012 1505 by 285		Batch: W40156	
Antimony		**< 3**	3	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	

AMERICAN INTERPLEX CORPORATION
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ANALYTICAL RESULTS

AIC No. 158628-3 (Continued)
Sample Identification: P Street Raw Biosolid 6/14/12 1428

Analyte		Result	RL	Units	Qualifier
Arsenic		**< 5**	5	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Beryllium		**< 0.03**	0.03	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Cadmium		**2.8**	0.4	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Chromium		**120**	0.7	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Copper		**380**	0.6	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Lead		**90**	4	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Molybdenum		**10**	0.8	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Nickel		**44**	1	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Selenium		**< 7**	7	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Silver		**7.3**	0.7	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 21-Jun-2012 1250 by 297		Batch: S32606	
Thallium		**< 4**	4	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Zinc		**1300**	0.2	**mg/Kg**	
EPA 3051A, 6010C	Prep: 18-Jun-2012 0932 by 100	Analyzed: 18-Jun-2012 1617 by 297		Batch: S32606	
Mercury		**1.5**	0.1	**mg/Kg**	
EPA 7471B	Prep: 22-Jun-2012 1245 by 297	Analyzed: 22-Jun-2012 1407 by 270		Batch: S32631	

AMERICAN INTERPLEX CORPORATION
LABORATORIES

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City of Fort Smith
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Fort Smith, AR 72904

DUPLICATE RESULTS

Analyte		AIC No.	Result	RPD	RPD Limit	Preparation Date	Analysis Date	Dil	Qual
Total Solids		158614-1	15 %			18Jun12 0911 by 285	18Jun12 1505 by 285		
	Batch: W40156	Duplicate	14 %	0.0945	10.0	18Jun12 0911 by 285	18Jun12 1505 by 285		

LABORATORY CONTROL SAMPLE RESULTS

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	0.1 mg/l	99.5	85.0-115			W40155	18Jun12 0902 by 306	18Jun12 1500 by 306		
Total Recoverable Phenolics	0.1 mg/l	91.8	85.0-115			W40185	20Jun12 0831 by 306	21Jun12 1200 by 306		
Total Cyanide	0.1 mg/l	101	85.0-115			W40165	19Jun12 0858 by 306	19Jun12 1701 by 306		
Mercury	0.0025 mg/l	99.6	85.0-115			S32611	18Jun12 1512 by 100	19Jun12 1632 by 297		
Total Recoverable Antimony	0.05 mg/l	94.3	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Arsenic	0.05 mg/l	98.1	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Beryllium	0.05 mg/l	95.0	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Cadmium	0.05 mg/l	96.4	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Chromium	0.05 mg/l	97.6	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Copper	0.05 mg/l	100	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Lead	0.05 mg/l	105	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Molybdenum	0.05 mg/l	97.5	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Nickel	0.05 mg/l	99.1	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Selenium	0.05 mg/l	97.4	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Silver	0.02 mg/l	89.0	85.0-115			S32603	15Jun12 1337 by 100	19Jun12 1817 by 270		
Total Recoverable Thallium	0.05 mg/l	98.4	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Recoverable Zinc	0.05 mg/l	102	85.0-115			S32603	15Jun12 1337 by 100	17Jun12 1904 by 297		
Total Cyanide	0.1 mg/Kg	99.3	85.0-115			W40260	27Jun12 0830 by 306	27Jun12 1652 by 306		
Total Recoverable Phenolics	0.1 mg/Kg	91.0	85.0-115			W40204	21Jun12 1002 by 306	21Jun12 1530 by 306		
Antimony	5 mg/Kg	99.4	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Arsenic	5 mg/Kg	99.2	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Beryllium	0.5 mg/Kg	97.7	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Cadmium	5 mg/Kg	98.8	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Chromium	0.5 mg/Kg	96.0	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Copper	0.5 mg/Kg	95.9	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Lead	5 mg/Kg	96.8	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Molybdenum	0.5 mg/Kg	97.3	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Nickel	0.5 mg/Kg	99.1	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Selenium	5 mg/Kg	101	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Silver	0.1 mg/Kg	99.1	85.0-115			S32606	18Jun12 0932 by 100	21Jun12 1240 by 297		
Thallium	5 mg/Kg	101	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Zinc	0.5 mg/Kg	98.2	85.0-115			S32606	18Jun12 0932 by 100	18Jun12 1526 by 297		
Mercury	0.0025 mg/Kg	97.6	85.0-115			S32631	22Jun12 1246 by 297	22Jun12 1353 by 270		

AMERICAN INTERPLEX CORPORATION
LABORATORIES

City of Fort Smith
3900 Kelley Highway
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MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	158628-2	0.1 mg/l	86.3	80.0-120	W40155	18Jun12 0902 by 306	18Jun12 1500 by 306		
	158628-2	0.1 mg/l	83.2	80.0-120	W40155	18Jun12 0902 by 306	18Jun12 1500 by 306		
	Relative Percent Difference:		3.16	10.0	W40155				
Total Recoverable Phenolics	158631-3	0.1 mg/l	80.9	80.0-120	W40185	20Jun12 0831 by 306	21Jun12 1200 by 306		
	158631-3	0.1 mg/l	82.4	80.0-120	W40185	20Jun12 0831 by 306	21Jun12 1200 by 306		
	Relative Percent Difference:		1.59	10.0	W40185				
Total Cyanide	158539-1	0.1 mg/l	85.1	75.0-125	W40165	19Jun12 0858 by 306	19Jun12 1452 by 306		
	158539-1	0.1 mg/l	85.0	75.0-125	W40165	19Jun12 0858 by 306	19Jun12 1454 by 306		
	Relative Percent Difference:		0.117	20.0	W40165				
Mercury	158578-1	0.0025 mg/l	92.8	70.0-130	S32611	18Jun12 1512 by 100	19Jun12 1637 by 297		
	158578-1	0.0025 mg/l	95.6	70.0-130	S32611	18Jun12 1512 by 100	19Jun12 1642 by 297		
	Relative Percent Difference:		2.79	20.0	S32611				
Total Recoverable Antimony	158628-2	0.05 mg/l	95.2	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	108	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		12.5	20.0	S32603				
Total Recoverable Arsenic	158628-2	0.05 mg/l	98.1	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	109	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		10.2	20.0	S32603				
Total Recoverable Beryllium	158628-2	0.05 mg/l	96.0	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	107	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		11.2	20.0	S32603				
Total Recoverable Cadmium	158628-2	0.05 mg/l	97.5	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	110	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		12.3	20.0	S32603				
Total Recoverable Chromium	158628-2	0.05 mg/l	97.6	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	109	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		10.8	20.0	S32603				
Total Recoverable Copper	158628-2	0.05 mg/l	101	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	111	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		8.59	20.0	S32603				
Total Recoverable Lead	158628-2	0.05 mg/l	106	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	121	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		12.6	20.0	S32603				
Total Recoverable Molybdenum	158628-2	0.05 mg/l	98.3	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	110	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		10.9	20.0	S32603				
Total Recoverable Nickel	158628-2	0.05 mg/l	101	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	114	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		12.0	20.0	S32603				
Total Recoverable Selenium	158628-2	0.05 mg/l	96.3	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	106	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		9.58	20.0	S32603				
Total Recoverable Silver	158628-2	0.02 mg/l	91.0	75.0-125	S32603	15Jun12 1337 by 100	19Jun12 1823 by 270		
	158628-2	0.02 mg/l	102	75.0-125	S32603	15Jun12 1337 by 100	19Jun12 1830 by 270		
	Relative Percent Difference:		11.4	20.0	S32603				
Total Recoverable Thallium	158628-2	0.05 mg/l	95.3	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	107	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		11.8	20.0	S32603				
Total Recoverable Zinc	158628-2	0.05 mg/l	102	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1909 by 297		
	158628-2	0.05 mg/l	116	75.0-125	S32603	15Jun12 1337 by 100	17Jun12 1915 by 297		
	Relative Percent Difference:		11.1	20.0	S32603				

AMERICAN INTERPLEX CORPORATION
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City of Fort Smith
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MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Cyanide	158628-3	0.1 mg/Kg	87.1	75.0-125	W40260	27Jun12 0830 by 306	27Jun12 1656 by 306		
	158628-3	0.1 mg/Kg	89.0	75.0-125	W40260	27Jun12 0830 by 306	27Jun12 1658 by 306		
	Relative Percent Difference:		2.18	20.0	W40260				
Total Recoverable Phenolics	158628-3	0.1 mg/Kg	77.2	80.0-120	W40204	21Jun12 1002 by 306	21Jun12 1530 by 306		Q
	158628-3	0.1 mg/Kg	78.0	80.0-120	W40204	21Jun12 1002 by 306	21Jun12 1530 by 306		Q
	Relative Percent Difference:		0.939	10.0	W40204				
Antimony	158652-1	499 mg/Kg	84.3	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	88.6	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		4.91	20.0	S32606				
Arsenic	158652-1	499 mg/Kg	89.0	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	94.5	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		5.82	20.0	S32606				
Beryllium	158652-1	49.9 mg/Kg	90.6	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	90.2	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		0.388	20.0	S32606				
Cadmium	158652-1	499 mg/Kg	90.5	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	95.4	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		5.34	20.0	S32606				
Chromium	158652-1	49.9 mg/Kg	80.3	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	96.8	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		9.63	20.0	S32606				
Copper	158652-1	49.9 mg/Kg	93.0	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	99.0	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		5.47	20.0	S32606				
Lead	158652-1	499 mg/Kg	89.2	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	93.7	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		4.65	20.0	S32606				
Molybdenum	158652-1	49.9 mg/Kg	89.7	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	94.7	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		5.35	20.0	S32606				
Nickel	158652-1	49.9 mg/Kg	89.3	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	95.5	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		4.54	20.0	S32606				
Selenium	158652-1	499 mg/Kg	86.4	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	89.5	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		3.59	20.0	S32606				
Silver	158652-1	9.98 mg/Kg	97.8	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1604 by 297		
	158652-1	9.95 mg/Kg	101	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1607 by 297		
	Relative Percent Difference:		-	-	S32606				
Thallium	158652-1	499 mg/Kg	91.4	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	498 mg/Kg	95.7	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		4.63	20.0	S32606				
Zinc	158652-1	49.9 mg/Kg	84.5	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1529 by 297		
	158652-1	49.8 mg/Kg	96.6	75.0-125	S32606	18Jun12 0932 by 100	18Jun12 1532 by 297		
	Relative Percent Difference:		6.02	20.0	S32606				
Mercury	158628-3	1.24 mg/Kg	78.1	70.0-130	S32631	22Jun12 1246 by 297	22Jun12 1358 by 270		
	158628-3	1.25 mg/Kg	79.1	70.0-130	S32631	22Jun12 1246 by 297	22Jun12 1403 by 270		
	Relative Percent Difference:		0.417	20.0	S32631				

AMERICAN INTERPLEX CORPORATION
LABORATORIES

1972-2012

City of Fort Smith
3900 Kelley Highway
Fort Smith, AR 72904

LABORATORY BLANK RESULTS

Analyte	Result	RL	PQL	QC Sample	Preparation Date	Analysis Date	Qual
Total Recoverable Phenolics	< 0.005 mg/l	0.005	0.005	W40155-1	18Jun12 0902 by 306	18Jun12 1500 by 306	
Total Recoverable Phenolics	< 0.005 mg/l	0.005	0.005	W40185-1	20Jun12 0831 by 306	21Jun12 1200 by 306	
Total Cyanide	< 0.01 mg/l	0.01	0.01	W40165-1	19Jun12 0858 by 306	19Jun12 1446 by 306	
Mercury	< 0.0002 mg/l	0.0002	0.0002	S32611-1	18Jun12 1512 by 100	19Jun12 1627 by 297	
Total Recoverable Antimony	< 0.03 mg/l	0.03	0.03	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Arsenic	< 0.0005 mg/l	0.0005	0.0005	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Beryllium	< 0.0003 mg/l	0.0003	0.0003	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Cadmium	< 0.0001 mg/l	0.0001	0.0001	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Chromium	< 0.007 mg/l	0.007	0.007	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Copper	< 0.0005 mg/l	0.0005	0.0005	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Lead	< 0.0005 mg/l	0.0005	0.0005	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Molybdenum	< 0.008 mg/l	0.008	0.008	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Nickel	< 0.0005 mg/l	0.0005	0.0005	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Selenium	< 0.002 mg/l	0.002	0.002	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Silver	< 0.0002 mg/l	0.0002	0.0002	S32603-1	15Jun12 1337 by 100	19Jun12 1811 by 270	
Total Recoverable Thallium	< 0.0005 mg/l	0.0005	0.0005	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Recoverable Zinc	< 0.002 mg/l	0.002	0.002	S32603-1	15Jun12 1337 by 100	17Jun12 1858 by 297	
Total Cyanide	< 0.01 mg/Kg	0.01	0.01	W40260-1	27Jun12 0830 by 306	27Jun12 1651 by 306	
Total Recoverable Phenolics	< 0.005 mg/Kg	0.005	0.005	W40204-1	21Jun12 1002 by 306	21Jun12 1530 by 306	
Total Solids	< 0.01 %	0.01	0.01	W40156-1	18Jun12 0911 by 285	18Jun12 1505 by 285	
Antimony	< 3 mg/Kg	3	3	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Arsenic	< 5 mg/Kg	5	5	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Beryllium	< 0.03 mg/Kg	0.03	0.03	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Cadmium	< 0.4 mg/Kg	0.4	0.4	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Chromium	< 0.7 mg/Kg	0.7	0.7	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Copper	< 0.6 mg/Kg	0.6	0.6	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Lead	< 4 mg/Kg	4	4	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Molybdenum	< 0.8 mg/Kg	0.8	0.8	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Nickel	< 1 mg/Kg	1	1	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Selenium	< 7 mg/Kg	7	7	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Silver	< 0.7 mg/Kg	0.7	0.7	S32606-1	18Jun12 0932 by 100	21Jun12 1238 by 297	
Thallium	< 4 mg/Kg	4	4	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Zinc	< 0.2 mg/Kg	0.2	0.2	S32606-1	18Jun12 0932 by 100	18Jun12 1523 by 297	
Mercury	< 0.1 mg/Kg	0.1	0.1	S32631-1	22Jun12 1246 by 297	22Jun12 1348 by 270	

AMERICAN INTERPLEX CORPORATION
LABORATORIES

CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

PAGE 1 OF 1

Client: City of Fort Smith
Project Reference: P Street Table III Priority Pollutants
Project Manager: RANDY EASLEY
Sampled By: Kristy Cantu

PO No.

