

AR 00 21750

HTH QTR



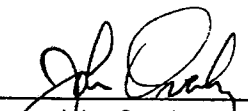
October 31, 2014
Control No. 183760
Page 1 of 9

City of Fort Smith
ATTN: Mr. Lance McAvoy
3900 Kelley Highway
Fort Smith, AR 72904

This report contains the analytical results and supporting information for samples submitted on October 21, 2014. Attached please find a copy of the Chain of Custody and/or other documents received. Note that any remaining sample will be discarded two weeks from the original report date unless other arrangements are made.

This report is intended for the sole use of the client listed above. Assessment of the data requires access to the entire document.

This report has been reviewed by the Laboratory Director or a qualified designee.



John Overbey
Laboratory Director

This document has been distributed to the following:

PDF cc: City of Fort Smith
ATTN: Mr. Lance McAvoy
lmcavoy@fortsmithar.gov

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 October 21, 2014
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 a custody seal intact and signed 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:

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Sampled Date/Time</u>	<u>Notes</u>
183760-1	Massard Influent 10/20/14 0813	20-Oct-2014 0813	
183760-2	Massard Effluent 10/20/14 1318	20-Oct-2014 1318	
183760-3	Massard Raw Biosolid 10/20/14 1053	20-Oct-2014 1053	

Qualifiers:

D Result is from a secondary dilution factor

Case Narrative:

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", (SM).
"American Society for Testing and Materials" (ASTM).
"Association of Analytical Chemists" (AOAC).

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

ANALYTICAL RESULTS

AIC No. 183760-1

Sample Identification: Massard Influent 10/20/14 0813

Analyte	Result	RL	Units	Qualifier
Total Recoverable Phenolics EPA 420.1	11	5	ug/l	
Prep: 22-Oct-2014 0822 by 311	Analyzed: 22-Oct-2014 1600 by 311		Batch: W49684	
Total Cyanide SM 4500-CN C,E 1999	< 10	10	ug/l	
Prep: 22-Oct-2014 1205 by 311	Analyzed: 22-Oct-2014 1524 by 311		Batch: W49688	
Mercury, low level EPA 245.7	0.60	0.050	ug/l	D
Prep: 22-Oct-2014 1342 by 302	Analyzed: 22-Oct-2014 1731 by 302		Batch: S37602	Dil: 10
Total Recoverable Antimony EPA 200.8	< 60	60	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Arsenic EPA 200.8	1.0	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Beryllium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Cadmium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Chromium EPA 200.8	< 10	10	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Copper EPA 200.8	6.2	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Lead EPA 200.8	1.1	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Molybdenum EPA 200.8	< 8	8	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Nickel EPA 200.8	3.8	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Selenium EPA 200.8	< 5	5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Silver EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Thallium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	
Total Recoverable Zinc EPA 200.8	210	20	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1229 by 302		Batch: S37598	

AIC No. 183760-2

Sample Identification: Massard Effluent 10/20/14 1318

Analyte	Result	RL	Units	Qualifier
Total Recoverable Phenolics EPA 420.1	8.9	5	ug/l	
Prep: 22-Oct-2014 0822 by 311	Analyzed: 22-Oct-2014 1600 by 311		Batch: W49684	
Total Cyanide SM 4500-CN C,E 1999	< 10	10	ug/l	
Prep: 22-Oct-2014 1205 by 311	Analyzed: 22-Oct-2014 1526 by 311		Batch: W49688	

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ANALYTICAL RESULTS

AIC No. 183760-2 (Continued)

Sample Identification: Massard Effluent 10/20/14 1318

Analyte	Result	RL	Units	Qualifier
Mercury, low level EPA 245.7	0.0050	0.0050	ug/l	
Prep: 22-Oct-2014 1342 by 302	Analyzed: 22-Oct-2014 1716 by 302		Batch: S37602	
Total Recoverable Antimony EPA 200.8	< 60	60	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Arsenic EPA 200.8	0.71	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Beryllium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Cadmium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Chromium EPA 200.8	< 10	10	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Copper EPA 200.8	3.4	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Lead EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Molybdenum EPA 200.8	< 8	8	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Nickel EPA 200.8	3.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Selenium EPA 200.8	< 5	5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Silver EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Thallium EPA 200.8	< 0.5	0.5	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	
Total Recoverable Zinc EPA 200.8	32	20	ug/l	
Prep: 21-Oct-2014 1656 by 302	Analyzed: 22-Oct-2014 1234 by 302		Batch: S37598	

AIC No. 183760-3

Sample Identification: Massard Raw Biosolid 10/20/14 1053

Analyte	Result	RL	Units	Qualifier
Total Cyanide EPA 9010C, 9014	< 3	3	mg/Kg	
Prep: 23-Oct-2014 0815 by 308	Analyzed: 23-Oct-2014 1407 by 308		Batch: W49698	
Total Recoverable Phenolics EPA 9065	41	20	mg/Kg	
Prep: 23-Oct-2014 0816 by 308	Analyzed: 23-Oct-2014 1130 by 308		Batch: W49699	
Total Solids SM 2540 G 1997	3.6	0.01	wt %	
Prep: 22-Oct-2014 1704 by 313	Analyzed: 24-Oct-2014 1045 by 313		Batch: W49696	
Antimony EPA 3051A, 6010C	< 3	3	mg/Kg	
Prep: 27-Oct-2014 1358 by 311	Analyzed: 28-Oct-2014 1401 by 302		Batch: S37627	

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ANALYTICAL RESULTS

AIC No. 183760-3 (Continued)

Sample Identification: Massard Raw Biosolid 10/20/14 1053

Analyte	Result	RL	Units	Qualifier
Arsenic EPA 3051A, 6010C	5.7 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	5	mg/Kg Batch: S37627	
Beryllium EPA 3051A, 6010C	0.50 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.03	mg/Kg Batch: S37627	
Cadmium EPA 3051A, 6010C	0.73 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.4	mg/Kg Batch: S37627	
Chromium EPA 3051A, 6010C	13 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.7	mg/Kg Batch: S37627	
Copper EPA 3051A, 6010C	1100 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.6	mg/Kg Batch: S37627	
Lead EPA 3051A, 6010C	67 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	4	mg/Kg Batch: S37627	
Molybdenum EPA 3051A, 6010C	13 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.8	mg/Kg Batch: S37627	
Nickel EPA 3051A, 6010C	56 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	1	mg/Kg Batch: S37627	
Selenium EPA 3051A, 6010C	< 7 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	7	mg/Kg Batch: S37627	
Silver EPA 3051A, 6010C	11 Prep: 27-Oct-2014 1358 by 311 Analyzed: 28-Oct-2014 1401 by 302	0.7	mg/Kg Batch: S37627	
Thallium EPA 3051A, 6010C	< 4 Prep: 27-Oct-2014 1358 by 311 Analyzed: 30-Oct-2014 1350 by 302	4	mg/Kg Batch: S37627	
Zinc EPA 3051A, 6010C	910 Prep: 27-Oct-2014 1358 by 311 Analyzed: 30-Oct-2014 1350 by 302	0.2	mg/Kg Batch: S37627	
Mercury EPA 7471B	1.0 Prep: 27-Oct-2014 1337 by 311 Analyzed: 27-Oct-2014 1553 by 311	0.1	mg/Kg Batch: S37625	