SAMPLE MATRIX: WATER, SOIL

AIC No.	Sample Identification	Date/Time Collected	GRAB	COMP	WATER	SOIL	NO OF BOTTLES	T. Cyanide	Phenolics	PP Metals	Table III 13PP Metals, CN?, Phenols, TSolids, Oil?	MO	NO	AIC CONTROL NO: 158628
1	P Street Influent	6/14/12 0958	X		X		1	X						AIC PROPOSAL NO:
1	P Street Influent	6/14/12 0958	X		X		1		X					Carrier/Tracking No. Fed-Ex
1	P Street Influent	6/14/12 0958	X		X		1			X		X		Received Temperature C 2-6
2	P Street Effluent	6/14/12 1458	X		X		1	X						Remarks
2	P Street Effluent	6/14/12 1458	X		X		1		X					
2	P Street Effluent	6/14/12 1458	X		X		1			X		X		
3	P Street RAW Biosolid	6/14/12 1408	X		X		1				X		X	
		Container Type						P	G	P	G	P	G	Field pH calibration
		Preservative						B	S	N	NO	N	NO	on _____ @ _____
														Buffer:

G = Glass P = Plastic V = VOA vials H = HCl to pH2 T = Sodium Thiosulfate
NO = none S = Sulfuric acid pH2 N = Nitric acid pH2 B = NaOH to pH12 Z = Zinc acetate

Turnaround Time Requested: (Please circle)
NORMAL or EXPEDITED IN ____ DAYS
Expedited results requested by: _____
Who should AIC contact with questions: _____
Phone: _____ Fax: _____
Report Attention to:
Report Address to:

Relinquished By:	Date/Time	Received By:	Date/Time
Kristy Cantu	6/14/12 1546		
Relinquished By:	Date/Time	Received in Lab By:	Date/Time
		Shaun Culver	6-15-12 8:45 AM

Comments: [1] Required Reporting Limit for Metals must be identified on back of COC.
Fed Ex # 803337685724

19-Oct-09

FORM 0060

AR0033278

INTER-OFFICE MEMO

TO: Steve Floyd, Superintendent of Water and Wastewater Operations

FROM: Don Clover, Biologist

DATE: July 23, 2012

RE: Biomonitoring Results - "P" Street Plant Ceriodaphnia Re-test

Please find below the *Ceriodaphnia dubia* re-test results for the second quarter of 2012. The *Ceriodaphnia dubia* receiving water test originally initiated on June 5, 2012 did not meet control reproduction and coefficient of variation acceptance criteria as outlined in AR0033278. The test was therefore considered invalid and a re-test utilizing synthetic laboratory water for dilution purposes was scheduled for July 9th. The *Ceriodaphnia dubia* chronic re-test using synthetic laboratory water did not experience lethal or sub-lethal effects in the low flow dilution of 8% effluent. The test therefore passes at the low-flow dilution of 8% for lethal and sub-lethal effects.

Parameter #TGP3B- 0

Parameter #TGP6C-

Parameter #TLP3B- 0

Parameter #TLP6C-

Parameter #TOP3B- 11%

Parameter # TOP6C-

Parameter #TPP3B- 11%

Parameter #TPP6C-

Parameter #TQP3B- 13.16%

Parameter #TQP6C-

I have reviewed the test results and the reports are accurate and valid.

Don Clover

Don Clover

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

July 19, 2012

Don Clover
City of Fort Smith
3900 Kelley Hwy.
Fort Smith, AR 72904

RE: Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Dear Don Clover:
Enclosed are the analytical results for sample(s) received by the laboratory on July 10, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

Andy Brownfield for
Connie Sparks
connie.sparks@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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SAMPLE SUMMARY

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60124980001	**P STREET EFFLUENT**	Water	07/09/12 08:00	07/10/12 11:40

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(913)599-5665

SAMPLE ANALYTE COUNT

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60124980001	**P STREET EFFLUENT**	EPA 821/R-02/013	TDH	1

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ANALYTICAL RESULTS

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Sample: P STREET EFFLUENT **Lab ID: 60124980001** Collected: 07/09/12 08:00 Received: 07/10/12 11:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical Method: EPA 821/R-02/013							
Toxicity, Chronic	**Complete**		1.0	1		07/17/12 12:30		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Lenexa, KS 66219
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QUALIFIERS

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P STREET WWTP BIOMONITORING
Pace Project No.: 60124980

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60124980001	**P STREET EFFLUENT**	EPA 821/R-02/013	BIO/1549		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1542105

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy
Ft. Smith, AR 72904
Email To:
Phone: 479-784-1012 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Don Clover
Copy To:
Purchase Order No.:
Project Name: "P" Street WWTP Effluent Monitoring
Project Number:

Section C Invoice Information:

Attention: Don Clover
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9/,-) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COLLECTED: COMPOSITE START TIME	COLLECTED: COMPOSITE END/GRAB DATE	COLLECTED: COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): Chlor. Monitoring	Chlorine Compliance	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	WW	C	7/8/12	0800	7/9/12	0800		1								X		XX			24980
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
T. Cl2 = 0.01 mg/L	John Hancock / City of Fort Smith	7/9/12	1200	Dawn Franklin	7/9/12	1200				
F. Cl2 = 0.01 mg/L				Don Hancock	7/10/12	1140	2.8	Y	Y	Y

2

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: John M. Hancock

SIGNATURE of SAMPLER: John M. Hancock DATE Signed (MM/DD/YY): 7/9/12

Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Condition Upon Receipt

Pace Analytical
www.pacelabs.com

Client Name: Ft Smith Project # 60124980

Courier: [ ] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other _____

Tracking #: _____ Pace Shipping Label Used? [ ] Yes [ ] No

Custody Seal on Cooler/Box Present: [X] Yes [ ] No Seals intact: [X] Yes [ ] No

Optional
Proj. Due Date:
Proj. Name: 7/26

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [ ] Foam [X] None [ ] Other _____

Thermometer Used: T-111 Type of Ice: (Wet) Blue None [ ] Samples on ice, cooling process has begun

Cooler Temperature: 2.8

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: 7/10/12 MB 1140

		Comments:
Chain of Custody present:	[X] Yes [ ] No [ ] N/A	1.
Chain of Custody filled out:	[X] Yes [ ] No [ ] N/A	2.
Chain of Custody relinquished:	[X] Yes [ ] No [ ] N/A	3.
Sampler name & signature on COC:	[X] Yes [ ] No [ ] N/A	4.
Samples arrived within holding time:	[X] Yes [ ] No [ ] N/A	5.
Short Hold Time analyses (<72hr):	[X] Yes [ ] No [ ] N/A	6.
Rush Turn Around Time requested:	[ ] Yes [X] No [ ] N/A	7.
Sufficient volume:	[X] Yes [ ] No [ ] N/A	8.
Correct containers used:	[X] Yes [ ] No [ ] N/A	9.
-Pace containers used:	[X] Yes [ ] No [ ] N/A	
Containers intact:	[X] Yes [ ] No [ ] N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	[ ] Yes [ ] No [X] N/A	11.
Filtered volume received for dissolved tests	[ ] Yes [ ] No [X] N/A	12.
Sample labels match COC	[X] Yes [ ] No [ ] N/A	13.
-Includes date/time/ID/analyses Matrix: WT		
All containers needing preservation have been checked.	[ ] Yes [ ] No [X] N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	[ ] Yes [ ] No [X] N/A	
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	[ ] Yes [X] No	Initial when completed _____ Lot # of added preservative _____
Trip Blank present:	[ ] Yes [ ] No [X] N/A	15.
Pace Trip Blank lot # (if purchased): _____		
Headspace in VOA vials (>6mm):	[ ] Yes [ ] No [X] N/A	16.
Project sampled in USDA Regulated Area:	[ ] Yes [ ] No [X] N/A	17. List State: _____

Client Notification/ Resolution: Copy COC to Client? (Y) / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: CS Date: 7/12/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

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REFERENCE #60124980

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

July 18, 2012

Don Clover
City of Fort Smith
3900 Kelley HWY
Fort Smith . AR 72904

Re: Lab Project Number: 60124980
Client Project ID: Wet Test

Dear:

Enclosed are the analytical results for sample(s) received by the laboratory. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any question concerning this report, please feel free to contact me.

Sincerely.

Tim Harrell

Tim Harrell
Tim.Harrell@pacelabs.com
Technical Director

Kansas/ NELAP Certification Number E-10116
Utah Certification Number 9135995665
Texas Certification Number T104704407-08-TX
Oklahoma Certification Number 9205/9935
Louisiana Certification Number 03055
Arkansas Certification Number 05-008-0

Enclosures

REPORT OF LABORATORY ANALYSIS

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical®
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REFERENCE #60124980

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

CHRONIC TOXICITY TEST FOR CITY OF FORT SMITH

PERMIT # AR 0033278
AFIN # 66-00226

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

Don Clover
City of Fort Smith
3900 Kelley HWY
Fort Smith, AR 72904

PREPARED BY:
Pace Analytical Services, Inc.
808 West McKay
Frontenac, KS 66763
1-620-235-0003

July 18, 2012

REPORT OF LABORATORY ANALYSIS

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE OF CONTENTS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

SUMMARY

A Chronic Whole Effluent Toxicity Test using the three brood 7-day chronic Cladoceran (Ceriodaphnia dubia), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the CITY OF FORT SMITH effluent discharge from July 9, 2012 to July 13, 2012. All the test methods followed are as listed in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms."

Statistically significant ($p<0.05$) mortality is determined by Dunnet's procedure using average percent survival of each test concentration versus the average survival of the controls. If significant mortality occurs, median lethal concentrations (LC50) are calculated using effluent concentrations and their corresponding percent mortality data. The LC50's and the 95% confidence intervals are calculated where appropriate by the Spearman-Karber method. Statistical analysis is accomplished by following steps in EPA 821-R-02-013, November 2002 and by use of Toxstat version 3.4.

In minnow section of testing, NO DATA

In Cladoceran section of testing, it was observed that the effluent had no significant effect on the survival of the organisms in the 11% effluent concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 11% for survival. The LC50 was estimated to be >11% effluent. No significant reduction in reproduction was observed in the 11% effluent concentrations. The Toxic Units is <1. The IC25 is >11. The NOEC for reproduction in effluent was determined to be 11%. The PMSD is 12.2.

The chronic toxicity exhibited by the Ceriodaphnia treated by the effluent sampled from July 9 to July 13 from the CITY OF FORT SMITH effluent discharge, is acceptable as described in EPA 821-R-02-013.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the CITY OF FORT SMITH effluent discharge. Chronic toxicity was measured using the Ceriodaphnia dubia survival and reproduction test described in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." The raw data of the study is stored at Pace Analytical Services, INC. 808 West McKay, Frontenac, KS 66763.

TEST MATERIAL

City of Fort Smith personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 7-10-12. Subsequent samples followed by delivery on 7-12-12 and on 7-14-12. All samples were stored at ≤ 6° Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in EPA 821-R-02-013.

TEST METHODS

Pace used EPA test method 1002.0 was used for conducting the Cladoceran, Ceriodaphnia dubia, Survival and Reproduction Test. The tests were conducted to estimate the LC50, NOEC, and LOEC for survival and reproduction of these test species.

The Ceriodaphnia tests were initiated on 7-10-12 and carried out until 7-17-12. The Ceriodaphnia tests were carried out in 35ml vials containing 25 ml of test solution. One Neonate was placed in each of 10 replicates to make a total of 10 neonates per sample concentration.

TEST ORGANISMS

Organisms used in these tests were cultured at Pace under controlled temperature and photo period conditions or were purchased from an external supplier. Pace maintains records of culture techniques for all organisms, whether produced in house or purchased.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RESULTS

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REFERENCE #60124980

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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE 1

Permittee: CITY OF FORT SMITH Effluent discharge.

Date Sampled No. 1: 7-9-12 8:00

No. 2: 7-11-12 8:00

No. 3: 7-13-12 8:00

Test Initiated: 14:00 Date: 7-10-12

Dilution Water used: Moderately Hard Synthetic Water

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

Effluent Concentration (%)	Average Dry Weight in Milligrams in Replicate Chambers A	B	C	D	E	Mean Dry Weight (mg)	CV% *
Control 0%	NO	DATA					
Dilution 1 3%							
Dilution 2 5%							
Dilution 3 6%							
Dilution 4 8%							
Dilution 5 11%							

* Coefficient of Variation = Standard Deviation X 100 / Mean

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH Effluent discharge.

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E	24hr	48hr	7 day	
Control 0%	NO	DATA							
Dilution 1 3%									
Dilution 2 5%									
Dilution 3 6%									
Dilution 4 8%									
Dilution 5 11%									

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

Replicate	Control 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 3 8%	Dilution 4 11%
1	21	22	21	23	20	18
2	21	20	22	21	20	22
3	15	25	20	16	22	22
4	19	18	20	16	18	19
5	18	20	20	21	23	19
6	21	21	19	21	19	21
7	23	21	24	25	23	22
8	18	18	16	21	22	18
9	21	19	22	23	21	24
10	16	23	19	21	19	20
Mean	19.3	20.7	20.3	20.8	20.7	20.5
SD	2.541	2.214	2.163	2.860	1.767	2.014
CV %	13.16	10.69	10.65	13.75	8.54	9.82

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Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH Effluent discharge.

CERIODAPHNIA MEAN PERCENT SURVIVAL

	Percent Effluent (%)					
Time Elapsed	Control 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 4 8%	Dilution 5 11%
24 hrs	100	100	100	100	100	100
48 hrs	100	100	100	100	100	100
7-day	100	100	100	100	100	100
SD	0.0	0.0	0.0	0.0	0.0	0.0
CV %	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 2
SUMMARY OF TEST CONDITIONS FOR THE FATHEAD MINNOW (Pimephales promelas) LARVAL SURVIVAL AND GROWTH TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	500 ml
7. Test solution volume	250 ml
8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	8
11. No. replicates/concentration	5
12. No. larvae/concentration	40
13. Feeding regime	Feed 0.1 ml newly hatched brine shrimp nauplii three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None

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TABLE 2 (CONT.)

16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	7 days
19. Endpoints	Survival and growth
20. Test acceptability	80% or greater survival in the controls, Average dry weight in controls >0.25 mg, Coefficient of variation in the control must not exceed 40%.

TABLE 2 (CONT.)
SUMMARY OF TEST CONDITIONS FOR THE CLADOCERAN (Ceriodaphnia dubia) SURVIVAL AND REPRODUCTION TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	30 ml
7. Test solution volume	25 ml

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TABLE 2 (CONT.)

8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	1
11. No. replicates/concentration	10
12. No. larvae/concentration	10
13. Feeding regime	Feed 0.1 ml YCT three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None
16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	6 days - 8 days
19. Endpoints	Survival and Reproduction
20. Test acceptability	80% or greater survival in the controls, Average reproduction rate of 15 young / adult. Coefficient of variation in the control must not exceed 40%.

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TABLE 2 (SECTION 2)

BIOMONITORING CHRONIC TOXICITY REPORT
FATHEAD MINNOW (Pimephales promelas)
CHEMICAL PARAMETERS CHART

Permittee: CITY OF FORT SMITH. Effluent discharge.

ANALYSTS: Pace Analytical Services, Inc.
Timothy Harrell
Mike Bollin

SAMPLE NO. 1 COLLECTED: DATE: 7-9-12

SAMPLE NO. 2 COLLECTED: DATE: 7-11-12

SAMPLE NO. 3 COLLECTED: DATE: 7-13-12

TABLE 2 (SECTION 2)
INITIAL WATER QUALITY
EFFLUENT CONCENTRATION

	Control	100%
PH	7.71	7.37
D.O.	8.80	8.30
Temp	25	25
Alk	60	58
Hard	92	90
Cond	380	567
Chlorine	<0.1	<0.1

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos
Chlorine is reported as mg/L

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TEST WATER QUALITY

24-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.63	7.20	25
3% Effluent	7.63	7.20	25
5% Effluent	7.63	7.30	25
6% Effluent	7.62	7.30	25
8% Effluent	7.62	7.30	25
11% Effluent	7.61	7.30	25

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.96	7.80	25
3% Effluent	8.02	7.80	25
5% Effluent	8.02	7.80	25
6% Effluent	8.03	7.80	25
8% Effluent	8.04	7.80	25
11% Effluent	8.05	7.80	25

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FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	11%
pH	7.76	7.87
D.O.	7.30	7.40
Temp	25	25
Alk	64	64
Hard	98	94
Cond	489	464

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos

TEST VALIDITY

The Ceriodaphnia dubia survival rates were 100 in the control. The Ceriodaphnia in the control produced an average of 19.3 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 0.00 and 13.16. Control data met or exceeded all criteria set out by EPA 821-R-02-013 for test acceptance.