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DUPLICATE RESULTS

Analyte	AIC No.	Result	RPD	RPD Limit	Preparation Date	Analysis Date	Dil	Qual
Total Solids	183807-2	1.2 wt %			22Oct14 1704 by 313	24Oct14 1045 by 313		
	Batch: W49696 Duplicate	1.2 wt %	1.35	10.0	22Oct14 1704 by 313	24Oct14 1045 by 313		

LABORATORY CONTROL SAMPLE RESULTS

Analyte	Spike Amount	%	Limits	RPD	Limit	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	0.1 mg/l	94.1	85.0-115			W49684	22Oct14 0823 by 311	22Oct14 1600 by 311		
Total Cyanide	0.1 mg/l	104	85.0-115			W49688	22Oct14 1206 by 311	22Oct14 1516 by 311		
Mercury, low level	0.01 ug/l	105	76.0-113			S37602	22Oct14 1343 by 302	22Oct14 1650 by 302		
Total Recoverable Antimony	0.05 mg/l	107	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Arsenic	0.05 mg/l	98.3	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Beryllium	0.05 mg/l	99.3	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Cadmium	0.05 mg/l	105	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Chromium	0.05 mg/l	97.1	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Copper	0.05 mg/l	109	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Lead	0.05 mg/l	103	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Molybdenum	0.05 mg/l	106	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Nickel	0.05 mg/l	110	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Selenium	0.05 mg/l	101	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Silver	0.02 mg/l	105	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Thallium	0.05 mg/l	105	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Recoverable Zinc	0.05 mg/l	110	85.0-115			S37598	21Oct14 1657 by 302	22Oct14 1200 by 302		
Total Cyanide	0.500 mg/Kg	101	85.0-115			W49698	23Oct14 0815 by 308	23Oct14 1406 by 308		
Total Recoverable Phenolics	10.0 mg/Kg	98.2	85.0-115			W49699	23Oct14 0816 by 308	23Oct14 1130 by 308		
Antimony	500 mg/Kg	87.3	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Arsenic	500 mg/Kg	88.2	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Beryllium	50.0 mg/Kg	90.8	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Cadmium	500 mg/Kg	89.4	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Chromium	50.0 mg/Kg	95.8	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Copper	50.0 mg/Kg	91.2	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Lead	500 mg/Kg	93.7	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Molybdenum	50.0 mg/Kg	90.5	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Nickel	50.0 mg/Kg	93.0	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Selenium	500 mg/Kg	85.7	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Silver	10.0 mg/Kg	98.1	85.0-115			S37627	27Oct14 1358 by 311	28Oct14 1330 by 302		
Thallium	500 mg/Kg	90.5	85.0-115			S37627	27Oct14 1358 by 311	30Oct14 1431 by 302		
Zinc	50.0 mg/Kg	90.3	85.0-115			S37627	27Oct14 1358 by 311	30Oct14 1431 by 302		
Mercury	1.25 mg/Kg	95.7	85.0-115			S37625	27Oct14 1338 by 311	27Oct14 1536 by 311		

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 Recoverable Phenolics	183760-2	0.1 mg/l	85.2	80.0-120	W49684	22Oct14 0823 by 311	22Oct14 1600 by 311		
	183760-2	0.1 mg/l	83.5	80.0-120	W49684	22Oct14 0823 by 311	22Oct14 1600 by 311		
	Relative Percent Difference:		1.82	10.0	W49684				
Total Cyanide	183795-1	0.1 mg/l	93.5	75.0-125	W49688	22Oct14 1206 by 311	22Oct14 1520 by 311		
	183795-1	0.1 mg/l	94.7	75.0-125	W49688	22Oct14 1206 by 311	22Oct14 1522 by 311		
	Relative Percent Difference:		1.28	20.0	W49688				
Mercury, low level	183648-1	0.01 ug/l	96.0	63.0-111	S37602	22Oct14 1343 by 302	22Oct14 1656 by 302		
	183648-1	0.01 ug/l	102	63.0-111	S37602	22Oct14 1343 by 302	22Oct14 1701 by 302		
	Relative Percent Difference:		2.93	18.0	S37602				
Total Recoverable Antimony	183771-1	0.05 mg/l	107	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	108	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.692	20.0	S37598				
Total Recoverable Arsenic	183771-1	0.05 mg/l	99.3	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	101	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		1.65	20.0	S37598				
Total Recoverable Beryllium	183771-1	0.05 mg/l	93.5	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	94.8	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		1.39	20.0	S37598				
Total Recoverable Cadmium	183771-1	0.05 mg/l	104	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	105	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.804	20.0	S37598				
Total Recoverable Chromium	183771-1	0.05 mg/l	96.5	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	96.8	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.345	20.0	S37598				
Total Recoverable Copper	183771-1	0.05 mg/l	106	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	106	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.411	20.0	S37598				
Total Recoverable Lead	183771-1	0.05 mg/l	101	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	101	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.353	20.0	S37598				
Total Recoverable Molybdenum	183771-1	0.05 mg/l	110	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	111	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.800	20.0	S37598				
Total Recoverable Nickel	183771-1	0.05 mg/l	108	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	107	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.822	20.0	S37598				
Total Recoverable Selenium	183771-1	0.05 mg/l	100	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	103	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		2.24	20.0	S37598				
Total Recoverable Silver	183771-1	0.02 mg/l	106	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.02 mg/l	105	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.441	20.0	S37598				
Total Recoverable Thallium	183771-1	0.05 mg/l	104	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	104	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.208	20.0	S37598				
Total Recoverable Zinc	183771-1	0.05 mg/l	107	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1205 by 302		
	183771-1	0.05 mg/l	107	75.0-125	S37598	21Oct14 1657 by 302	22Oct14 1209 by 302		
	Relative Percent Difference:		0.181	20.0	S37598				
Total Cyanide	183760-3	0.982 mg/Kg	92.9	75.0-125	W49698	23Oct14 0815 by 308	23Oct14 1409 by 308		
	183760-3	0.977 mg/Kg	96.8	75.0-125	W49698	23Oct14 0815 by 308	23Oct14 1411 by 308		
	Relative Percent Difference:		4.13	20.0	W49698				

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MATRIX SPIKE SAMPLE RESULTS

Analyte	Sample	Spike Amount	%	Limits	Batch	Preparation Date	Analysis Date	Dil	Qual
Total Recoverable Phenolics	183760-3	9.48 mg/Kg	88.6	80.0-120	W49699	23Oct14 0816 by 308	23Oct14 1130 by 308		
	183760-3	9.20 mg/Kg	99.0	80.0-120	W49699	23Oct14 0816 by 308	23Oct14 1130 by 308		
	Relative Percent Difference:		9.49	10.0	W49699				
Antimony	183807-1	494 mg/Kg	79.9	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	499 mg/Kg	77.3	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		3.70	20.0	S37627				
Arsenic	183807-1	494 mg/Kg	87.5	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	499 mg/Kg	88.4	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.879	20.0	S37627				
Beryllium	183807-1	49.4 mg/Kg	90.9	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	49.9 mg/Kg	91.6	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.615	20.0	S37627				
Cadmium	183807-1	494 mg/Kg	87.0	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	499 mg/Kg	87.2	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.123	20.0	S37627				
Chromium	183807-1	49.4 mg/Kg	101	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	49.9 mg/Kg	109	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		5.16	20.0	S37627				
Copper	183807-1	49.4 mg/Kg	94.1	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	49.9 mg/Kg	95.0	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.747	20.0	S37627				
Lead	183807-1	494 mg/Kg	90.5	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	499 mg/Kg	90.2	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.350	20.0	S37627				
Molybdenum	183807-1	49.4 mg/Kg	90.9	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	49.9 mg/Kg	90.1	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.979	20.0	S37627				
Nickel	183807-1	49.4 mg/Kg	87.7	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	49.9 mg/Kg	89.2	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		1.31	20.0	S37627				
Selenium	183807-1	494 mg/Kg	84.4	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	499 mg/Kg	84.6	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		0.0791	20.0	S37627				
Silver	183807-1	9.88 mg/Kg	96.2	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1336 by 302		
	183807-1	9.98 mg/Kg	95.0	75.0-125	S37627	27Oct14 1358 by 311	28Oct14 1341 by 302		
	Relative Percent Difference:		1.32	20.0	S37627				
Thallium	183807-1	494 mg/Kg	96.5	75.0-125	S37627	27Oct14 1358 by 311	30Oct14 1435 by 302		
	183807-1	499 mg/Kg	97.3	75.0-125	S37627	27Oct14 1358 by 311	30Oct14 1439 by 302		
	Relative Percent Difference:		0.766	20.0	S37627				
Zinc	183807-1	49.4 mg/Kg	99.2	75.0-125	S37627	27Oct14 1358 by 311	30Oct14 1435 by 302		
	183807-1	49.9 mg/Kg	101	75.0-125	S37627	27Oct14 1358 by 311	30Oct14 1439 by 302		
	Relative Percent Difference:		0.896	20.0	S37627				
Mercury	183918-1	2.33 mg/Kg	91.0	70.0-130	S37625	27Oct14 1338 by 311	27Oct14 1541 by 311		
	183918-1	2.41 mg/Kg	84.4	70.0-130	S37625	27Oct14 1338 by 311	27Oct14 1545 by 311		
	Relative Percent Difference:		5.83	20.0	S37625				



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	W49684-1	22Oct14 0823 by 311	22Oct14 1600 by 311	
Total Cyanide	< 0.01 mg/l	0.01	0.01	W49688-1	22Oct14 1206 by 311	22Oct14 1514 by 311	
Mercury, low level	< 0.0018 ug/l	0.0018	0.0050	S37602-1	22Oct14 1343 by 302	22Oct14 1630 by 302	
Total Recoverable Antimony	< 0.03 mg/l	0.03	0.03	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Arsenic	< 0.0005 mg/l	0.0005	0.0005	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Beryllium	< 0.0002 mg/l	0.0002	0.0002	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Cadmium	< 0.0001 mg/l	0.0001	0.0001	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Chromium	< 0.007 mg/l	0.007	0.007	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Copper	< 0.0005 mg/l	0.0005	0.0005	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Lead	< 0.0005 mg/l	0.0005	0.0005	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Molybdenum	< 0.008 mg/l	0.008	0.008	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Nickel	< 0.0005 mg/l	0.0005	0.0005	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Selenium	< 0.002 mg/l	0.002	0.002	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Silver	< 0.0002 mg/l	0.0002	0.0002	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Thallium	< 0.0005 mg/l	0.0005	0.0005	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Recoverable Zinc	< 0.002 mg/l	0.002	0.002	S37598-1	21Oct14 1657 by 302	22Oct14 1155 by 302	
Total Cyanide	< 0.1 mg/Kg	0.1	0.1	W49698-1	23Oct14 0815 by 308	23Oct14 1404 by 308	
Total Recoverable Phenolics	< 0.5 mg/Kg	0.5	0.5	W49699-1	23Oct14 0816 by 308	23Oct14 1130 by 308	
Total Solids	< 0.01 wt %	0.01	0.01	W49696-1	22Oct14 1704 by 313	24Oct14 1045 by 313	
Antimony	< 3 mg/Kg	3	3	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Arsenic	< 5 mg/Kg	5	5	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Beryllium	< 0.03 mg/Kg	0.03	0.03	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Cadmium	< 0.4 mg/Kg	0.4	0.4	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Chromium	< 0.7 mg/Kg	0.7	0.7	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Copper	< 0.6 mg/Kg	0.6	0.6	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Lead	< 4 mg/Kg	4	4	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Molybdenum	< 0.8 mg/Kg	0.8	0.8	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Nickel	< 1 mg/Kg	1	1	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Selenium	< 7 mg/Kg	7	7	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Silver	< 0.7 mg/Kg	0.7	0.7	S37627-1	27Oct14 1358 by 311	28Oct14 1326 by 302	
Thallium	< 4 mg/Kg	4	4	S37627-1	27Oct14 1358 by 311	30Oct14 1428 by 302	
Zinc	< 0.2 mg/Kg	0.2	0.2	S37627-1	27Oct14 1358 by 311	30Oct14 1428 by 302	
Mercury	< 0.1 mg/Kg	0.1	0.1	S37625-1	27Oct14 1338 by 311	27Oct14 1532 by 311	



CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>City of Fort Smith</u>			PO No.		NO OF BOTTLES	ANALYSES REQUESTED ¹										AIC CONTROL NO: <u>183760</u>								
Project Reference: <u>massard Table III Priority Pollutants</u>			SAMPLE MATRIX			T. Cyanide	Phenolics	PP Metals	Table III, 13 PP Metals	CN, P, Metals, CS, T. Solids, ODA	MO	MO											AIC PROPOSAL NO:	
Project Manager: <u>Lance McAvoy</u>			WATER SOIL																				Carrier/Tracking No. <u>FedEx</u>	
Sampled By: <u>Rachel Sharp Chris Cooper</u>			G	C											Received Temperature C <u>1.1 C</u>									
AIC No.	Sample Identification	Date/Time Collected	R	O											Remarks									
①	Massard Influent	10/20/14 0813	X	X	1	X																		
①	Massard Influent	10/20/14 0813	X	X	1		X	/																
①	Massard Influent	10/20/14 0813	X	X	1			X		X														
②	Massard Effluent	10/20/14 1318	X	X	1	X																		
②	Massard Effluent	10/20/14 1318	X	X	1		X			X														
②	Massard Effluent	10/20/14 1318	X	X	1			X		X														
③	Massard Raw Biosolid	10/20/14 1053	X	X	1				X		X													
Container Type						P	G	P	G	P	G							Field pH calibration on _____ @ _____						
Preservative						B	S	N	NO	N	NO							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) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <u>Rachel J. Sharp</u>					Date/Time: <u>10/20/14 1430</u>					Received By:									
Expedited results requested by:					Relinquished By:					Date/Time:					Received in Lab By: <u>Jimmy Day</u>									
Who should AIC contact with questions: <u>Lance McAvoy</u>					Comments:					Date/Time: <u>10/21/14 0845</u>														
Phone: <u>479-754-2337</u> Fax:					Fed Ex Tracking #: <u>802472067299</u>																			
Report Attention to:																								
Report Address to: <u>Lance McAvoy</u>																								




CHAIN OF CUSTODY / ANALYSIS REQUEST FORM

Client: <u>City of Fort Smith</u>			PO No.		NO OF BOTTLES <u>146-66(245.7)</u>	ANALYSES REQUESTED ¹										AIC CONTROL NO: <u>183760</u>				
Project Reference: <u>Massard Table III Priority Pollutants (Ch)</u>			SAMPLE MATRIX													AIC PROPOSAL NO:				
Project Manager: <u>Lance McAvoy</u>			WATER SOIL													Carrier/Tracking No. <u>Fed Ex</u>				
Sampled By: <u>Rachel Sharp Chr-s Corp</u>			G	C											Received Temperature C <u>11°C</u>					
AIC No.	Sample Identification	Date/Time Collected	R	O	A	S											Remarks			
①	<u>Massard Inflow</u>	<u>10/20/14 0813</u>	X		X		1	X												
②	<u>Massard Effluent</u>	<u>10/20/14 1318</u>	X		X		1	X												
Container Type			Preservative												Field pH calibration on _____ @ _____ Buffer:					
G = Glass NO = none			P = Plastic S = Sulfuric acid pH2		V = VOA vials. N = Nitric acid pH2			H = HCl to pH2 B = NaOH to pH12			T = Sodium Thiosulfate Z = Zinc acetate									
Turnaround Time Requested: (Please circle) <u>NORMAL</u> or EXPEDITED IN _____ DAYS					Relinquished By: <u>Rachel Sharp</u>			Date/Time: <u>10/20/14 1430</u>			Received By:			Date/Time						
Expedited results requested by:					Relinquished By:			Date/Time			Received in Lab By: <u>Jimmy Day</u>			Date/Time: <u>10/21/14 CBHS</u>						
Who should AIC contact with questions: <u>Lance McAvoy</u>					Comments: <u>Fed Ex Tracking # : 8024 7206 7299</u>															
Phone: <u>479-784-2337</u> Fax:					Report Address to: <u>Lance McAvoy</u>															

INTER-OFFICE MEMO

TO: Steve Floyd, Superintendent of Water and Wastewater Operations

FROM: Don Clover, Biologist 

DATE: November 13, 2014

AR0021750

RE: Biomonitoring Results - Massard Plant

Please find below the chronic biomonitoring results for the fourth quarter of 2014. Lethal and sub-lethal toxicity were not experienced in the low-flow dilution of 8% effluent for the *Ceriodaphnia dubia* test organism. The test therefore passes at the low-flow dilution of 8% effluent for lethal and sub-lethal effects. Lethal and sub-lethal toxicity were not experienced in the low-flow dilution of 8% effluent for the fathead minnow (*Pimephales promelas*) test. The test therefore passes at the low-flow dilution of 8% effluent for lethal and sub-lethal effects.

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- 19.7%

Parameter #TQP6C- 13.9%

Prepared By: Don Clover Date: 11/13/14

Reviewed By: D. A. M. J. Date: 11/14/14



REFERENCE #60180817

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

October 30, 2014

Lance McAvoy
City of Fort Smith (Massard)
3900 Kelley HWY
Fort Smith, AR 72904

Re: Lab Project Number: 60180817
Client Project ID: Wet Test

RECEIVED

NOV 10 2014

WATER/WASTEWATER

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@pacelabs.com
Technical Director

REPORT OF LABORATORY ANALYSIS

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REFERENCE #60180817

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 (Massard)**

PERMIT # AR 0021750
AFIN # 66-00226

PERFORMED ON:

Pimephales promelas

and

Ceriodaphnia dubia

PREPARED FOR:

Lance McAvoy
City of Fort Smith (Massard)
3900 Kelley HWY
Fort Smith, AR 72904

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

October 30, 2014

REPORT OF LABORATORY ANALYSIS

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REPORT OF LABORATORY ANALYSIS

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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 (Massard) effluent discharge from October 20, 2014 to October 24, 2014. 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-Kärber 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 18.6.

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 15.5.

The chronic toxicity exhibited by the fathead minnows and the *Ceriodaphnia* treated by the effluent sampled from October 20 to October 24 from the CITY OF FORT SMITH (Massard) effluent discharge, is acceptable as described in EPA 821-R-02-013.