CONCLUSIONS

The No Observed Effect Concentration (NOEC) for Ceriodaphnia dubia was 11% for Survival and 11% for Reproduction. The tests were ran using a synthetic control against effluent concentrations of 3%, 5%, 6%, 8%, and 11%. The effluent sampled on 7-9-12, 7-11-12, and 7-13-12 exhibited acceptable chronic toxicity in Ceriodaphnia dubia during the exposure period as described in EPA 821-R-02-013.

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APPENDIX A
STATISTICAL ANNALYSIS

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
3%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
5%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
6%	10	0	10

TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	TOTAL ANIMALS
CONTROL	10	0	10
8%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	TOTAL ANIMALS
CONTROL	10	0	10
11%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHER'S EXACT TESTS

	NUMBER	NUMBER	SIG

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	3%	10	0	
2	5%	10	0	
3	6%	10	0	
4	8%	10	0	
5	11%	10	0	

60124980 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6124980D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	1.000	1.000	1.000
2	3%	10	1.000	1.000	1.000
3	5%	10	1.000	1.000	1.000
4	6%	10	1.000	1.000	1.000
5	8%	10	1.000	1.000	1.000
6	11%	10	1.000	1.000	1.000

60124980 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6124980D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	3%	0.000	0.000	0.000	0.00
3	5%	0.000	0.000	0.000	0.00
4	6%	0.000	0.000	0.000	0.00
5	8%	0.000	0.000	0.000	0.00
6	11%	0.000	0.000	0.000	0.00

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E 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	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	14	19	19	3

Calculated Chi-Square goodness of fit test statistic = 2.5690
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 2.51

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	15.000	23.000	19.300
2	3%	10	18.000	25.000	20.700
3	5%	10	16.000	24.000	20.300
4	6%	10	16.000	25.000	20.800
5	8%	10	18.000	23.000	20.700
6	11%	10	18.000	24.000	20.500

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	6.456	2.541	0.803	13.16
2	3%	4.900	2.214	0.700	10.69
3	5%	4.678	2.163	0.684	10.65
4	6%	8.178	2.860	0.904	13.75
5	8%	3.122	1.767	0.559	8.54
6	11%	4.056	2.014	0.637	9.82

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	15.683	3.137	0.600
Within (Error)	54	282.500	5.231	
Total	59	298.183		

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

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.300	19.300		
2	3%	20.700	20.700	-1.369	
3	5%	20.300	20.300	-0.978	
4	6%	20.800	20.800	-1.466	
5	8%	20.700	20.700	-1.369	
6	11%	20.500	20.500	-1.173	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

60124980 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6124980E Transform: NO TRANSFORMATION

DUNNETT'S 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			
2	3%	10	2.363	12.2	-1.400
3	5%	10	2.363	12.2	-1.000
4	6%	10	2.363	12.2	-1.500
5	8%	10	2.363	12.2	-1.400
6	11%	10	2.363	12.2	-1.200

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	3	5	6	8	11
Response 1	21	22	21	23	20	18
Response 2	21	20	22	21	20	22
Response 3	15	25	20	16	22	22
Response 4	19	18	20	16	18	19
Response 5	18	20	20	21	23	19
Response 6	21	21	19	21	19	21
Response 7	23	21	24	25	23	22
Response 8	18	18	16	21	22	18
Response 9	21	19	22	23	21	24
Response 10	16	23	19	21	19	20

*** Inhibition Concentration Percentage Estimate ***
Toxicant/Effluent: Ft Smith
Test Start Date: 7/10/12 Test Ending Date: 7/17/12
Test Species: Dubia
Test Duration: 7 Day
DATA FILE:

Conc. ID	Number Replicates	Concentration	Response Means	Std. Dev.	Pooled Response Means
1	10	0.000	19.300	2.541	20.383
2	10	3.000	20.700	2.214	20.383
3	10	5.000	20.300	2.163	20.383
4	10	6.000	20.800	2.860	20.383
5	10	8.000	20.700	1.767	20.383
6	10	11.000	20.500	2.014	20.383

*** No Linear Interpolation Estimate can be calculated from the input data since none of the (possibly pooled) group response means were less than 75% of the control response mean.

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APPENDIX B
CHAIN OF CUSTODY FORMS

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Page: 1 of 1

1542105

Section A
Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy
Ft. Smith, Ar 72904
Email To:
Phone: 479-784-1012 Fax:
Requested Due Date/TAT:

Section B
Required Project Information:

Report To: Don Clover
Copy To:
Purchase Order No.:
Project Name: "P" Street WWTP Biomonitoring
Project Number:

Section C
Invoice Information:

Attention: Don Clover
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft Smith, Ar
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: AR

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes
MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N)	Analysis Test Y/N: Chronic Minnow	Chronic Ceriodaphnia	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	C	7/8/12	0800	7/9/12	0800		1								X		X	X		
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
T. Cl2 = 0.01 mg/L	JOHN HANCOCK / City of Fort Smith	7/9/12	1200	James Rand	7-9	1200				
F. Cl2 = 0.01 mg/L				Jim Hansell	7/10/12	11:40	2.8	Y	Y	Y

SAMPLER NAME AND SIGNATURE

°C | (Y/N) | Cooler | Contact

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Page: 1 of 1

1564014

Section A
Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy Ft. Smith, AR 72904
Email To:
Phone: 479-784-1012 Fax:
Requested Due Date/TAT:

Section B
Required Project Information:

Report To: Don Clover
Copy To:
Purchase Order No.:
Project Name: "P" Street WWTP Biomonitoring
Project Number:

Section C
Invoice Information:

Attention: Don Clover
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes
MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	C	7/10/12	~~7:00~~ 0800	7/11/12	0800		1								X		X		
2					0800																
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Analysis Test: Chronic Fathead, Chronic Ceriodaphnia

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
T. Cl_2 = 0.02 mg/L	John Hancock / City of Fort Smith	7/11/12	1234	Jamie Bane	6-11	D34				
F. Cl_2 = 0.01 mg/L					6/12/12	1620	3.4	Y	Y	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: John Hancock
SIGNATURE of SAMPLER: John Hancock
DATE Signed (MM/DD/YY): 7/11/12

~~Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.~~

F-ALL-Q-020rev.07, 15-May-2007

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1564012

Section A — Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy Ft. Smith, AR 72904
Email To:
Phone: 479-784-1012 Fax:
Requested Due Date/TAT:

Section B — Required Project Information:

Report To: Don Clover
Copy To:
Purchase Order No.:
Project Name: P Street WWTP Biomonitoring
Project Number:

Section C — Invoice Information:

Attention: Don Clover
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D — Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: Chlorine Monitor	Chronic Ceriodaphnia	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	C	7/12/12	0800	7/13/12	0800		1								X	X	X		
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
T. Cl2 = 0.01 mg/L	John Hancock / City of Fort Smith	7/13/12	1354	James Kane	7/13	1354	
E. Cl2 = 0.01 mg/L					7/14/12	0800	1.0 Y Y Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: John M Hancock
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 7/13/12

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX C

REFERENCE TOXICANTS SUMMARY

Pace Analytical Services, Inc.
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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

The absence of significant control mortality during this test indicated the health of the organisms and indicated that any significant mortality in the test concentrations was not due to contaminants or variations in testing conditions.

Reference toxicity testing is routinely performed by staff members in our biomonitoring - bioassay laboratory.

Start: 7/6/12 14:00 End: 7/13/12 14:30

Reference Toxicant (NaCl) Pimephales promelas

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
10 g/l	40	7	2	0
8 g/l	40	36	29	6
6 g/l	40	40	36	23
4 g/l	40	40	40	39
2 g/l	40	40	40	40

IC25 (4.91 g/l Sodium Chloride)

Survival NOEC: 4.0 g/l

Reference Toxicant (NaCl) Ceriodaphnia Dubia

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	4	0	0
2.0 g/l	10	10	9	2
1.5 g/l	10	10	10	10
1.0 g/l	10	10	10	10
0.5 g/l	10	10	10	10

IC25 (1.20 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By: _____
Timothy Harrell, Technical Director

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX D
STATE AGENCY FORMS

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: City of Fort Smith
NPDES No.: AR 0033278
Contact: Paul Easley
Analyst: Tim Harrell
Mike Bollin

Sample No. 1 Collected: Date: 7/9/2012 Time: 8:00
Sample No. 2 Collected: Date: 7/11/2012 Time: 8:00
Sample No. 3 Collected: Date: 7/13/2012 Time: 8:00
Test Begin: Date: 7/10/2012 Time: 14:00
Test End: Date: 7/17/2012 Time: 12:30

Dilution: Control
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	8.8	8.4	8.1	8	8.1	7.8	8.2	
DO Final	7.2	7.8	7.2	7.2	7.4	7.5	7.3	
pH Initial	7.71	7.68	7.75	7.51	7.55	7.56	7.68	
pH Final	7.63	7.96	7.82	7.68	7.63	7.8	7.76	
Alkalinity	60							
Hardness	92							
Conductivity	380							
Chlorine	<.1						<.1	

Dilution: 6
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.4	8.1	8.1	8.1	7.9	8.3	
DO Final	7.3	7.8	7.3	7.3	7.4	7.5	7.3	
pH Initial		7.73	7.86	7.62	7.6	7.58	7.7	
pH Final	7.62	8.03	7.84	7.73	7.68	7.83	7.82	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 3
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.4	8.1	8	8.1	7.8	8.2	
DO Final	7.2	7.8	7.2	7.2	7.4	7.5	7.3	
pH Initial		7.72	7.82	7.58	7.58	7.57	7.7	
pH Final	7.63	8.02	7.82	7.72	7.65	7.82	7.79	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 8
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.4	8.1	8.1	7.62	7.9	8.2	
DO Final	7.3	7.8	7.3	7.3	7.68	7.4	7.4	
pH Initial		7.75	7.86	7.64	7.62	7.58	7.73	
pH Final	8.4	8.04	7.85	7.75	7.5	7.84	7.84	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 5
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.4	8.1	8	8.1	7.8	8.2	
DO Final	7.3	7.8	7.3	7.2	7.4	7.5	7.3	
pH Initial		7.72	7.85	7.59	7.6	7.57	7.7	
pH Final	7.63	8.02	7.82	7.73	7.66	7.82	7.81	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 11
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	Init. 100%
DO Initial		8.4	8	8.2	8.2	8	8.3	8.3
DO Final	7.3	7.8	7.4	7.3	7.5	7.4	7.4	
pH Initial		7.78	7.87	7.66	7.64	7.59	7.74	7.37
pH Final	7.61	8.05	7.87	7.78	7.72	7.85	7.87	
Alkalinity								58
Hardness								90
Conductivity								567
Chlorine							<.1	<.1

Summary Reporting Forms
Chronic Biomonitoring

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Fort Smith **NPDES No.:** AR 0033278

	[redacted]	Time:	Date:	[redacted]	Time:	Date:
Composite 1 Collected	**From**	8:00	7/8/2012	**To**	8:00	7/9/2012
Composite 2 Collected	**From**	8:00	7/10/2012	**To**	8:00	7/11/2012
Composite 3 Collected	**From**	8:00	7/12/2012	**To**	8:00	7/13/2012

Test initiated: **am/pm** 14:00 AM **date** 7/10/2012
Test terminated: **am/pm** 12:30 AM **date** 7/17/2012

Dilution water used: **Receiving** **Reconstituted** X

Percent Survival

Time of Reading	Percent Effluent					
	Control	3	5	6	8	11
24h	100	100	100	100	100	100
48h	100	100	100	100	100	100
End of test	100	100	100	100	100	100

Number of Young Produced per Female @ End of Test

Rep	Control	3	5	6	8	11
A	21	22	21	23	20	18
B	21	20	22	21	20	22
C	15	25	20	16	22	22
D	19	18	20	16	18	19
E	18	20	20	21	23	19
F	21	21	19	21	19	21
G	23	21	24	25	23	22
H	18	18	16	21	22	18
I	21	19	22	23	21	24
J	16	23	19	21	19	20
Mean	19.3	20.7	20.3	20.8	20.7	20.5
CV%*	13.16	10.69	10.65	13.75	8.54	9.82

***coefficient of variation = standard deviation x 100/mean.**

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of the test significantly different (p=.05) than the control survival for the % effluent corresponding to (lethality):

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No: X**
b) ½ Low Flow Dilution	**(**	**%):**	**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=.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	**(**	**8 %):**	**Yes:**	**No:** X
b) ½ Low Flow Dilution	**(**	**%):**	**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):

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 NOEC below and circle lowest number:

a) NOEC survival: 11 **% effluent**
b) NOEC reproduction: 11 **% effluent**

AR0021750

INTER-OFFICE MEMO

TO: Steve Floyd, Supt. of W/W Operations

FROM: Randy Easley, Environmental Manager

DATE: May 15, 2012

RE: Quarterly Bio-Monitoring Analyses.

Attached you will find the results of "Bio-Monitoring Analyses" for the ~~first~~ 2nd quarter of 2012 for the Massard treatment facility.

As you will note, the Bio-Monitoring analyses indicate that the Massard treatment facility passed for both lethal and sub-lethal effects for both ceriodaphnia and fathead minnows.

The following parameters should be reported as:

Parameter #TGP3B	0
Parameter #TGP6C	0
Parameter #TLP3B-	0
Parameter #TLP6C-	0
Parameter #TOP3B-	11
Parameter #TOP6C-	11
Parameter #TPP3B-	11
Parameter #TPP6C-	11
Parameter #TQP3B-	16.39
Parameter #TQP6C-	6.31

If you have any questions, please don't hesitate to contact me.