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INTRODUCTION

Pace Analytical was contracted to perform this chronic toxicity test on effluent from the CITY OF FORT SMITH (Massard) 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 (Massard) personnel collected sampling of the effluent. A sample of the effluent was delivered to Pace by commercial carrier on 10-21-14. Subsequent samples followed by delivery on 10-23-14 and on 10-25-14. All samples were stored at $\leq 6^{\circ}$ 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 10-21-14 and carried out until 10-29-14. 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 and/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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REFERENCE #60180817

Pace Analytical Services, Inc.
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RESULTS

REPORT OF LABORATORY ANALYSIS

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TABLE 1

Permittee: CITY OF FORT SMITH (Massard) Effluent discharge.

Date Sampled No. 1: 10-20-14 8:00

No. 2: 10-22-14 8:00

No. 3: 10-24-14 8:00

Test Initiated: 14:40

Date: 10-21-14

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					Mean Dry Weight (mg)	CV% *
	A	B	C	D	E		
Control 0%	0.322	0.449	0.486	0.396	0.432	0.419	13.94
Dilution 1 3%	0.477	0.346	0.442	0.416	0.395	0.415	11.88
Dilution 2 5%	0.441	0.400	0.425	0.364	0.412	0.408	7.13
Dilution 3 6%	0.337	0.378	0.495	0.428	0.429	0.413	14.42
Dilution 4 8%	0.427	0.353	0.329	0.447	0.401	0.391	12.66
Dilution 5 11%	0.435	0.487	0.359	0.499	0.387	0.433	14.07

* Coefficient of Variation = Standard Deviation X 100 / Mean

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Permittee: CITY OF FORT SMITH (Massard) 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%	87.5	100	100	100	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%	87.5	100	100	100	100	100	100	97.5	4.79
Dilution 4 8%	100	100	87.5	100	100	100	100	97.5	4.79
Dilution 5 11%	100	100	100	100	100	100	100	100	0.00

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Permitted Discharge FORT SMITH (Massard) 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	22	24	21	19	19	23
2	22	23	23	24	21	25
3	18	24	21	23	20	16
4	26	20	26	17	21	18
5	22	20	23	25	25	25
6	17	24	18	25	23	19
7	22	22	23	16	25	22
8	15	24	22	21	21	26
9	16	19	23	26	18	25
10	27	22	25	18	24	26
Mean	20.7	22.2	22.5	21.4	21.7	22.5
SD	4.084	1.932	2.224	3.688	2.452	3.629
CV %	19.73	8.70	9.88	17.23	11.30	16.13

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Permittee: CITY OF FORT SMITH (Massard) 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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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

REPORT OF LABORATORY ANALYSIS

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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	Until 60% or more surviving control females have three broods or a maximum of 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 (Massard). Effluent discharge.

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

SAMPLE NO. 1 COLLECTED: DATE: 10-20-14

SAMPLE NO. 2 COLLECTED: DATE: 10-22-14

SAMPLE NO. 3 COLLECTED: DATE: 10-24-14

**TABLE 2 (SECTION 2)
INITIAL WATER QUALITY
EFFLUENT CONCENTRATION**

	Control	100%
PH	7.69	7.58
D.O.	8.70	8.50
Temp	25.0	25.0
Alk	58	118
Hard	90	92
Cond	390	470
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	7.58	6.90	25.1
3% Effluent	7.56	6.90	24.8
5% Effluent	7.55	6.90	24.8
6% Effluent	7.52	6.90	24.8
8% Effluent	7.50	7.00	24.8
11% Effluent	7.48	7.00	24.8

48-Hour Water Quality Measurements

Effluent Concentration (%)	PH	D.O. (mg/l)	Temperature (C)
0% Control	7.69	7.20	25.2
3% Effluent	7.74	7.20	24.9
5% Effluent	7.75	7.20	24.9
6% Effluent	7.78	7.20	24.9
8% Effluent	7.80	7.30	24.9
11% Effluent	7.81	7.30	24.9

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FINAL WATER QUALITY

EFFLUENT CONCENTRATION

	Control	11%
pH	7.71	7.75
D.O.	7.10	7.10
Temp	25.1	25.0
Alk	64	70
Hard	98	100
Cond	512	680

- * 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

REPORT OF LABORATORY ANALYSIS

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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 0.419 mg/organism in the controls. The percent coefficient of variation (%CV) values for the fathead minnow control for survival and growth were 4.79 and 13.94. The Ceriodaphnia dubia survival rates were 100 in the control. The Ceriodaphnia in the control produced an average of 20.7 young over the seven-day exposure period. Percent CV values for Ceriodaphnia dubia control survival and reproduction was 0.00 and 19.73. 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 10-20-14, 10-22-14, and 10-24-14 exhibited acceptable chronic toxicity in Pimephales promelas and in Ceriodaphnia dubia during the exposure period as described in EPA 821-R-02-013.

REPORT OF LABORATORY ANALYSIS

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REFERENCE #60180817

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

APPENDIX A STATISTICAL ANNALYSIS

REPORT OF LABORATORY ANALYSIS

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60180817 Ft Smith FATHEAD SURVIVAL

File: 6180817A 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	3	0	27	0	0

Calculated Chi-Square goodness of fit test statistic = 38.0902

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.

60180817 Ft Smith FATHEAD SURVIVAL

File: 6180817A Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.032

W = 0.597

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.

60180817 Ft Smith FATHEAD SURVIVAL

File: 6180817A

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	0.991	1.107	1.084
5	8	5	0.991	1.107	1.084
6	11	5	1.107	1.107	1.107

60180817 Ft Smith FATHEAD SURVIVAL

File: 6180817A

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	0.003	0.052	0.023	4.79
5	8	0.003	0.052	0.023	4.79
6	11	0.000	0.000	0.000	0.00

60180817 Ft Smith FATHEAD SURVIVAL

File: C:\TOXSTAT\6180817A.

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	1.084	27.50	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 $\alpha = 0.05$

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B Transform: NO TRANSFORMATION

Shapiro - Wilk's test for normality

D = 0.066

W = 0.959

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.

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance

Calculated B1 statistic = 2.22

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.

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B

Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	5	0.332	0.486	0.419
2	3%	5	0.346	0.477	0.415
3	5%	5	0.364	0.441	0.408
4	6%	5	0.337	0.495	0.413
5	8%	5	0.329	0.447	0.391
6	11%	5	0.359	0.499	0.433

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B

Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	0.003	0.058	0.026	13.94
2	3%	0.002	0.049	0.022	11.88
3	5%	0.001	0.029	0.013	7.13
4	6%	0.004	0.060	0.027	14.42
5	8%	0.002	0.050	0.022	12.66
6	11%	0.004	0.061	0.027	14.07

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B

Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.005	0.001	0.345
Within (Error)	24	0.066	0.003	
Total	29	0.070		

Critical F value = 2.62 (0.05, 5, 24)

Since $F < \text{Critical F}$ FAIL TO REJECT H_0 : All equal

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B

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	0.419	0.419		
2	3%	0.415	0.415	0.115	
3	5%	0.408	0.408	0.320	
4	6%	0.413	0.413	0.169	
5	8%	0.391	0.391	0.834	
6	11%	0.433	0.433	-0.435	

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

60180817 Ft Smith FATHEAD GROWTH

File: 6180817B

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	0.078	18.6	0.004
3	5%	5	0.078	18.6	0.011
4	6%	5	0.078	18.6	0.006
5	8%	5	0.078	18.6	0.028
6	11%	5	0.078	18.6	-0.014

FISHER'S EXACT TEST

=====

NUMBER OF

IDENTIFICATION	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

=====

NUMBER OF

IDENTIFICATION	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

=====

NUMBER OF

IDENTIFICATION	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	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	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	

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6180817E 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	4	16	19	19	2

Calculated Chi-Square goodness of fit test statistic = 3.2187
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6180817E Transform: NO TRANSFORMATION

Bartlett's test for homogeneity of variance
Calculated B1 statistic = 7.89

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.

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6180817E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	15.000	27.000	20.700
2	3%	10	19.000	24.000	22.200
3	5%	10	18.000	26.000	22.500
4	6%	10	16.000	26.000	21.400
5	8%	10	18.000	25.000	21.700
6	11%	10	16.000	26.000	22.500

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6180817E Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	CONTROL	16.678	4.084	1.291	19.73
2	3%	3.733	1.932	0.611	8.70
3	5%	4.944	2.224	0.703	9.88
4	6%	13.600	3.688	1.166	17.23
5	8%	6.011	2.452	0.775	11.30
6	11%	13.167	3.629	1.147	16.13

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
File: 6180817E Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	25.133	5.027	0.519
Within (Error)	54	523.200	9.689	
Total	59	548.333		

Critical F value = 2.45 (0.05,5,40)

Since $F < \text{Critical } F$ FAIL TO REJECT H_0 : All equal

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
 File: 6180817E 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	20.700	20.700		
2	3%	22.200	22.200	-1.078	
3	5%	22.500	22.500	-1.293	
4	6%	21.400	21.400	-0.503	
5	8%	21.700	21.700	-0.718	
6	11%	22.500	22.500	-1.293	

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

60180817 Ft Smith CERIODAPHNIA DUBIA REPRODU
 File: 6180817E 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	3.216	15.5	-1.500
3	5%	10	3.216	15.5	-1.800
4	6%	10	3.216	15.5	-0.700
5	8%	10	3.216	15.5	-1.000
6	11%	10	3.216	15.5	-1.800

Conc. ID	1	2	3	4	5	6
Conc. Tested	0	3	5	6	8	11
Response 1	.322	.477	.441	.337	.427	.435
Response 2	.449	.346	.400	.378	.353	.487
Response 3	.486	.442	.425	.495	.329	.359
Response 4	.396	.416	.364	.428	.447	.499
Response 5	.432	.395	.412	.429	.401	.387

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: Ft Smith

Test Start Date: 10/21/14 Test Ending Date: 10/28/14

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	0.417	0.062	0.417
2	5	3.000	0.415	0.049	0.415
3	5	5.000	0.408	0.029	0.412
4	5	6.000	0.413	0.060	0.412
5	5	8.000	0.391	0.050	0.412
6	5	11.000	0.433	0.061	0.412

*** 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	22	24	21	19	19	23
Response 2	22	23	23	24	21	25
Response 3	18	24	21	23	20	16
Response 4	26	20	26	17	21	18
Response 5	22	20	23	25	25	25
Response 6	17	24	18	25	23	19
Response 7	22	22	23	16	25	22
Response 8	15	24	22	21	21	26
Response 9	16	19	23	26	18	25
Response 10	27	22	25	18	24	26

*** Inhibition Concentration Percentage Estimate ***

Toxicant/Effluent: Ft Smith

Test Start Date: 10/21/14 Test Ending Date: 10/28/14

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	20.700	4.084	21.833
2	10	3.000	22.200	1.932	21.833
3	10	5.000	22.500	2.224	21.833
4	10	6.000	21.400	3.688	21.833
5	10	8.000	21.700	2.452	21.833
6	10	11.000	22.500	3.629	21.833

*** 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.



REFERENCE #60180817

Pace Analytical Services, Inc.
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Lenexa, KS 66219
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APPENDIX B CHAIN OF CUSTODY FORMS

REPORT OF LABORATORY ANALYSIS

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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.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: <u>City of Fort Smith</u>		Report To: <u>Lance McAvoy</u>		Attention: <u>Lance McAvoy</u>	
Address: <u>3900 Kelley Hwy</u> <u>Ft. Smith, AR 72904</u>		Copy To:		Company Name: <u>City of Fort Smith</u>	
Email To:		Purchase Order No.:		Address: <u>3900 Kelley Hwy, Ft. Smith, AR</u>	
Phone: <u>479-784-2337</u> Fax:		Project Name: <u>Massard Biomonitring</u>		Pace Quote Reference:	
Requested Due Date/TAT:		Project Number:		Pace Project Manager:	
				Pace Profile #:	
REGULATORY AGENCY					
<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER					
<input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER					
Site Location				STATE: <u>AR</u>	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test ↓	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Face Project No./ Lab I.D.						
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other		ICE																			
	SAMPLE ID (A-Z, 0-9 / , -) Sample IDs MUST BE UNIQUE				DATE	TIME	DATE	TIME																															
1	Massard Effluent		WW	C	10/21/14	0500	10/23/14	0800		1										X	X															1500 3.2	Y	Y	Y
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			
Free Cl ₂ = 0.02mg/L Total Cl ₂ = 0.02mg/L	Rachel L. Sharp / City of Ft. Smith	10/22/14	1200	[Signature]	10/23/14	1500	3.2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE				Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Rachel L. Sharp							
SIGNATURE of SAMPLER: Rachel L. Sharp			DATE Signed (MM/DD/YY): 10/22/14				