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Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

May 07, 2012

Mr. Paul Easley
City of Fort Smith
3900 Kelley Hwy.
Fort Smith, AR 72904

RE: Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Dear Mr. Easley:
Enclosed are the analytical results for sample(s) received by the laboratory on April 23, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Connie Sparks

Connie Sparks

connie.sparks@pacelabs.com
Project Manager

Enclosures

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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Lenexa, KS 66219
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SAMPLE SUMMARY

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60120045001	MASSARD EFFLUENT	Water	04/23/12 08:00	04/23/12 10:00

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SAMPLE ANALYTE COUNT

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60120045001	MASSARD EFFLUENT	EPA 821/R-02/013	TDH	1

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ANALYTICAL RESULTS

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Sample: MASSARD EFFLUENT **Lab ID: 60120045001** Collected: 04/23/12 08:00 Received: 04/23/12 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical Method: EPA 821/R-02/013							
Toxicity, Chronic	**Complete**		1.0	1		04/24/12 11:30		

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALIFIERS

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: MASSARD BIOMONITORING
Pace Project No.: 60120045

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60120045001	MASSARD EFFLUENT	EPA 821/R-02/013	BIO/1526		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of

1542103

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy
Ft. Smith, AR 72904
Email To:
Phone: 479-784-2337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Randy Easley
Copy To:
Purchase Order No.:
Project Name: Massard Biomonitoring
Project Number:

Section C Invoice Information:

Attention: Randy Easley
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Massard Effluent	WW	C	4/22/12	0800	4/23/12	0800		1								X	X			60120045
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
T. Cl_2 = 0.01 mg/L	John Hancock / City of Fort Smith	4/23/12	1030		4/23/12	1030	2.0 Y Y Y
F. Cl_2 = 0.02 mg/L							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: John Hancock

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 4/23/12

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

2

Sample Condition Upon Receipt

Pace Analytical
www.pacelabs.com

Client Name: Ft Smith Project # 60120045

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other _____

Tracking #: _____ Pace Shipping Label Used? [ ] Yes [ ] No

Custody Seal on Cooler/Box Present: [X] Yes [ ] No Seals intact: [X] Yes [ ] No

Optional
Proj. Due Date:
Proj. Name: 5/9

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [ ] Foam [X] None [ ] Other _____

Thermometer Used: T-111 Type of Ice: (Wet) Blue None [ ] Samples on ice, cooling process has begun

Cooler Temperature: 2-4

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: MB 4/24/12 1000

		Comments:
Chain of Custody present:	[X] Yes [ ] No [ ] N/A	1.
Chain of Custody filled out:	[X] Yes [ ] No [ ] N/A	2.
Chain of Custody relinquished:	[X] Yes [ ] No [ ] N/A	3.
Sampler name & signature on COC:	[X] Yes [ ] No [ ] N/A	4.
Samples arrived within holding time:	[X] Yes [ ] No [ ] N/A	5.
Short Hold Time analyses (<72hr):	[X] Yes [ ] No [ ] N/A	6.
Rush Turn Around Time requested:	[ ] Yes [X] No [ ] N/A	7.
Sufficient volume:	[X] Yes [ ] No [ ] N/A	8.
Correct containers used:	[X] Yes [ ] No [ ] N/A	9.
-Pace containers used:	[X] Yes [ ] No [ ] N/A	
Containers intact:	[X] Yes [ ] No [ ] N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	[ ] Yes [ ] No [X] N/A	11.
Filtered volume received for dissolved tests	[ ] Yes [ ] No [X] N/A	12.
Sample labels match COC:	[X] Yes [ ] No [ ] N/A	13.
-Includes date/time/ID/analyses Matrix: Ext		
All containers needing preservation have been checked.	[ ] Yes [ ] No [X] N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	[ ] Yes [ ] No [X] N/A	
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	[ ] Yes [X] No	Initial when completed _____ Lot # of added preservative _____
Trip Blank present:	[ ] Yes [ ] No [X] N/A	15.
Pace Trip Blank lot # (if purchased): _____		
Headspace in VOA vials (>6mm):	[ ] Yes [ ] No [X] N/A	16.
Project sampled in USDA Regulated Area:	[ ] Yes [ ] No [X] N/A	17. List State: _____

Client Notification/ Resolution: Copy COC to Client? (Y) / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: CS Date: 4/26/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

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REFERENCE #60120045

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

May 2, 2012

Paul Easley
City of Fort Smith
3900 Kelley HWY
Fort Smith , AR 72904

Re: Lab Project Number: 60120045
Client Project ID: Wet Test

Dear Paul Easley:

Enclosed are the analytical results for sample(s) received by the laboratory. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any question concerning this report, please feel free to contact me.

Sincerely,

Tim Harrell
Tim.Harrell@pacelabs.com
Technical Director

Kansas/ NELAP Certification Number E-10116
Utah Certification Number 9135995665
Texas Certification Number T104704407-08-TX
Oklahoma Certification Number 9205/9935
Louisiana Certification Number 03055
Arkansas Certification Number 05-008-0

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
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REFERENCE #60120045

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

CHRONIC TOXICITY TEST FOR CITY OF FORT SMITH

PERMIT # AR 0021750
AFIN # 66-00226

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

Paul Easley
City of Fort Smith
3900 Kelley HWY
Fort Smith, AR 72904

PREPARED BY:
Pace Analytical Services, Inc.
808 West McKay
Frontenac, KS 66763
1-620-235-0003

May 2, 2012

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE OF CONTENTS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (Pimephales promelas), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (Ceriodaphnia dubia), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the CITY OF FORT SMITH effluent discharge from April 23, 2012 to April 27, 2012. All the test methods followed are as listed in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms."

Statistically significant ($p<0.05$) mortality is determined by Dunnet's procedure using average percent survival of each test concentration versus the average survival of the controls. If significant mortality occurs, median lethal concentrations (LC50) are calculated using effluent concentrations and their corresponding percent mortality data. The LC50's and the 95% confidence intervals are calculated where appropriate by the Spearman-Karber method. Statistical analysis is accomplished by following steps in EPA 821-R-02-013, November 2002 and by use of Toxstat version 3.4.

In minnow section of testing, it was observed that the effluent had no significant effect on the survival of the larvae at the 11% concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 11% for survival. The LC50 was estimated to be >11% effluent. No significant reduction in growth was observed in the 11% effluent concentration. The Toxic Units is <1. The IC25 is >11. The NOEC for growth in effluent was determined to be 11%. The PMSD is 11.8.

In Cladoceran section of testing, it was observed that the effluent had no significant effect on the survival of the organisms in the 11% effluent concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 11% for survival. The LC50 was estimated to be >11% effluent. No significant reduction in reproduction was observed in the 11% effluent concentrations. The Toxic Units is <1. The IC25 is >11. The NOEC for reproduction in effluent was determined to be 11%. The PMSD is 17.2.

The chronic toxicity exhibited by the fathead minnows and the Ceriodaphnia treated by the effluent sampled from April 23 to April 27 from the CITY OF FORT SMITH effluent discharge, is acceptable as described in EPA 821-R-02-013.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the CITY OF FORT SMITH effluent discharge. Chronic toxicity was measured using the Pimephales promelas at larval for survival and growth test and the Ceriodaphnia dubia survival and reproduction test described in EPA 821-R-02-013, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." The raw data of the study is stored at Pace Analytical Services, INC. 808 West McKay, Frontenac, KS 66763.

TEST MATERIAL

City of Fort Smith personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 4-24-12. Subsequent samples followed by delivery on 4-26-12 and on 4-28-12. All samples were stored at ≤ 6° Celsius. Moderately Hard Synthetic Water was used as a control and also to make the required dilutions in the test as described in EPA 821-R-02-013.

TEST METHODS

Pace used EPA test method 1000.0 for conducting the Fathead Minnow, Pimephales promelas, Larval Survival and Growth Test. EPA test method 1002.0 was used for conducting the Cladoceran, Ceriodaphnia dubia, Survival and Reproduction Test. The tests were conducted to estimate the LC50, NOEC, and LOEC for survival, growth, and reproduction of these test species.

The Pimephales and Ceriodaphnia tests were initiated on 4-24-12 and carried out until 5-1-12. The Pimephales tests were conducted in 500 ml plastic jars with 250 ml of test solution. Eight larvae were placed in each of at least 5 replicates to make a total of 40 larvae per sample concentration. The Ceriodaphnia tests were carried out in 35ml vials containing 25 ml of test solution. One Neonate was placed in each of 10 replicates to make a total of 10 neonates per sample concentration.

TEST ORGANISMS

Organisms used in these tests were cultured at Pace under controlled temperature and photo period conditions or were purchased from an external supplier. Pace maintains records of culture techniques for all organisms, whether produced in house or purchased.

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RESULTS

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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE 1

Permittee: CITY OF FORT SMITH Effluent discharge.

Date Sampled No. 1: 4-23-12 8:00

No. 2: 4-25-12 8:00

No. 3: 4-27-12 8:00

Test Initiated: 11:30 Date: 4-24-12

Dilution Water used: Moderately Hard Synthetic Water

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

Effluent Concentration (%)	Average Dry Weight in Milligrams in Replicate Chambers A	B	C	D	E	Mean Dry Weight (mg)	CV% *
Control 0%	0.439	0.374	0.392	0.332	0.419	0.391	6.31
Dilution 1 3%	0.437	0.441	0.394	0.436	0.392	0.420	3.56
Dilution 2 5%	0.416	0.410	0.369	0.433	0.387	0.403	3.73
Dilution 3 6%	0.430	0.368	0.426	0.429	0.401	0.411	3.93
Dilution 4 8%	0.428	0.416	0.407	0.400	0.338	0.398	5.30
Dilution 5 11%	0.384	0.374	0.407	0.354	0.426	0.389	4.29

* Coefficient of Variation = Standard Deviation X 100 / Mean

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Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH Effluent discharge.

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E	24hr	48hr	7 day	
Control 0%	100	100	100	87.5	100	100	100	97.5	4.79
Dilution 1 3%	100	100	100	100	100	100	100	100	0.00
Dilution 2 5%	100	100	100	100	100	100	100	100	0.00
Dilution 3 6%	100	100	100	100	100	100	100	100	0.00
Dilution 4 8%	100	100	100	100	87.5	100	100	97.5	4.79
Dilution 5 11%	100	100	100	100	100	100	100	100	0.00

REPORT OF LABORATORY ANALYSIS

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Permittee: CITY OF FORT SMITH Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

Replicate	Control 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 3 8%	Dilution 4 11%
1	19	23	25	30	25	21
2	28	30	19	26	18	24
3	24	25	27	25	26	30
4	26	25	32	32	26	25
5	30	29	25	29	17	20
6	25	25	34	31	20	28
7	27	29	26	20	28	22
8	23	28	24	29	27	24
9	24	17	18	18	23	15
10	23	26	26	24	24	26
Mean	24.9	25.7	25.6	26.4	23.4	23.5
SD	3.071	3.802	4.926	4.695	3.836	4.275
CV %	12.33	14.79	19.24	17.78	16.39	18.19

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Permittee: CITY OF FORT SMITH Effluent discharge.

CERIODAPHNIA MEAN PERCENT SURVIVAL

	Percent Effluent (%)					
Time Elapsed	Control 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 4 8%	Dilution 5 11%
24 hrs	100	100	100	100	100	100
48 hrs	100	100	100	100	100	100
7-day	100	100	100	100	100	100
SD	0.0	0.0	0.0	0.0	0.0	0.0
CV %	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 2
SUMMARY OF TEST CONDITIONS FOR THE FATHEAD MINNOW (Pimephales promelas) LARVAL SURVIVAL AND GROWTH TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	500 ml
7. Test solution volume	250 ml
8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	8
11. No. replicates/concentration	5
12. No. larvae/concentration	40
13. Feeding regime	Feed 0.1 ml newly hatched brine shrimp nauplii three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None

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TABLE 2 (CONT.)

16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	7 days
19. Endpoints	Survival and growth
20. Test acceptability	80% or greater survival in the controls, Average dry weight in controls >0.25 mg, Coefficient of variation in the control must not exceed 40%.

TABLE 2 (CONT.)
SUMMARY OF TEST CONDITIONS FOR THE CLADOCERAN
(Ceriodaphnia dubia) SURVIVAL AND REPRODUCTION TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	30 ml
7. Test solution volume	25 ml

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TABLE 2 (CONT.)

8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	1
11. No. replicates/concentration	10
12. No. larvae/concentration	10
13. Feeding regime	Feed 0.1 ml YCT three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None
16. Dilution Water	Moderately Hard Synthetic Water prepared with MILLI-Q deionized water and reagent grade chemicals
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	6 days - 8 days
19. Endpoints	Survival and Reproduction
20. Test acceptability	80% or greater survival in the controls, Average reproduction rate of 15 young / adult. Coefficient of variation in the control must not exceed 40%.

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Fax: 913.599.1759

TABLE 2 (SECTION 2)

BIOMONITORING CHRONIC TOXICITY REPORT
FATHEAD MINNOW (Pimephales promelas)
CHEMICAL PARAMETERS CHART

Permittee: CITY OF FORT SMITH. Effluent discharge.

ANALYSTS: Pace Analytical Services, Inc.
Timothy Harrell
Mike Bollin

SAMPLE NO. 1 COLLECTED: DATE: 4-23-12

SAMPLE NO. 2 COLLECTED: DATE: 4-25-12

SAMPLE NO. 3 COLLECTED: DATE: 4-27-12

TABLE 2 (SECTION 2)
INITIAL WATER QUALITY
EFFLUENT CONCENTRATION

	Control	100%
PH	7.78	7.71
D.O.	8.20	8.10
Temp	25	25
Alk	60	128
Hard	94	96
Cond	416	624
Chlorine	<0.1	<0.1

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos
Chlorine is reported as mg/L

REPORT OF LABORATORY ANALYSIS

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Phone: 913.599.5665
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TEST WATER QUALITY

24-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.88	6.60	25
3% Effluent	7.88	7.00	25
5% Effluent	7.87	7.10	25
6% Effluent	7.87	7.20	25
8% Effluent	7.85	7.20	25
11% Effluent	7.84	7.40	25

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.68	6.60	25
3% Effluent	7.72	6.70	25
5% Effluent	7.74	6.70	25
6% Effluent	7.76	6.80	25
8% Effluent	7.77	6.90	25
11% Effluent	7.80	6.90	25

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	11%
pH	7.71	7.82
D.O.	6.80	7.00
Temp	25	25
Alk	64	70
Hard	98	100
Cond	458	413

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos

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TEST VALIDITY

The Pimephales promelas control survival rate was 97.5%. The mean dry weight (growth) of the Pimephales promelas was determined at 0.391 mg/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 0.00 and 6.31. The Ceriodaphnia dubia survival rates were 100 in the control. The Ceriodaphnia in the control produced an average of 24.9 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 0.00 and 12.33. Control data met or exceeded all criteria set out by EPA 821-R-02-013 for test acceptance.

CONCLUSIONS

The No Observed Effect Concentration (NOEC) for Pimephales promelas was 11% for survival and 11% for growth. The No Observed Effect Concentration (NOEC) for Ceriodaphnia dubia was 11% for Survival and 11% for Reproduction. The tests were ran using a synthetic control against effluent concentrations of 3%, 5%, 6%, 8%, and 11%. The effluent sampled on 4-23-12, 4-25-12, and 4-27-12 exhibited acceptable chronic toxicity in Pimephales promelas and in Ceriodaphnia dubia during the exposure period as described in EPA 821-R-02-013.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX A
STATISTICAL ANNALYSIS

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

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	2.010	7.260	11.460	7.260	2.010
OBSERVED	2	0	28	0	0

Calculated Chi-Square goodness of fit test statistic = 40.4019
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.022

W = 0.547

Critical W (P = 0.05) (n = 30) = 0.927
Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's test for homogeneity of variance
B lett's test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	0.991	1.107	1.084
2	3%	5	1.107	1.107	1.107
3	5%	5	1.107	1.107	1.107
4	6%	5	1.107	1.107	1.107
5	8%	5	0.991	1.107	1.084
6	11%	5	1.107	1.107	1.107

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.003	0.052	0.023	4.79
2	3%	0.000	0.000	0.000	0.00
3	5%	0.000	0.000	0.000	0.00
4	6%	0.000	0.000	0.000	0.00
5	8%	0.003	0.052	0.023	4.79
6	11%	0.000	0.000	0.000	0.00

60120045 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6120045A. Transform: ARC SINE(SQUARE ROOT(Y))

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.084				
2	3%	1.107	30.00	16.00	5.00	
3	5%	1.107	30.00	16.00	5.00	
4	6%	1.107	30.00	16.00	5.00	
5	8%	1.084	27.50	16.00	5.00	
6	11%	1.107	30.00	16.00	5.00	

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

60120045 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6120045B. Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.023

W = 0.945

Critical W (P = 0.05) (n = 30) = 0.927
Critical W (P = 0.01) (n = 30) = 0.900

Data PASS normality test at P=0.01 level. Continue analysis.

60120045 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6120045B. Transform: NO TRANSFORMATION

B. lett's test for homogeneity of variance
Calculated B1 statistic = 1.68

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60120045 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6120045B. Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.004	0.001	0.744
Within (Error)	24	0.023	0.001	
Total	29	0.026		

Critical F value = 2.62 (0.05,5,24)
Since F < Critical F FAIL TO REJECT Ho: All equal

60120045 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6120045B. Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.391	0.391		
2	3%	0.420	0.420	-1.478	
3	5%	0.403	0.403	-0.606	
4	6%	0.411	0.411	-1.006	
5	8%	0.398	0.398	-0.339	
6	11%	0.389	0.389	0.113	

Dunnett table value = 2.36 (1 Tailed Value, P=0.05, df=24,5)

60120045 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6120045B. Transform: NO TRANSFORMATION

DUNNETT'S 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	5			
2	3%	5	0.046	11.8	-0.029
	5%	5	0.046	11.8	-0.012
	6%	5	0.046	11.8	-0.020
5	8%	5	0.046	11.8	-0.007
6	11%	5	0.046	11.8	0.002

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
3%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
5%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
6%	10	0	10

TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
ince b is greater than 6 there is no significant difference
between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	TOTAL ANIMALS
CONTROL	10	0	10
8%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference
between CONTROL and TREATMENT at the 0.05 level.