*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. DAS

Sample Condition Upon Receipt

Client Name: Ft Smith

Courier: Fed Ex UPS USPS Client Commercial Pace Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other _____

Thermometer Used: T-243 Type of Ice: Wet Blue None Samples received on ice, cooling process has begun (circle one)

Cooler Temperature: 3.2

Temperature should be above freezing to 6°C

Optional
Proj Due Date:
Proj Name:

Date and initials of person examining contents: MB 10/23/14 1500

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



CHAIN-OF-CUSTODY / Analytical Request Document

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

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: Lance McAvoy
 Copy To:
 Purchase Order No.:
 Project Name: Massad Biomonitoring
 Project Number:

Section C

Invoice Information:
 Attention: Lance McAvoy
 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				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.													
		COMPOSITE START				COMPOSITE END/GRAB		Preservatives																												
		DATE	TIME			DATE	TIME	Unpreserved	H ₂ SO ₄			HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other	I U	Analysis Test ↓	N	N															
1	Massad Effluent	WM	C			10/23/14	0800	10/24/14	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			
Free Cl ₂ = 0.02 mg/L Total Cl ₂ = 0.02 mg/L	Rachel L. Sharp / City of Fort Smith	10/24/14	1800	[Signature] / Pace	10/25/14	0800	2.3	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Rachel L. Sharp

SIGNATURE of SAMPLER: [Signature]

DATE Signed (MM/DD/YY): 10/24/14

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

R&S 10/24/14

Sample Condition Upon Receipt

Client Name: Fort Smith

Optional
Proj Due Date
Proj Name

Courier: Fed Ex UPS USPS Client Commercial Pace Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other _____

Thermometer Used: T-243 Type of Ice: Wet Blue None Samples received on ice, cooling process has begun

Cooler Temperature: 2.3

Date and initials of person examining contents: MB 10/29/14 0800

Temperature should be above freezing to 6°C

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

APPENDIX C

REFERENCE TOXICANTS SUMMARY

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

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: 10/6/13 11:30 End: 10/13/12 10:00

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	8	2	0
8 g/l	40	36	28	5
6 g/l	40	40	34	25
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	6	0	0
2.0 g/l	10	10	10	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 (1.24 g/l Sodium Chloride)

Survival NOEC: 1.5 g/l

Submitted By:


Timothy Harrell, Technical Director

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

APPENDIX D
STATE AGENCY FORMS

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, Inc.

Biomonitoring Form
 Chronic Toxicity Summary Form
Pimephales promelas
 Chemical Parameters Chart

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

Sample No. 1 Collected: Date: 10/20/2014 Time: 8:00
 Sample No. 2 Collected: Date: 10/22/2014 Time: 8:00
 Sample No. 3 Collected: Date: 10/24/2014 Time: 8:00
 Test Begin: Date: 10/21/2014 Time: 14:40
 Test End: Date: 10/24/2014 Time: 13:00

Dilution: 0 Day:								Dilution: 6 Day:									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	25.2	25	24.9	25.1	24.9	25.1		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	
DO Initial	8.2	8.1	8.2	8.1	8	8	8.1		DO Initial		8.1	8.2	8.1	8.1	8	8.1	
DO Final	6.9	7.2	7.2	7.3	7.2	7	7.1		DO Final	6.9	7.2	7.2	7.2	7.2	7	7.1	
pH Initial	7.69	7.54	7.62	7.6	7.48	7.53	7.53		pH Initial		7.6	7.69	7.67	7.56	7.59	7.61	
pH Final	7.58	7.69	7.76	7.54	7.61	7.65	7.75		pH Final	7.52	7.78	7.85	7.84	7.7	7.75	7.73	
Alkalinity	58								Alkalinity								
Hardness	90								Hardness								
Conductivity	390								Conductivity								
Chlorine	<.1						<.1		Chlorine								

Dilution: 3 Day:								Dilution: 8 Day:									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	
DO Initial		8.1	8.2	8.1	8.1	8	8.1		DO Initial		8.1	8.2	8.1	8.1	8	8.1	
DO Final	6.9	7.2	7.2	7.3	7.2	7	7.1		DO Final	7	7.3	7.2	7.2	7.2	7	7.1	
pH Initial		7.57	7.65	7.64	7.52	7.56	7.56		pH Initial		7.63	7.69	7.69	7.56	7.59	7.64	
pH Final	7.56	7.74	7.78	7.77	7.66	7.7	7.72		pH Final	7.5	7.8	7.83	7.85	7.73	7.75	7.73	
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity									Conductivity								
Chlorine									Chlorine								

Dilution: 5 Day:								Dilution: 11 Day:									
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	Init. 100%
DO Initial		8.1	8.2	8.1	8.1	8	8.1		DO Initial		8.1	8.2	8.1	8.2	8	8.1	8.5
DO Final	6.9	7.2	7.2	7.2	7.2	7	7.1		DO Final	7	7.3	7.2	7.2	7.3	7.1	7.1	
pH Initial		7.59	7.66	7.66	7.68	7.58	7.59		pH Initial		7.66	7.7	7.72	7.59	7.61	7.66	7.58
pH Final	7.55	7.75	7.8	7.81	7.55	7.72	7.73		pH Final	7.48	7.81	7.85	7.88	7.75	7.78	7.75	
Alkalinity									Alkalinity								118
Hardness									Hardness								92
Conductivity									Conductivity								470
Chlorine									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	10/19/2014	To 8:00	10/20/2014
Composite 2 Collected	From 8:00	10/21/2014	To 8:00	10/22/2014
Composite 3 Collected	From 8:00	10/23/2014	To 8:00	10/24/2014

Test initiated: am/pm 14:40 AM date 10/21/2014
 Test terminated: am/pm 13:00 AM date 10/28/2014

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 0 %	87.5	100	100	100	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%	87.5	100	100	100	100	100	100	97.5	4.79
8%	100	100	87.5	100	100	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%	0.322	0.449	0.486	0.396	0.432	0.419	13.94
3%	0.477	0.346	0.442	0.416	0.395	0.415	11.88
5%	0.441	0.4	0.425	0.364	0.412	0.408	7.13
6%	0.337	0.378	0.495	0.428	0.429	0.413	14.42
8%	0.427	0.353	0.329	0.447	0.401	0.391	12.66
11%	0.435	0.487	0.359	0.499	0.387	0.433	14.07

*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) 1/2 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) 1/2 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: Lance McAvoy
 Analyst: Tim Harrell
 Mike Bollin