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	TOTAL ANIMALS
CONTROL	10	0	10
11%	10	0	10
TOTAL	20	0	20

CRITICAL FISHER'S VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference
between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHER'S EXACT TESTS

	NUMBER	NUMBER	SIG

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	3%	10	0	
2	5%	10	0	
	6%	10	0	
4	8%	10	0	
5	11%	10	0	

60120045 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6120045D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	1.000	1.000	1.000
2	3%	10	1.000	1.000	1.000
3	5%	10	1.000	1.000	1.000
4	6%	10	1.000	1.000	1.000
5	8%	10	1.000	1.000	1.000
6	11%	10	1.000	1.000	1.000

60120045 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6120045D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.000	0.000	0.000	0.00
2	3%	0.000	0.000	0.000	0.00
3	5%	0.000	0.000	0.000	0.00
4	6%	0.000	0.000	0.000	0.00
5	8%	0.000	0.000	0.000	0.00
6	11%	0.000	0.000	0.000	0.00

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E 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	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	10	23	18	3

Calculated Chi-Square goodness of fit test statistic = 3.4754
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

B lett's test for homogeneity of variance
Calculated B1 statistic = 2.39

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Synthetic	10	19.000	30.000	24.900
2	3%	10	17.000	30.000	25.700
3	5%	10	18.000	34.000	25.600
4	6%	10	18.000	32.000	26.400
5	8%	10	17.000	28.000	23.400
6	11%	10	15.000	30.000	23.500

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Synthetic	9.433	3.071	0.971	12.33
2	3%	14.456	3.802	1.202	14.79
3	5%	24.267	4.926	1.558	19.24
4	6%	22.044	4.695	1.485	17.78
5	8%	14.711	3.836	1.213	16.39
6	11%	18.278	4.275	1.352	18.19

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	75.883	15.177	0.882
Within (Error)	54	928.700	17.198	
Total	59	1004.583		

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

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Synthetic	24.900	24.900		
2	3%	25.700	25.700	-0.431	
3	5%	25.600	25.600	-0.377	
4	6%	26.400	26.400	-0.809	
5	8%	23.400	23.400	0.809	
6	11%	23.500	23.500	0.755	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

60120045 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6120045E Transform: NO TRANSFORMATION

DUNNETT'S 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	Synthetic	10			
2	3%	10	4.284	17.2	-0.800
	5%	10	4.284	17.2	-0.700
	6%	10	4.284	17.2	-1.500
5	8%	10	4.284	17.2	1.500
6	11%	10	4.284	17.2	1.400

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	3	5	6	8	11
Response 1	19	23	25	30	25	21
Response 2	28	30	19	26	18	24
Response 3	24	25	27	25	26	30
Response 4	26	25	32	32	26	25
Response 5	30	29	25	29	17	20
Response 6	25	25	34	31	20	28
Response 7	27	29	26	20	28	22
Response 8	23	28	24	29	27	24
Response 9	24	17	18	18	23	15
Response 10	23	26	26	24	24	26

*** Inhibition Concentration Percentage Estimate ***
Toxicant/Effluent: Ft Smith
Test Start Date: 4/24/12 Test Ending Date: 5/1/12
Test Species: Dubia
Test Duration: 7 Day
DATA FILE:

Conc. ID	Number Replicates	Concentration	Response Means	Std. Dev.	Pooled Response Means
1	10	0.000	24.900	3.071	25.650
2	10	3.000	25.700	3.802	25.650
3	10	5.000	25.600	4.926	25.650
4	10	6.000	26.400	4.695	25.650
5	10	8.000	23.400	3.836	23.450
	10	11.000	23.500	4.275	23.450

*** No Linear Interpolation Estimate can be calculated from the input data since none of the (possibly pooled) group response means were less than 75% of the control response mean.

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	3	5	6	8	11
Response 1	.439	.437	.416	.430	.428	.384
Response 2	.334	.441	.410	.368	.416	.374
Response 3	.392	.394	.369	.426	.407	.407
Response 4	.332	.436	.433	.429	.400	.354
Response 5	.419	.392	.387	.401	.338	.426

*** Inhibition Concentration Percentage Estimate ***
Toxicant/Effluent: Ft Smith
Test Start Date: 4/24/12 Test Ending Date: 5/1/12
Test Species: Fathead
Test Duration: 7 Day
DATA FILE:

Conc. ID	Number Replicates	Concentration	Response Means	Std. Dev.	Pooled Response Means
1	5	0.000	0.383	0.049	0.404
2	5	3.000	0.420	0.025	0.404
3	5	5.000	0.403	0.025	0.404
4	5	6.000	0.411	0.027	0.404
5	5	8.000	0.398	0.035	0.398
6	5	11.000	0.389	0.028	0.389

*** No Linear Interpolation Estimate can be calculated from the input data since none of the (possibly pooled) group response means were less than 75% of the control response mean.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

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APPENDIX B
CHAIN OF CUSTODY FORMS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: of 1

1542103

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy Ft. Smith, AR 72904
Email To:
Phone: 479-784-2337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Randy Easley
Copy To:
Purchase Order No.:
Project Name: Massard Biomonitoring
Project Number:

Section C Invoice Information:

Attention: Randy Easley
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE
Drinking Water DW
Water WT
Waste Water WW
Product P
Soil/Solid SL
Oil OL
Wipe WP
Air AR
Tissue TS
Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other Ice	Analysis Test Y/N	Requested Analysis Filtered (Y/N): Y/N	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Massard Effluent	WW	C	4/22/12	0800	4/23/12	0800		1								X	Y	MM		
2																		Y	XX		
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Analysis Test: Y/N
Y — Arsenic, Mercury, Chloride, Cyanide

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
T. Cl_2 = 0.02 mg/L F. Cl_2 = 0.02 mg/L	John Hancock / City of Fort Smith	4/23/12	1030		4/23/12	1000	2.4

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: John Hancock

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

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Page: 1 of 1

1371410

Section A Required Client Information:

Company: CITY OF FORT SMITH
Address: 3900 Kelley Hwy Ft. Smith, AR 72904
Email To:
Phone: 479-784-2337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: RANDY EASLEY
Copy To:
Purchase Order No.:
Project Name: MASSARD BIOMONITORING
Project Number:

Section C Invoice Information:

Attention: RANDY EASLEY
Company Name: CITY OF FORT SMITH
Address: 3900 Kelley Hwy, Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analysis Test ↓	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		NN			
1	MASSARD EFFLUENT	WW	C	4/24/12	0800	4/25/12	0800		1								X	XX	Chronic Mysid Chronic Ceriodaphnia		
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Sample Temp at Collection: ICE

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
T. Cl_2 = 0.02 mg/L		4/25/12	1615		4/26/12	1030	2.0	Y	Y	Y
F. Cl_2 = 0.01 mg/L										

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: JOHN HANCOCK
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 04/25/12

~~*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.~~

4/25/12

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1542104

Section A — **Required** Client Information:

Company: CITY OF FORT SMITH
Address: 3900 Kelley Hwy
FT. SMITH, AR 72904
Email To:
Phone: 479-784-2337 Fax:
Requested Due Date/TAT:

Section B — **Required** Project Information:

Report To: RANDY EASLEY
Copy To:
Purchase Order No.:
Project Name: MASSARD BIOMONITORING
Project Number:

Section C — Invoice Information:

Attention: RANDY EASLEY
Company Name: CITY OF FORT SMITH
Address: 3900 Kelley Hwy FT. SMITH, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D — **Required** Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analysis Test	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MASSARD EFFLUENT	WW	C	4/26/12	0800	4/27/12	0800		1								ICE	X	Chronic Mussow		
2																		X	Chronic Ceriodaphnia		
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
T. Cl2 =										
F. Cl2 =		4/27/12	1219	Jamie Rane	4/27/12	1219				
					4/28/12	1630	2.2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: JOHN HANCOCK
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 4/27/12

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

4/27/12

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX C

REFERENCE TOXICANTS SUMMARY

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

The absence of significant control mortality during this test indicated the health of the organisms and indicated that any significant mortality in the test concentrations was not due to contaminants or variations in testing conditions.

Reference toxicity testing is routinely performed by staff members in our biomonitoring - bioassay laboratory.

Start: 4/24/12 14:00 End: 5/1/12 14:00

Reference Toxicant (NaCl) Pimephales promelas

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
10 g/l	40	7	3	0
8 g/l	40	37	29	5
6 g/l	40	38	34	16
4 g/l	40	40	40	40
2 g/l	40	40	40	40

IC25 (4.84 g/l Sodium Chloride)

Survival NOEC: 4.0 g/l

Reference Toxicant (NaCl) Ceriodaphnia Dubia

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	4	0	0
2.0 g/l	10	9	6	1
1.5 g/l	10	10	10	10
1.0 g/l	10	10	10	10
0.5 g/l	10	10	10	10

IC25 (1.09 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By: Timothy Harrell, Technical Director

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX D
STATE AGENCY FORMS

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: City of Fort Smith
NPDES No.: AR 0021750
Contact: Paul Easley
Analyst: Tim Harrell
Mike Bollin

Sample No. 1 Collected: Date: 4/23/2012 Time: 8:00
Sample No. 2 Collected: Date: 4/25/2012 Time: 8:00
Sample No. 3 Collected: Date: 4/27/2012 Time: 8:00
Test Begin: Date: 4/24/2012 Time: 12:00
Test End: Date: 5/1/2012 Time: 13:30

Dilution: 0 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	8.2	8.1	8.2	8.3	8.2	8.4	8.3	
DO Final	6.6	6.6	7.8	7.3	7.6	7.5	6.8	
pH Initial	7.78	7.66	7.65	7.69	7.62	7.56	7.52	
pH Final	7.88	7.68	7.87	7.73	7.68	7.67	7.71	
Alkalinity	60						64	
Hardness	94						98	
Conductivity	416						458	
Chlorine	<.1						<.1	

Dilution: 6 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.2	8.3	8.3	8.3	8.4	8.3	
DO Final	7.2	6.8	7.8	7.3	7.6	7.5	6.9	
pH Initial		7.67	7.7	7.7	7.7	7.59	7.63	
pH Final	7.87	7.76	7.89	7.78	7.72	7.77	7.8	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 3 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.1	8.2	8.3	8.2	8.4	8.3	
DO Final	7	6.7	7.8	7.3	7.6	7.5	6.8	
pH Initial		7.66	7.68	7.69	7.66	7.57	7.56	
pH Final	7.88	7.72	7.88	7.76	7.69	7.75	7.74	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 8 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.2	8.3	8.3	8.4	8.5	8.3	
DO Final	7.2	6.9	7.7	7.3	7.5	7.5	6.9	
pH Initial		7.68	7.72	7.73	7.73	7.6	7.65	
pH Final	7.85	7.77	7.89	7.79	7.73	7.77	7.8	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 5 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.1	8.2	8.3	8.3	8.4	8.3	
DO Final	7.1	6.7	7.8	7.3	7..60	7.5	6.9	
pH Initial		7.67	7.7	7.7	7.68	7.57	7.58	
pH Final	7.87	7.74	7.88	7.78	7.72	7.75	7.79	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 11 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	Init. 100%
DO Initial		8.3	8.3	8.4	8.4	8.5	8.4	8.1
DO Final	7.4	6.9	7.7	7.3	7.5	7.4	7	
pH Initial		7.69	7.74	7.75	7.76	7.63	7.7	7.71
pH Final	7.84	7.8	7.9	7.8	7.75	7.78	7.82	
Alkalinity								128
Hardness								96
Conductivity								624
Chlorine							<.1	<.1

Summary Reporting Forms Chronic Biomonitoring
Fathead Minnow Larvae Growth and Survival
(Pimephales promelas)

Permittee:- City of Fort Smith **NPDES No.:** AR 0021750

		Time:	Date:		Time:	Date:
Composite 1 Collected	From	8:00	4/22/2012	To	8:00	4/23/2012
Composite 2 Collected	From	8:00	4/24/2012	To	8:00	4/25/2012
Composite 3 Collected	From	8:00	4/26/2012	To	8:00	4/27/2012

Test initiated: am/pm 10:00 AM date 4/24/2012
Test terminated: am/pm 11:30 AM date 5/1/2012

Dilution water used: Receiving Reconstituted X

Data Table for Survival

Effluent Conc.%	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
Syn O %	100	100	100	87.5	100	100	100	97.5	4.79
3%	100	100	100	100	100	100	100	100	0
5%	100	100	100	100	100	100	100	100	0
6%	100	100	100	100	100	100	100	100	0
8%	100	100	100	100	87.5	100	100	97.5	4.79
11%	100	100	100	100	100	100	100	100	0

Data Table for Survival

Effluent Conc.%	Average Dry Weight in milligrams in Replicate Chambers					Mean Dry Weight mg	CV%*
	A	B	C	D	E		
Syn. 0%	0.439	0.374	0.392	0.332	0.419	0.391	6.31
3%	0.437	0.441	0.394	0.436	0.392	0.42	3.56
5%	0.416	0.41	0.369	0.433	0.387	0.403	3.73
6%	0.43	0.368	0.426	0.429	0.401	0.411	3.93
8%	0.428	0.416	0.407	0.4	0.338	0.398	5.3
11%	0.384	0.374	0.407	0.354	0.426	0.389	4.29

*coefficient of variation = standard deviation x 100/mean.

Fathead Minnow Larvae Growth and Survival (cont)
(Pimephales promelas)

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

Is the mean survival at 7 days significantly different (p=.05) than the control survival for the % effluent corresponding to:

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No: X**
b) ½ Low Flow Dilution	**(**	**%):**	**Yes:**	**No:**

2. Dunnett's Procedure (or appropriate test):

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

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No:** X
b) ½ Low Flow Dilution	**(**	**%):**	**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):

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 NOEC below and circle lowest number:

a) NOEC survival:	11 **% effluent**
b) NOEC reproduction:	11 **% effluent**

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: City of Fort Smith
NPDES No.: AR 0021750
Contact: Paul Easley
Analyst: Tim Harrell
Mike Bollin

Sample No. 1 Collected: Date: 4/23/2012 Time: 8:00
Sample No. 2 Collected: Date: 4/25/2012 Time: 8:00
Sample No. 3 Collected: Date: 4/27/2012 Time: 8:00
Test Begin: Date: 4/24/2012 Time: 12:00
Test End: Date: 5/1/2012 Time: 13:30

Dilution: 0
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	8.2	8.1	8.2	8.3	8.2	8.4	8.3	
DO Final	6.6	6.6	7.8	7.3	7.6	7.5	6.8	
pH Initial	7.78	7.66	7.65	7.69	7.62	7.56	7.52	
pH Final	7.88	7.68	7.87	7.73	7.68	7.67	7.71	
Alkalinity	60						64	
Hardness	94						98	
Conductivity	416						458	
Chlorine	<.1						<.1	

Dilution: 6
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.2	8.3	8.3	8.3	8.4	8.3	
DO Final	7.2	6.8	7.8	7.3	7.6	7.5	6.9	
pH Initial		7.67	7.7	7.7	7.7	7.59	7.63	
pH Final	7.87	7.76	7.89	7.78	7.72	7.77	7.8	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 3
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.1	8.2	8.3	8.2	8.4	8.3	
DO Final	7	6.7	7.8	7.3	7.6	7.5	6.8	
pH Initial		7.66	7.68	7.69	7.66	7.57	7.56	
pH Final	7.88	7.72	7.88	7.76	7.69	7.75	7.74	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 8
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.2	8.3	8.3	8.4	8.5	8.3	
DO Final	7.2	6.9	7.7	7.3	7.5	7.5	6.9	
pH Initial		7.68	7.72	7.73	7.73	7.6	7.65	
pH Final	7.85	7.77	7.89	7.79	7.73	7.77	7.8	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 5
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		8.1	8.2	8.3	8.3	8.4	8.3	
DO Final	7.1	6.7	7.8	7.3	7..60	7.5	6.9	
pH Initial		7.67	7.7	7.7	7.68	7.57	7.58	
pH Final	7.87	7.74	7.88	7.78	7.72	7.75	7.79	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 11
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	Init. 100%
DO Initial		8.3	8.3	8.4	8.4	8.5	8.4	8.1
DO Final	7.4	6.9	7.7	7.3	7.5	7.4	7	
pH Initial		7.69	7.74	7.75	7.76	7.63	7.7	7.71
pH Final	7.84	7.8	7.9	7.8	7.75	7.78	7.82	
Alkalinity								128
Hardness								96
Conductivity								624
Chlorine							<.1	<.1

Summary Reporting Forms
Chronic Biomonitoring

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Fort Smith **NPDES No.:** AR 0021750

		Time:	Date:		Time:	Date:
Composite 1 Collected	**From**	8:00	4/22/2012	**To**	8:00	4/23/2012
Composite 2 Collected	**From**	8:00	4/24/2012	**To**	8:00	4/25/2012
Composite 3 Collected	**From**	8:00	4/26/2012	**To**	8:00	4/27/2012

Test initiated: **am/pm** 10:00 AM **date** 4/24/2012
Test terminated: **am/pm** 11:30 AM **date** 5/1/2012

Dilution water used: **Receiving** **Reconstituted** X

Percent Survival

Time of Reading	Percent Effluent					
	0	3	5	6	8	11
24h	100	100	100	100	100	100
48h	100	100	100	100	100	100
End of test	100	100	100	100	100	100

Number of Young Produced per Female @ End of Test

Rep	0	3	5	6	8	11
A	19	23	25	30	25	21
B	28	30	19	26	18	24
C	24	25	27	25	26	30
D	26	25	32	32	26	25
E	30	29	25	29	17	20
F	25	25	34	31	20	28
G	27	29	26	20	28	22
H	23	28	24	29	27	24
I	24	17	18	18	23	15
J	23	26	26	24	24	26
Mean	24.9	25.7	25.6	26.4	23.4	23.5
CV%*	12.33	14.79	19.24	17.78	16.39	18.19

*coefficient of variation = standard deviation x 100/mean.

Ceriodaphnia dubia
Survival and Reproduction (cont)

1. Fisher's Exact Test:

Is the mean survival at the end of the test significantly different (p=.05) than the control survival for the % effluent corresponding to (lethality):

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No: X**
b) ½ Low Flow Dilution	**(**	**%):**	**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=.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	**(**	**8 %):**	**Yes:**	**No: X**
b) ½ Low Flow Dilution	**(**	**%):**	**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):

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 NOEC below and circle lowest number:

a) NOEC survival:	11 **% effluent**
b) NOEC reproduction:	11 **% effluent**

AR0033278

INTER-OFFICE MEMO

TO: Steve Floyd, Superintendent of Water and Wastewater Operations

FROM: Don Clover, Biologist

DATE: July 6, 2012

RE: Biomonitoring Results - "P" Street Plant

Please find below the biomonitoring test results for the second quarter of 2012. The *Ceriodaphnia dubia* receiving water test control did not meet reproduction and coefficient of variation acceptance criteria as outlined in AR0033278. The test was therefore considered invalid and a re-test utilizing synthetic laboratory water for dilution purposes was scheduled for July 9th. The fathead minnow (*Pimephales promelas*) chronic test did not experience lethal or sub-lethal effects in the low flow dilution of 8% effluent. The test therefore passes at the low-flow dilution of 8% for lethal and sub-lethal effects.

Parameter #TGP3B- Not Valid

Parameter #TGP6C- 0

Parameter #TLP3B- Not Valid

Parameter #TLP6C- 0

Parameter #TOP3B- Not Valid

Parameter # TOP6C- 11%

Parameter #TPP3B- Not Valid

Parameter #TPP6C- 11%

Parameter #TQP3B- Not Valid

Parameter #TQP6C- 5.52%

I have reviewed the test results and the reports are accurate and valid.

Don Clover

Don Clover

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

June 18, 2012

Mr. Paul Easley
City of Fort Smith
3900 Kelley Hwy.
Fort Smith, AR 72904

RE: Project: P STREET BIOMONITORING
Pace Project No.: 60122719

Dear Mr. Easley:
Enclosed are the analytical results for sample(s) received by the laboratory on June 05, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Connie Sparks

Connie Sparks

connie.sparks@pacelabs.com
Project Manager

Enclosures

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9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: P STREET BIOMONITORING
Pace Project No.: 60122719

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 05-008-0
Illinois Certification #: 001191
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-08-TX
Utah Certification #: 9135995665

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ANALYTICAL RESULTS

Project: P STREET BIOMONITORING
Pace Project No.: 60122719

Sample: P STREET EFFLUENT **Lab ID: 60122719001** Collected: 06/04/12 08:00 Received: 06/05/12 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical Method: EPA 821/R-02/013							
Toxicity, Chronic	**Complete**		1.0	1		06/05/12 13:00		

Sample: ARKANSAS RIVER **Lab ID: 60122719002** Collected: 06/04/12 08:55 Received: 06/05/12 11:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Chronic Toxicity	Analytical Method: EPA 821/R-02/013							
Toxicity, Chronic	**Complete**		1.0	1		06/05/12 13:00		

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QUALIFIERS

Project: P STREET BIOMONITORING
Pace Project No.: 60122719

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P STREET BIOMONITORING
Pace Project No.: 60122719

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60122719001	**P STREET EFFLUENT**	EPA 821/R-02/013	BIO/1541		
60122719002	**ARKANSAS RIVER**	EPA 821/R-02/013	BIO/1541		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1553820

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy
Ft. Smith AR 72904
Email To:
Phone: 4797842337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Randy Easley
Copy To:
Purchase Order No.:
Project Name: "P" Street Biomonitoring
Project Number:

Section C Invoice Information:

Attention: Randy Easley
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Chronic Minnow	Chronic Ceriodaphnia	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	C	6/3/12	0800	6/4/12	0800		1								X		X	X		01277.9
2	Arkansas River	WT	G			6/4/12	0955		1								X		X	X		01
3																						02
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
P Street Effluent TCl2 = 0.02 mg/L	Kristy L Cantu	6/4/12	1326		6/5/12	1100	2.4 Y Y X
P Street Effluent FCl2 = 0.02 mg/L							
Arkansas River TCl2 = 0.02 mg/L							
Arkansas River FCl2 = 0.03 mg/L							

2

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kristy L. Cantu

SIGNATURE of SAMPLER: Kristy L Cantu

DATE Signed (MM/DD/YY): 6/4/12

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Condition Upon Receipt

Pace Analytical
www.pacelabs.com

Client Name: Ft Smith Project # 60122719

Courier: [ ] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace [ ] Other _____

Tracking #: _____ Pace Shipping Label Used? [ ] Yes [ ] No

Custody Seal on Cooler/Box Present: [X] Yes [ ] No Seals intact. [X] Yes [ ] No

Optional
Proj. Due Date: 6/21
Proj. Name:

Packing Material: [ ] Bubble Wrap [ ] Bubble Bags [ ] Foam [X] None [ ] Other _____

Thermometer Used: T-111 Type of Ice: (Wet) Blue None [ ] Samples on ice, cooling process has begun

Cooler Temperature: 2.4

Temperature should be above freezing to 6°C

Date and Initials of person examining contents: TH 6/5/12 1130

		Comments:
Chain of Custody present:	[X] Yes [ ] No [ ] N/A	1.
Chain of Custody filled out:	[X] Yes [ ] No [ ] N/A	2.
Chain of Custody relinquished:	[X] Yes [ ] No [ ] N/A	3.
Sampler name & signature on COC:	[X] Yes [ ] No [ ] N/A	4.
Samples arrived within holding time:	[X] Yes [ ] No [ ] N/A	5.
Short Hold Time analyses (<72hr):	[X] Yes [ ] No [ ] N/A	6.
Rush Turn Around Time requested:	[ ] Yes [X] No [ ] N/A	7.
Sufficient volume	[X] Yes [ ] No [ ] N/A	8.
Correct containers used:	[X] Yes [ ] No [ ] N/A	9.
-Pace containers used:	[X] Yes [ ] No [ ] N/A	
Containers intact.	[X] Yes [ ] No [ ] N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	[ ] Yes [ ] No [X] N/A	11.
Filtered volume received for dissolved tests	[ ] Yes [X] No [ ] N/A	12.
Sample labels match COC	[X] Yes [ ] No [ ] N/A	13
-Includes date/time/ID/analyses Matrix: _____		
All containers needing preservation have been checked	[ ] Yes [ ] No [X] N/A	14
All containers needing preservation are found to be in compliance with EPA recommendation.	[ ] Yes [ ] No [X] N/A	
Exceptions VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	[ ] Yes [X] No	Initial when completed _____ Lot # of added preservative _____
Trip Blank present:	[ ] Yes [ ] No [X] N/A	15.
Pace Trip Blank lot # (if purchased): _____		
Headspace in VOA vials (>6mm):	[ ] Yes [ ] No [X] N/A	16.
Project sampled in USDA Regulated Area:	[ ] Yes [ ] No [X] N/A	17. List State: _____

Client Notification/ Resolution: Copy COC to Client? (Y) / N Field Data Required? Y / N

Person Contacted _____ Date/Time. _____

Comments/ Resolution _____

Project Manager Review: CS Date: 6/7/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i e out of hold, incorrect preservative, out of temp, incorrect containers)

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REFERENCE #60122719 Rev 1

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

June 14, 2012

Paul Easley
City of Fort Smith
3900 Kelley HWY
Fort Smith, AR 72904

Re: Lab Project Number: 60122719 Rev 1
Client Project ID: Wet Test

Dear:

Enclosed are the analytical results for sample(s) received by the laboratory. The results relate only to the samples included in this report. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any question concerning this report, please feel free to contact me.

Sincerely,

Connie Sparks

for Tim Harrell
Tim.Harrell@pacelabs.com
Technical Director

Kansas/ NELAP Certification Number E-10116
Utah Certification Number 9115995665
Texas Certification Number T104704407-08-TX
Oklahoma Certification Number 9205/9935
Louisiana Certification Number 03055
Arkansas Certification Number 05-008-0

Enclosures

REPORT OF LABORATORY ANALYSIS

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REFERENCE #60122719 Rev 1

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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

CHRONIC TOXICITY TEST FOR CITY OF FORT SMITH (P STREET)

PERMIT # AR 0033278
AFIN # 66-00226

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

Paul Easley
City of Fort Smith (P Street)
3900 Kelley HWY
Fort Smith, AR 72904

PREPARED BY:
Pace Analytical Services, Inc.
808 West McKay
Frontenac, KS 66763
1-620-235-0003

June 14, 2012

REPORT OF LABORATORY ANALYSIS

ACCREDITED IN ACCORDANCE WITH nelac

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE OF CONTENTS

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

SUMMARY

A Chronic Whole Effluent Toxicity Test using the 7-day chronic fathead minnows (Pimephales promelas), static renewal larval survival and growth test, and three brood 7-day chronic Cladoceran (Ceriodaphnia dubia), static renewal survival and reproduction test, was conducted on effluent discharge water collected at the CITY OF FORT SMITH (P STREET) effluent discharge from June 4, 2012 to June 8, 2012. All the test methods followed are as listed in EPA 821-R-02-011, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms."

Statistically significant ($p<0.05$) mortality is determined by Dunnet's procedure using average percent survival of each test concentration versus the average survival of the controls. If significant mortality occurs, median lethal concentrations (LC50) are calculated using effluent concentrations and their corresponding percent mortality data. The LC50's and the 95% confidence intervals are calculated where appropriate by the Spearman-Karber method. Statistical analysis is accomplished by following steps in EPA 821-R-02-011, November 2002 and by use of Toxstat version 3.4.

In minnow section of testing, it was observed that the effluent had no significant effect on the survival of the larvae at the 11% concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 11% for survival. The LC50 was estimated to be >11% effluent. No significant reduction in growth was observed in the 11% effluent concentration. The Toxic Units is <1. The IC25 is >11. The NOEC for growth in effluent was determined to be 11%. The PMSD is 10.7.

In Cladoceran section of testing, The upstream dilution water did not meet the QC requirement and appears to influence these results. It was observed that the effluent had no significant effect on the survival of the organisms in the 11% effluent concentration. No significant mortality was observed in the other effluent concentrations after the 7-day exposure period. The No Observed Effect Concentration (NOEC) was determined to be 11% for survival. The LC50 was estimated to be >11% effluent. Significant reduction in reproduction was observed in all effluent concentrations and the upstream. The Toxic Units is N/A. The IC25 is N/A. The NOEC for reproduction in effluent was determined to be inconclusive. The PMSD is 66.0.

The chronic toxicity exhibited by the fathead minnows and the Ceriodaphnia treated by the effluent sampled from June 4 to June 8 from the CITY OF FORT SMITH (P STREET) effluent discharge, is non acceptable or invalid based on the upstream control for only the Ceriodaphnia as described in EPA 821-R-02-011.

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the CITY OF.FORT SMITH (P STREET) effluent discharge. Chronic toxicity was measured using the Pimephales promelas at larval for survival and growth test and the Ceriodaphnia dubia survival and reproduction test described in EPA 821-R-02-011, "Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms." The raw data of the study is stored at Pace Analytical Services, INC. 808 West McKay, Frontenac, KS 66763.

TEST MATERIAL

City of Fort Smith (P Street) personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 6-5-12. Subsequent samples followed by delivery on 6-7-12 and on 6-9-12. All samples were stored at ≤ 6° Celsius. Upstream water was used as a control and also to make the required dilutions in the test as described in EPA 821-R-02-011.

TEST METHODS

Pace used EPA test method 1000.0 for conducting the Fathead Minnow, Pimephales promelas, Larval Survival and Growth Test. EPA test method 1002.0 was used for conducting the Cladoceran, Ceriodaphnia dubia, Survival and Reproduction Test. The tests were conducted to estimate the LC50, NOEC, and LOEC for survival, growth, and reproduction of these test species.

The Pimephales and Ceriodaphnia tests were initiated on 6-5-12 and carried out until 6-12-12. The Pimephales tests were conducted in 500 ml plastic jars with 250 ml of test solution. Eight larvae were placed in each of at least 5 replicates to make a total of 40 larvae per sample concentration. The Ceriodaphnia tests were carried out in 35ml vials containing 25 ml of test solution. One Neonate was placed in each of 10 replicates to make a total of 10 neonates per sample concentration.

TEST ORGANISMS

Organisms used in these tests were cultured at Pace under controlled temperature and photo period conditions or were purchased from an external supplier. Pace maintains records of culture techniques for all organisms, whether produced in house or purchased.

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

RESULTS

Pace Analytical Services, Inc.
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Phone: 913.599.5665
Fax: 913.599.1759

TABLE 1

Permittee: CITY OF FORT SMITH (P STREET) Effluent discharge.