Sample No. 1 Collected: Date: 10/20/2014 Time: 8:00
 Sample No. 2 Collected: Date: 10/22/2014 Time: 8:00
 Sample No. 3 Collected: Date: 10/24/2014 Time: 8:00
 Test Begin: Date: 10/21/2014 Time: 14:40
 Test End: Date: 10/24/2014 Time: 13:00

Dilution: 0 Day:									Dilution: 6 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	25.1	25.2	25	24.9	25.1	24.9	25.1		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	
DO Initial	8.2	8.1	8.2	8.1	8	8	8.1		DO Initial		8.1	8.2	8.1	8.1	8	8.1	
DO Final	6.9	7.2	7.2	7.3	7.2	7	7.1		DO Final	6.9	7.2	7.2	7.2	7.2	7	7.1	
pH Initial	7.69	7.54	7.62	7.6	7.48	7.53	7.53		pH Initial		7.6	7.69	7.67	7.56	7.59	7.61	
pH Final	7.58	7.69	7.76	7.54	7.61	7.65	7.75		pH Final	7.52	7.78	7.85	7.84	7.7	7.75	7.73	
Alkalinity	58								Alkalinity								
Hardness	90								Hardness								
Conductivity	390								Conductivity								
Chlorine	<.1						<.1		Chlorine								

Dilution: 3 Day:									Dilution: 8 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	
DO Initial		8.1	8.2	8.1	8.1	8	8.1		DO Initial		8.1	8.2	8.1	8.1	8	8.1	
DO Final	6.9	7.2	7.2	7.3	7.2	7	7.1		DO Final	7	7.3	7.2	7.2	7.2	7	7.1	
pH Initial		7.57	7.65	7.64	7.52	7.56	7.56		pH Initial		7.63	7.69	7.69	7.56	7.59	7.64	
pH Final	7.56	7.74	7.78	7.77	7.66	7.7	7.72		pH Final	7.5	7.8	7.83	7.85	7.73	7.75	7.73	
Alkalinity									Alkalinity								
Hardness									Hardness								
Conductivity									Conductivity								
Chlorine									Chlorine								

Dilution: 5 Day:									Dilution: 11 Day:								
	1	2	3	4	5	6	7	Comments		1	2	3	4	5	6	7	Comments
Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25		Temp (C)	24.8	24.9	24.9	24.8	24.9	24.8	25	Init. 100%
DO Initial		8.1	8.2	8.1	8.1	8	8.1		DO Initial		8.1	8.2	8.1	8.2	8	8.1	8.5
DO Final	6.9	7.2	7.2	7.2	7.2	7	7.1		DO Final	7	7.3	7.2	7.2	7.3	7.1	7.1	
pH Initial		7.59	7.66	7.66	7.68	7.58	7.59		pH Initial		7.66	7.7	7.72	7.59	7.61	7.66	7.58
pH Final	7.55	7.75	7.8	7.81	7.55	7.72	7.73		pH Final	7.48	7.81	7.85	7.88	7.75	7.78	7.75	
Alkalinity									Alkalinity								118
Hardness									Hardness								92
Conductivity									Conductivity								470
Chlorine									Chlorine							<.1	<.1

**Summary Reporting Forms
Chronic Biomonitoring**

Ceriodaphnia dubia Survival and Reproduction

Permittee: City of Fort Smith

NPDES No.:

AR 0021750

Composite 1 Collected	Time:	Date:	To	Time:	Date:
	From	8:00		10/19/2014	8:00

Composite 2 Collected	From	8:00	10/21/2014	To	8:00	10/22/2014
-----------------------	------	------	------------	----	------	------------

Composite 3 Collected	From	8:00	10/23/2014	To	8:00	10/24/2014
-----------------------	------	------	------------	----	------	------------

Test initiated: am/pm 14:40 AM date 10/21/2014

Test terminated: am/pm 13:00 AM date 10/28/2014

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	22	24	21	19	19	23
B	22	23	23	24	21	25
C	18	24	21	23	20	16
D	26	20	26	17	21	18
E	22	20	23	25	25	25
F	17	24	18	25	23	19
G	22	22	23	16	25	22
H	15	24	22	21	21	26
I	16	19	23	26	18	25
J	27	22	25	18	24	26
Mean	20.7	22.2	22.5	21.4	21.7	22.5
CV%*	19.73	8.7	9.88	17.23	11.3	16.13

*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) 1/2 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) 1/2 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

Sample Condition Upon Receipt

NO# 60180817



Client Name: F+ Smith

Courier: Fed Ex UPS USPS Client Commercial Pace Other

Tracking #: _____ Pace Shipping Label Used? Yes No

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

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T-243 Type of Ice: Wet Blue None Samples received on ice, cooling process has begun

Cooler Temperature: 3.4 (circle one)

Temperature should be above freezing to 6°C

Date and initials of person examining contents: MB 10/21/14 1430

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody filled out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler name & signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Filtered volume received for dissolved tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12.
Sample labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Includes date/time/ID/analyses Matrix:	<u>wt</u>	13.
All containers needing preservation have been checked:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
All containers needing preservation are found to be in compliance with EPA recommendation:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Initial when completed
Trip Blank present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	lot # of added preservative
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Project sampled in USDA Regulated Area:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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 [Signature] Date: 1022-14

From: (479) 784-2330
Steve Floyd
City of Fort Smith
3900 Kelley Highway

Origin ID: FSMA



J142214092303uv

Fort Smith, AR 72904

SHIP TO: (501) 682-0638

BILL SENDER

NPDES Enforcement Section, Water
ADEQ
5301 Northshore Drive

North Little Rock, AR 72118

Ship Date: 15JAN15
ActWgt: 2.0 LB
CAD: 1731127/INET3550

Delivery Address Bar Code



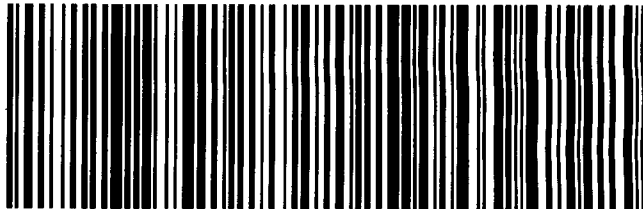
Ref #
Invoice #
PO #
Dept #

MON - 19 JAN AA
** 2DAY **

TRK# 7725 9647 9220
0201

SA LITA

72118
AR-US
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522G1/8F15/6AC9