Date Sampled No. 1: 6-4-12 8:00

No. 2: 6-6-12 8:00

No. 3: 6-8-12 8:00

Test Initiated: 13:00 Date: 6-5-12

Dilution Water used: Upstream

FATHEAD MINNOW LARVAE GROWTH AND SURVIVAL
(Pimephales promelas)

DATA TABLE FOR GROWTH OF FATHEAD MINNOWS

Effluent Concentration (%)	Average Dry Weight in Milligrams in Replicate Chambers A	B	C	D	E	Mean Dry Weight (mg)	CV% *
Upstream 0%	0.449	0.460	0.484	0.402	0.411	0.441	4.75
Dilution 1 3%	0.456	0.421	0.444	0.484	0.402	0.441	4.39
Dilution 2 5%	0.477	0.420	0.487	0.440	0.419	0.449	4.36
Dilution 3 6%	0.447	0.415	0.370	0.469	0.450	0.430	5.52
Dilution 4 8%	0.440	0.420	0.470	0.429	0.451	0.443	2.69
Dilution 5 11%	0.414	0.414	0.436	0.401	0.482	0.429	4.51
Lab Control	0.426	0.487	0.352	0.456	0.432	0.431	N/A

* Coefficient of Variation = Standard Deviation X 100 / Mean

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH (P STREET) Effluent discharge.

FATHEAD MINNOW SURVIVAL

Conc. %	Percent Survival in Replicate Chambers					Mean Percent Survival			CV %
	A	B	C	D	E	24hr	48hr	7 day	
Upstream 0%	100	100	100	100	100	100	100	100	0.00
Dilution 1 3%	100	100	100	100	100	100	100	100	0.00
Dilution 2 5%	100	100	100	100	100	100	100	100	0.00
Dilution 3 6%	100	100	87.5	100	100	100	100	97.5	4.79
Dilution 4 8%	100	100	100	100	100	100	100	100	0.00
Dilution 5 11%	100	100	100	100	100	100	100	100	0.00
Lab Control	100	100	87.5	100	100	100	100	97.5	4.79

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Fax: 913.599.1759

Permittee: CITY OF FORT SMITH (P STREET) Effluent discharge.

CERIODAPHNIA SURVIVAL AND REPRODUCTION

DATA TABLE FOR CERIODAPHNIA YOUNG PRODUCTION

Replicate	Upstream 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 3 8%	Dilution 4 11%
1	11	9	8	8	0	11
2	13	9	0	0	11	11
3	4	13	12	16	7	12
4	5	14	6	11	15	7
5	12	10	6	8	13	0
6	4	12	4	7	12	8
7	5	12	10	14	10	17
8	7	13	8	0	6	12
9	0	14	12	5	5	11
10	8	5	5	6	0	16
Mean	6.9	11.1	7.1	7.5	7.9	10.5
SD	4.122	2.846	3.725	5.255	5.216	4.790
CV %	59.74	25.64	52.47	70.06	66.03	45.62

Replicate	Control Lab
1	25
2	20
3	21
4	22
5	18
6	22
7	25
8	24
9	20
10	22
Mean	21.9
SD	2.283
CV %	10.42

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Phone: 913.599.5665
Fax: 913.599.1759

Permittee: CITY OF FORT SMITH (P STREET) Effluent discharge.

CERIODAPHNIA MEAN PERCENT SURVIVAL

	Percent Effluent (%)					
Time Elapsed	Upstream 0%	Dilution 1 3%	Dilution 2 5%	Dilution 3 6%	Dilution 4 8%	Dilution 5 11%
24 hrs	100	100	100	100	100	100
48 hrs	100	100	100	100	100	100
7-day	80	100	90	90	90	100
SD	0.422	0.0	0.316	0.316	0.316	0.0
CV %	52.7	0.0	35.14	35.14	35.14	0.0

Time Elapsed	Control Lab
24 hrs	100
48 hrs	100
7-day	100
SD	0.000
CV %	0.00

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

TABLE 2
SUMMARY OF TEST CONDITIONS FOR THE FATHEAD MINNOW (Pimephales promelas) LARVAL SURVIVAL AND GROWTH TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	500 ml
7. Test solution volume	250 ml
8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	8
11. No. replicates/concentration	5
12. No. larvae/concentration	40
11. Feeding regime	Feed 0.1 ml newly hatched brine shrimp nauplii three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None

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TABLE 2 (CONT.)

16. Dilution Water	Upstream
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	7 days
19. Endpoints	Survival and growth
20. Test acceptability	80% or greater survival in the controls, Average dry weight in controls >0.25 mg, Coefficient of variation in the control must not exceed 40%.

TABLE 2 (CONT.)
SUMMARY OF TEST CONDITIONS FOR THE CLADOCERAN (Ceriodaphnia dubia) SURVIVAL AND REPRODUCTION TEST

1. Test type	Static renewal
2. Temperature	25 degrees Celsius
3. Light quality	Ambient laboratory light
4. Light intensity	Ambient laboratory levels
5. Photoperiod	16 hr light, 8 hr dark
6. Test chamber size	30 ml
7. Test solution volume	25 ml

TABLE 2 (CONT.)

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Fax: 913.599.1759

8. Renewal of test concentrations	Daily
9. Age of test organism	< 24 hours
10. No. larvae/chamber	1
11. No. replicates/concentration	10
12. No. larvae/concentration	10
11. Feeding regime	Feed 0.1 ml YCT three times daily. Larvae are not fed 12 hours prior to termination of test.
14. Cleaning	Siphon daily, immediately before test solution renewal
15. Aeration	None
16. Dilution Water	Upstream
17. Effluent concentrations	0%, 3%, 5%, 6%, 8%, 11%
18. Test duration	6 days - 8 days
19. Endpoints	Survival and Reproduction
20. Test acceptability	80% or greater survival in the controls, Average reproduction rate of 15 young / adult. Coefficient of variation in the control must not exceed 40%.

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TABLE 2 (SECTION 2)

BIOMONITORING CHRONIC TOXICITY REPORT
FATHEAD MINNOW (Pimephales promelas)
CHEMICAL PARAMETERS CHART

Permittee: CITY OF FORT SMITH (P STREET). Effluent discharge.

ANALYSTS: Pace Analytical Services, Inc.
Timothy Harrell
Mike Bollin

SAMPLE NO. 1 COLLECTED: DATE: 6-4-12

SAMPLE NO. 2 COLLECTED: DATE: 6-6-12

SAMPLE NO. 3 COLLECTED: DATE: 6-8-12

TABLE 2 (SECTION 2)
INITIAL WATER QUALITY
EFFLUENT CONCENTRATION

	Control	100%	Upstream
PH	7.75	7.02	8.09
D.O.	8.20	7.50	7.70
Temp	25	25	25
Alk	60	66	130
Hard	94	116	188
Cond	312	425	684
Chlorine	<0.1	<0.1	<0.1

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos
Chlorine is reported as mg/L

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TEST WATER QUALITY

24-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Upstream	8.25	7.00	25
3% Effluent	8.24	7.00	25
5% Effluent	8.24	7.00	25
6% Effluent	8.23	7.00	25
8% Effluent	8.21	7.00	25
11% Effluent	8.19	7.10	25

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Upstream	8.25	7.30	25
3% Effluent	8.24	7.20	25
5% Effluent	8.22	7.20	25
6% Effluent	8.21	7.20	25
8% Effluent	8.19	7.10	25
11% Effluent	8.17	7.00	25

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FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	11%	Upstream
pH	7.59	8.10	8.35
D.O.	7.00	6.90	7.30
Temp	25	25	25
Alk	60	88	136
Hard	98	134	178
Cond	368	637	800

* D.O. is reported as mg/L
Alkalinity is reported as mg/L CaCO3
Hardness is reported as mg/L CaCO3
Conductance is reported as umhos

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TEST VALIDITY

The Pimephales promelas control survival rate was 100%. The mean dry weight (growth) of the Pimephales promelas was determined at 0.441 mg/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 0.00 and 4.75. The Ceriodaphnia dubia survival rates were 80 in the control. The Ceriodaphnia in the control produced an average of 6.9 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 52.70 and 59.74. Control data **DID NOT** met or exceeded all criteria set out by EPA 821-R-02-011 for test acceptance.

CONCLUSIONS

The No Observed Effect Concentration (NOEC) for Pimephales promelas was 11% for survival and 11% for growth. The No Observed Effect Concentration (NOEC) for Ceriodaphnia dubia was 11% for Survival and N/A for Reproduction. The tests were ran using a Upstream control against effluent concentrations of 3%, 5%, 6%, 8%, and 11%. The effluent sampled on 6-4-12, 6-6-12, and 6-8-12 exhibited non acceptable or inconclusive for chronic toxicity in Pimephales promelas and in Ceriodaphnia dubia during the exposure period as described in EPA 821-R-02-011.

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Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX A
STATISTICAL ANNALYSIS

60122719 Ft Smith FATHEAD SURVIVAL
File: 6122719A Transform: ARC SINE(SQUARE ROOT(Y))

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	2.010	7.260	11.460	7.260	2.010
OBSERVED	1	0	29	0	0

Calculated Chi-Square goodness of fit test statistic = 43.8832
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

60122719 Ft Smith FATHEAD SURVIVAL
File: 6122719A Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.011

W = 0.416

Critical W (P = 0.05) (n = 30) = 0.927
Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

60122719 Ft Smith FATHEAD SURVIVAL
File: 6122719A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Upstream	5	1.107	1.107	1.107
2	3%	5	1.107	1.107	1.107
3	5%	5	1.107	1.107	1.107
4	6%	5	0.991	1.107	1.084
5	8%	5	1.107	1.107	1.107
6	11%	5	1.107	1.107	1.107

60122719 Ft Smith FATHEAD SURVIVAL
File: 6122719A Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Upstream	0.000	0.000	0.000	0.00
2	3%	0.000	0.000	0.000	0.00
3	5%	0.000	0.000	0.000	0.00
4	6%	0.003	0.052	0.023	4.79
5	8%	0.000	0.000	0.000	0.00
6	11%	0.000	0.000	0.000	0.00

60122719 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6122719A. Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.011

W = 0.416

Critical W (P = 0.05) (n = 30) = 0.927
Critical W (P = 0.01) (n = 30) = 0.900

Data FAIL normality test. Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normal data and should not be performed.

60122719 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6122719A. Transform: ARC SINE(SQUARE ROOT(Y))

Hartley's test for homogeneity of variance
Ba lett's test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

60122719 Ft Smith FATHEAD SURVIVAL
File: C:\TOXSTAT\6122719A. Transform: ARC SINE(SQUARE ROOT(Y))

STEEL'S MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Upstream	1.107				
2	3%	1.107	27.50	16.00	5.00	
3	5%	1.107	27.50	16.00	5.00	
4	6%	1.084	25.00	16.00	5.00	
5	8%	1.107	27.50	16.00	5.00	
6	11%	1.107	27.50	16.00	5.00	

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

60122719 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6122719B. Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.024

W = 0.970

Critical W (P = 0.05) (n = 30) = 0.927
Critical W (P = 0.01) (n = 30) = 0.900

Data PASS normality test at P=0.01 level. Continue analysis.

60122719 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6122719B. Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 1.67

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60122719 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6122719B. Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.001	0.000	0.282
Within (Error)	24	0.024	0.001	
Total	29	0.026		

Critical F value = 2.62 (0.05,5,24)
Since F < Critical F FAIL TO REJECT Ho: All equal

60122719 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6122719B. Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Upstream	0.441	0.441		
2	3%	0.441	0.441	-0.010	
3	5%	0.449	0.449	-0.367	
4	6%	0.430	0.430	0.546	
5	8%	0.443	0.443	-0.079	
6	11%	0.429	0.429	0.585	

Dunnett table value = 2.36 (1 Tailed Value, P=0.05, df=24,5)

60122719 Ft Smith FATHEAD GROWTH
File: C:\TOXSTAT\6122719B. Transform: NO TRANSFORMATION

DUNNETT'S 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	Upstream	5			
2	3%	5	0.048	10.8	-0.000
3	5%	5	0.048	10.8	-0.007
4	6%	5	0.048	10.8	0.011
5	8%	5	0.048	10.8	-0.002
6	11%	5	0.048	10.8	0.012

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	2	8	10
3%	0	10	10
TOTAL	2	18	20

CRITICAL FISHER'S VALUE (10,10,2) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	2	8	10
5%	1	9	10
TOTAL	3	17	20

CRITICAL FISHER'S VALUE (10,10,2) (p=0.05) IS LESS THAN 0. b VALUE IS 1.
NO SIGNIFICANT DIFFERENCE

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	2	8	10
6%	1	9	10
TOTAL	3	17	20

CRITICAL FISHER'S VALUE (10,10,2) (p=0.05) IS LESS THAN 0. b VALUE IS 1.
NO SIGNIFICANT DIFFERENCE

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	2	8	10
8%	1	9	10
TOTAL	3	17	20

CRITICAL FISHER'S VALUE (10,10,2) (p=0.05) IS LESS THAN 0. b VALUE IS 1.
NO SIGNIFICANT DIFFERENCE

FISHER'S EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	NUMBER OF TOTAL ANIMALS
CONTROL	2	8	10
11%	0	10	10
TOTAL	2	18	20

CRITICAL FISHER'S VALUE (10,10,2) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

SUMMARY OF FISHER'S EXACT TESTS

ROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	2	
1	3%	10	0	
2	5%	10	1	

3	6%	10	1
4	8%	10	1
5	11%	10	0

60122719 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6122719D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Upstream	10	0.000	1.000	0.800
2	3%	10	1.000	1.000	1.000
3	5%	10	0.000	1.000	0.900
4	6%	10	0.000	1.000	0.900
5	8%	10	0.000	1.000	0.900
6	11%	10	1.000	1.000	1.000

60122719 Ft Smith CERIODAPHNIA DUBIA SURVIVAl
File: 6122719D Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Upstream	0.178	0.422	0.133	52.70
2	3%	0.000	0.000	0.000	0.00
3	5%	0.100	0.316	0.100	35.14
4	6%	0.100	0.316	0.100	35.14
5	8%	0.100	0.316	0.100	35.14
6	11%	0.000	0.000	0.000	0.00

50122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

******** Shapiro - Wilk's Test is aborted ********

This test can not be performed because total number of replicates
is greater than 50.

Total number of replicates = 60

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 4.31

Table Chi-square value = 15.09 (alpha = 0.01, df = 5)
Table Chi-square value = 11.07 (alpha = 0.05, df = 5)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Upstream	10	0.000	13.000	6.900
2	3%	10	5.000	14.000	11.100
3	5%	10	0.000	12.000	7.100
4	6%	10	0.000	16.000	7.500
5	8%	10	0.000	15.000	7.900
6	11%	10	0.000	17.000	10.500

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Upstream	16.989	4.122	1.303	59.74
2	3%	8.100	2.846	0.900	25.64
3	5%	13.878	3.725	1.178	52.47
4	6%	27.611	5.255	1.662	70.06
5	8%	27.211	5.216	1.650	66.03
6	11%	22.944	4.790	1.515	45.62

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	166.400	33.280	1.711
Within (Error)	54	1050.600	19.456	
Total	59	1217.000		

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

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Upstream	6.900	6.900		
2	3%	11.100	11.100	-2.129	
3	5%	7.100	7.100	-0.101	
4	6%	7.500	7.500	-0.304	
5	8%	7.900	7.900	-0.507	
6	11%	10.500	10.500	-1.825	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

60122719 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6122719E Transform: NO TRANSFORMATION

DUNNETT'S 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	Upstream	10			
2	3%	10	4.557	66.0	-4.200
3	5%	10	4.557	66.0	-0.200
	6%	10	4.557	66.0	-0.600
5	8%	10	4.557	66.0	-1.000
6	11%	10	4.557	66.0	-3.600

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9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

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APPENDIX B
CHAIN OF CUSTODY FORMS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1553820

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy
Ft. Smith AR 72904
Email To:
Phone: 479 784 2337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Randy Easley
Copy To:
Purchase Order No.:
Project Name: "P" Street Biomonitoring
Project Number:

Section C Invoice Information:

Attention: Randy Easley
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N)	Analysis Test: Chronic Minnow	Chronic Ceriodaphnia	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" Street Effluent	WW	C	6/3/12	0800	6/4/12	0800		1								X	N	X	X		
2	Arkansas River	WT	G	—	—	6/4/12	0855		1								X	N	X	X		
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ICE

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
P Street Effluent TCl2 = 0.02 mg/L	Kristy L Cate	6/4/12	1326	[signature]	6/5/12	1130	2.4 Y Y X
P Street Effluent FCl2 = 0.02 mg/L							
Arkansas River TCl2 = 0.02 mg/L							
Arkansas River FCl2 = 0.03 mg/L							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [illegible]

n °C | ed on (Y/N) | dy Cooler (Y/N) | Intact (Y/N)

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1411766

Section A Required Client Information:

Company: CITY OF FORT SMITH
Address: 3900 Kelley Hwy Ft. Smith, AR 72904
Email To:
Phone: 479-784-2337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: RANDY EASLEY
Copy To:
Purchase Order No.:
Project Name: P STREET BIOMONITORING
Project Number:

Section C Invoice Information:

Attention: RANDY EASLEY
Company Name: CITY OF FORT SMITH
Address: 3900 Kelley Hwy Ft. Smith, AR
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: Chronic Ammonia	Chronic Cerio	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	"P" STREET EFFLUENT	WW	C	6/5/12	0800	6/6/12	0800		1								X		X	X		
2	ARKANSAS RIVER	W	G			6/6/12	0852		1								X		X	X		
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
T. Cl_2 = 0.03 mg/l	JOHN HANCOCK / CITY OF FT SMITH	6/6/12	1239	X Jamie Rane	6-6	12:39
F. Cl_2 = 0.01 mg/l						
RIVER T. Cl_2 = 0.04 mg/l					6/7/12	1245
RIVER F. Cl_2 = 0.03 mg/l						

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
3.2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: JOHN HANCOCK

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY): 6/6/2012

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15 May 2007

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

1553818

Section A Required Client Information:

Company: City of Fort Smith
Address: 3900 Kelley Hwy Ft. Smith AR 72904
Email To:
Phone: 4797842337 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: RANDY EASLEY
Copy To:
Purchase Order No.:
Project Name: P Street Biomonitoring
Project Number:

Section C Invoice Information:

Attention: Randy Easley
Company Name: City of Fort Smith
Address: 3900 Kelley Hwy Ft. Smith AR 72904
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: AR

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / , -)
Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE
Drinking Water DW
Water WT
Waste Water WW
Product P
Soil/Solid SL
Oil OL
Wipe WP
Air AR
Tissue TS
Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	P Street Effluent	WW	C	6/7/12	0800	6/8/12	0800										ICE	N	Chronic Mynow		
2	Arkansas River	WT	G	—	—	6/8/12	0920										X	N	Chronic Ceriodaphnia		
3																	X		X		
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
P Street Effluent TCl2 = 0.02 mg/L FCl2 = 0.02 mg/L	[signature] / FT Smith	6/8/12	1233	X Jamie Jane	6-7	12:33	
Arkansas River TCl2 = <0.01 mg/L FCl2 = <0.01 mg/L				[signature]	6/9/12	0940	2.0 Y X Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kristy Cantu

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 6/8/12

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 ...

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX C

REFERENCE TOXICANTS SUMMARY

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

The absence of significant control mortality during this test indicated the health of the organisms and indicated that any significant mortality in the test concentrations was not due to contaminants or variations in testing conditions.

Reference toxicity testing is routinely performed by staff members in our biomonitoring - bioassay laboratory.

Start: 6/4/12 14:30 End: 6/12/12 14:30

Reference Toxicant (NaCl) Pimephales promelas

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
10 g/l	40	9	1	0
8 g/l	40	36	23	7
6 g/l	40	38	34	22
4 g/l	40	40	40	40
2 g/l	40	40	40	40

IC25 (4.87 g/l Sodium Chloride)

Survival NOEC: 4.0 g/l

Reference Toxicant (NaCl) Ceriodaphnia Dubia

Concentration of Toxicant	Avg. # of Live Organisms/replicate			
	0 hrs	24 hrs	48 hrs	7 days
2.5 g/l	10	4	0	0
2.0 g/l	10	10	8	1
1.5 g/l	10	10	10	10
1.0 g/l	10	10	10	10
0.5 g/l	10	10	10	10

IC25 (1.20 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Survival NOEC: 1.5 g/l

Submitted By: _____
Timothy Harrell, Technical Director

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9608 Loiret Blvd.
Lenexa, KS 66219
Phone: 913.599.5665
Fax: 913.599.1759

APPENDIX D
STATE AGENCY FORMS

Summary Reporting Forms Chronic Biomonitoring
Fathead Minnow Larvae Growth and Survival
(Pimephales promelas)

Permittee: City of Fort Smith **NPDES No.:** AR 0033278

		Time:	Date:		Time:	Date:
Composite 1 Collected	**From**	8:00	6/3/2012	**To**	8:00	6/4/2012
Composite 2 Collected	**From**	8:00	6/5/2012	**To**	8:00	6/6/2012
Composite 3 Collected	**From**	8:00	6/7/2012	**To**	8:00	6/8/2012

Test initiated: **am/pm** 13:00 AM **date** 6/5/2012
Test terminated: **am/pm** 12:00 AM **date** 6/12/2012

Dilution water used: **Receiving** X **Reconstituted**

Data Table for Survival

Effluent Conc.%	Percent Survival in Replicate Chambers					Mean Percent Survival			CV%*
	A	B	C	D	E	24h	48h	7 days	
Upstream O %	100	100	100	100	100	100	100	100	0
4%	100	100	100	100	100	100	100	100	0
6%	100	100	87.5	100	100	100	100	97.5	4.79
8%	100	100	100	100	100	100	100	100	0
10%	100	100	100	100	100	100	100	100	0
13%	100	100	100	100	100	100	100	100	0
Lab Control	100	100	87.5	100	100	100	100	97.5	4.79

Data Table for Survival

Effluent Conc.%	Average Dry Weight in milligrams in Replicate Chambers					Mean Dry Weight mg	CV%*
	A	B	C	D	E		
Upstream 0%	0.449	0.46	0.484	0.402	0.411	0.441	4.75
4%	0.456	0.451	0.444	0.484	0.402	0.441	4.39
6%	0.477	0.42	0.487	0.44	0.419	0.449	4.36
8%	0.447	0.415	0.37	0.469	0.45	0.43	5.52
10%	0.44	0.42	0.47	0.429	0.451	0.443	2.69
13%	0.414	0.414	0.436	0.401	0.482	0.429	4.51
Lab Control	0.426	0.487	0.352	0.456	0.432	0.431	N/A

*coefficient of variation = standard deviation x 100/mean.

Fathead Minnow Larvae Growth and Survival (cont)
(Pimephales promelas)

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

Is the mean survival at 7 days significantly different (p=.05) than the control survival for the % effluent corresponding to:

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No: X**
b) ½ Low Flow Dilution	**(**	**%):**	**Yes:**	**No:**

2. Dunnett's Procedure (or appropriate test):

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

a) Low Flow or Critical Dilution	**(**	**8 %):**	**Yes:**	**No:** X
b) ½ Low Flow Dilution	**(**	**%):**	**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):

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 NOEC below and circle lowest number:

a) NOEC survival: 11 **% effluent**
b) NOEC reproduction: 11 **% effluent**

Biomonitoring Form
Chronic Toxicity Summary Form
Pimephales promelas
Chemical Parameters Chart

Permittee: City of Fort Smith
NPDES No.: AR 0033278
Contact: Paul Easley
Analyst: Tim Harrell
Mike Bollin

Sample No. 1 Collected: Date: 6/4/2012 **Time:** 8:00
Sample No. 2 Collected: Date: 6/6/2012 **Time:** 8:00
Sample No. 3 Collected: Date: 6/8/2012 **Time:** 8:00
Test Begin: Date: 6/5/2012 **Time:** 13:00
Test End: Date: 6/12/2012 **Time:** 12:00

Dilution: Upstream
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	7.7	7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.3	7.6	7.6	7.5	7	7.3	
pH Initial	8.09	8.04	8.08	8.06	8.1	8.09	8.09	
pH Final	8.25	8.25	8.33	8.4	8.35	8.38	8.35	
Alkalinity	130							
Hardness	188							
Conductivity	684							
Chlorine	<1						<1	

Dilution: 6
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.9	7.8	8.3	7.9	7.2	
DO Final	7	7.2	7.7	7.6	7.5	7	7	
pH Initial		7.92	8	7.96	8.04	7.99	7.95	
pH Final	8.23	8.21	8.27	8.23	8.22	8.25	8.22	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 3
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.2	7.6	7.6	7.5	7	7.2	
pH Initial		8	8.05	8.04	8.08	8.06	8.02	
pH Final	8.24	8.24	8.3	8.3	8.3	8.33	8.3	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 8
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.9	7.9	8.4	7.9	7.8	
DO Final	7	7.1	7.8	7.7	7.4	7	7	
pH Initial		7.89	7.96	7.94	8.04	7.96	7.85	
pH Final	8.21	8.19	8.25	8.2	8.2	8.18	8.16	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 5
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.2	7.6	7.6	7.5	7	7.2	
pH Initial		7.94	8.03	8.01	8.05	8.02	7.96	
pH Final	8.24	8.22	8.28	8.26	8.24	8.27	8.23	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 11
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	8	7.9	8.4	7.9	7.8	7.5
DO Final	7.1	7	7.8	7.7	7.4	7	6.9	
pH Initial		7.87	7.94	7.9	8.02	7.96	7.85	7.82
pH Final	8.19	8.17	8.23	8.19	8.19	8.18	8.1	
Alkalinity								66
Hardness								136
Conductivity								425
Chlorine							<1	<1

Dilution: Lab Control
Day:

	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	8.2	8.2	8	8.1	8.4	8.2	7.8	
DO Final	7	7.4	7.3	7.2	7.2	7.4	7	
pH Initial	7.75	7.45	7.52	7.58	7.6	7.64	7.54	
pH Final	7.85	7.65	7.72	7.69	7.73	7.77	7.59	
Alkalinity	60							
Hardness	94							
Conductivity	312							
Chlorine	<1							

Summary Reporting Forms
Chronic Biomonitoring

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Fort Smith **NPDES No.:** AR 0033278

		Time:	Date:		Time:	Date:
Composite 1 Collected	**From**	8:00	6/3/2012	**To**	8:00	6/4/2012
Composite 2 Collected	**From**	8:00	6/5/2012	**To**	8:00	6/6/2012
Composite 3 Collected	**From**	8:00	6/7/2012	**To**	8:00	6/8/2012

Test initiated: **am/pm** 13:00 AM **date** 6/5/2012
Test terminated: **am/pm** 12:00 AM **date** 6/12/2012

Dilution water used: **Receiving** X **Reconstituted**

Percent Survival

Time of Reading	Percent Effluent						
	Upstream	3	5	6	8	11	Lab Control
24h	100	100	100	100	100	100	100
48h	100	100	100	100	100	100	100
End of test	80	100	90	90	90	100	100

Number of Young Produced per Female @ End of Test

Rep	Upstream	3	5	6	8	11	Lab Control
A	11	9	8	8	0	11	25
B	13	9	0	0	11	11	20
C	4	13	12	16	7	12	21
D	5	14	6	11	15	7	22
E	12	10	6	8	13	0	18
F	4	12	4	7	12	8	22
G	5	12	10	14	10	17	25
H	7	13	8	0	6	12	24
I	0	14	12	5	5	11	20
J	8	5	5	6	0	16	22
Mean	6.9	11.1	7.1	7.5	7.9	10.5	21.9
CV%*	59.74	25.64	52.47	70.06	66.03	45.62	10.42

*coefficient of variation = standard deviation x 100/mean.

Biomonitoring Form
Chronic Toxicity Summary Form
Ceriodaphnia dubia
Chemical Parameters Chart

Permittee: City of Fort Smith
NPDES No.: AR 0033278
Contact: Paul Easley
Analyst: Tim Harrell
Mike Bollin

Sample No. 1 Collected: Date: 6/4/2012 Time: 8:00
Sample No. 2 Collected: Date: 6/6/2012 Time: 8:00
Sample No. 3 Collected: Date: 6/8/2012 Time: 8:00
Test Begin: Date: 6/5/2012 Time: 13:00
Test End: Date: 6/12/2012 Time: 12:00

Dilution: Upstream Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	7.7	7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.3	7.6	7.6	7.5	7	7.3	
pH Initial	8.09	8.04	8.08	8.06	8.1	8.09	8.09	
pH Final	8.25	8.25	8.33	8.4	8.35	8.38	8.35	
Alkalinity	130							
Hardness	188							
Conductivity	684							
Chlorine	<.1						<.1	

Dilution: 6 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.9	7.8	8.3	7.9	7.2	
DO Final	7	7.2	7.7	7.6	7.5	7	7.1	
pH Initial		7.92	8	7.96	8.04	7.99	7.95	
pH Final	8.23	8.21	8.27	8.23	8.22	8.25	8.22	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 3 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.2	7.6	7.6	7.5	7	7.2	
pH Initial		8	8.05	8.04	8.08	8.06	8.02	
pH Final	8.24	8.24	8.3	8.3	8.3	8.33	8.3	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 8 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.9	7.9	8.4	7.9	7.8	
DO Final	7	7.1	7.8	7.7	7.4	7	7	
pH Initial		7.89	7.96	7.94	8.04	7.96	7.85	
pH Final	8.21	8.19	8.25	8.2	8.2	8.18	8.16	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 5 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial		7.2	7.8	7.8	8.3	7.9	7.6	
DO Final	7	7.2	7.6	7.6	7.5	7	7.1	
pH Initial		7.94	8.03	8.01	8.05	8.02	7.96	
pH Final	8.24	8.22	8.28	8.26	8.24	8.27	8.24	
Alkalinity								
Hardness								
Conductivity								
Chlorine								

Dilution: 11 Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	Init. 100%
DO Initial		7.2	8	7.9	8.4	7.9	7.8	7.5
DO Final	7.1	7	7.8	7.7	7.4	7	6.9	
pH Initial		7.87	7.94	7.9	8.02	7.96	7.85	7.02
pH Final	8.19	8.17	8.23	8.19	8.19	8.18	8.1	
Alkalinity								66
Hardness								116
Conductivity								425
Chlorine							<.1	<.1

Dilution: Lab Control Day:	1	2	3	4	5	6	7	Comments
Temp (C)	25	25	25	25	25	25	25	
DO Initial	8.2	8.2	8	8.1	8.4	8.1	7.8	
DO Final	7	7.4	7.3	7.2	7.2	7.4	7	
pH Initial	7.75	7.45	7.52	7.58	7.6	7.64	7.54	
pH Final	7.85	7.65	7.72	7.69	7.73	7.77	7.59	
Alkalinity	60							
Hardness	94							
Conductivity	312							
Chlorine	<.1							

From: (479) 784-2330
Steve Floyd
City of Fort Smith
3900 Kelley Highway

Fort Smith, AR 72904

Origin ID: FSMA

FedEx Express

J122012071603 25

Ship Date: 24JUL12
ActWgt: 2.0 LB
CAD: 1731127/INET3300

Delivery Address Bar Code

SHIP TO: (501) 682-0638 BILL SENDER

NPDES Enforcement Section, Water
ADEQ
5301 Northshore Drive

North Little Rock, AR 72118

Ref #
Invoice #
PO #
Dept #

WED - 25 JUL A4
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TRK# 0201 7938 2534 9825

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AR-US
MEM

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