



Georgia-Pacific LLC
Consumer Products

Crossett Paper Operations
100 Mill Supply Rd.
P.O. Box 3333
Crossett, AR 71635
(870) 567-8000
(870) 364-9076 fax
www.gp.com

May 30, 2013

Mr. Craig Uyeda
NPDES Enforcement Section
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Reference: Georgia-Pacific LLC: Crossett Paper Operations
NPDES Permit # **AR0001210**

Dear Mr. Uyeda:

Please find attached a revised Discharge Monitoring Report (DMR) for the Georgia-Pacific Crossett Paper Operations' - NPDES Permit # **AR0001210** – for the first quarter dioxin monitoring results submitted in April of 2013. Analytical results for samples collected on March 21, 2013 initially indicated a 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) concentration of 33.4 ppq. As these results were inconsistent with historical results and highly questionable, the lab was requested to analyze a duplicate sample collected at the same time and location as the first. The analysis of the duplicate sample yielded a result of less than the detection limit (i.e., “non detect”) for TCDD.

We do not believe that the detection of TCDD in the initial sample was accurate based on the duplicate sample result, our historical results and current operations. The laboratory explanation listed on page 2 of their attached report supports this conclusion. There have been no detections of TCDD in our recent history nor have there been any process changes at the facility. As explained by the laboratory explanation, a detection of TCDD is inconsistent with analytical profiles and results historically observed in the Pulp and Paper industry based on the fact that 2,3,7,8-TCDF was not detected. Please also see the attached lab report for the analysis results.

If you have any questions or need additional information, please feel free to contact me at (870) 567-8144 or by email at james.cutbirth@gapac.com.

Sincerely,

A handwritten signature in cursive script that reads "James W. Cutbirth".

James W. Cutbirth
Environmental Services Superintendent



22 May 2013

Rachel M. Johnson
Environmental Engineer
Georgia-Pacific Crossett Paper Operations
P.O. Box 3333
Crossett, AR 71635
Ph.: 870-567-8170
Email: RachelMJohnson@gapac.com

Subject: Certificate of Results

Dear Rachel;

Attached to this narrative are the analytical results you requested on the sample submitted for the determination of 2,3,7,8-TCDF and 2,3,7,8-TCDD. The insert below summarizes the relevant information pertaining to your project. In particular, QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. Results reported relate only to the items tested.

Project Information Summary	When applicable, see QC Annotations for details
Client Project No.	AR030-WF-0113 & AR030-WF-0313
AP Project #	A5408 & A5442
Analytical Protocol	Method 1613B
No. Samples Submitted	2
No. Samples Analyzed	2
No. Laboratory Method Blanks	1
No. OPRs / Batch CS3	1
No. Outstanding Samples	0
Date Received	4/18/2013 & 4/26/2013
Condition Received	good
Temperature upon Receipt (C)	1 - 2
Extraction within Holding Time	yes
Analysis within Holding Time	yes
Data meet QA/QC Requirements	yes
Exceptions	none
Analytical Difficulties	see below

ANALYTICAL PERSPECTIVES IS NOW PART OF SGS, THE WORLD'S LEADING INSPECTION, VERIFICATION, TESTING AND CERTIFICATION COMPANY.

QC Annotations:

1. Please see Appendix A & B attached for data qualifier/attribute and lab identifier descriptions which may be contained in the project.
2. The results obtained for this sample in the initial analysis (A5408) are not consistent with either dioxin formation in a pulp and paper chlorine bleaching process or a lab artifact, such as lab background or inadvertent spiking. The distribution of TCDF isomers (albeit low concentrations) is reminiscent of profiles observed in the emissions from combustion sources. However, the TCDD profile does not correlate with such samples. In fact, the TCDD isomers profile is reminiscent of samples associated with production of certain herbicides. These characteristics are inconsistent with lab background, inadvertent spiking, or the production of paper using chlorine bleaching. No samples in our laboratory in the past six months have featured such a prominent and isolated 2,3,7,8-TCDD peak, nor has there been any trend of observing 2,3,7,8-TCDD in method blanks in the lab, and the method blank associated with this sample showed no dioxin isomers. An inadvertent spike of 2,3,7,8-TCDD would yield a different concentration of 2,3,7,8-TCDD, and we would observe a similar concentration of 2,3,7,8-TCDF. Neither of these conditions exists in this sample, so we may rule out an inadvertent spike. Finally, production of 2,3,7,8-TCDD in paper generation (chlorine bleaching) is typically associated with production of 2,3,7,8-TCDF and 1,2,7,8-TCDD/F. Again, the sample's TCDD/F isomers profiles are not consistent with this pattern. Thus, while we cannot state definitively what the source of the 2,3,7,8-TCDD is, we are confident that it does not originate with the laboratory or the paper production process using chlorine bleaching. As a result, a back-up for this sample was sent in and analyzed (A5442). The results from both projects (A5408 and A5442) are reported in this narrative.



Analytical Perspectives Certification IDs:

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NORTH CAROLINA	37783
WASHINGTON	C2027
NEW YORK	11988
VIRGINIA	460180
MINNESOTA	037-999-448
OREGON	pending
TEXAS	T104704484-10-1
PENNSYLVANIA-NELAP SECONDARY	68-01849

SGS Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please do not hesitate to contact us.

The management and staff of SGS Analytical Perspectives welcomes customer feedback, both positive and negative, as we continually improve our services. Please visit our web site at www.ultratrace.com and click on the 'Leave Your Feedback Here!' link on the Home Page. Thank you for choosing SGS Analytical Perspectives.

Sincerely,

Heather Distel, Ph.D.
Senior Project Scientist/Team Lead
AK/ak

APPENDIX A: DATA QUALIFIERS / DATA ATTRIBUTES

>	Indicates high recoveries. Shown with the numeric value at the top of the range. ¹
B	The analyte was found in the method blank, at a concentration that was at least 10% of the concentration in the sample.
C	Two or more congeners co-elute. In EDDs C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group are shown with the number of the lowest IUPAC co-eluter.
E	The reported concentration exceeds the calibration range (upper point of the calibration curve).
EMPC	Represents an Estimated Maximum Possible Concentration. EMPC's arise in cases where the signal/noise ratio is not sufficient for peak identification (the determined ion-abundance ratio is outside the allowed theoretical range), or where there is a co-eluting interference.
ETH	Indicates the presence of a diphenyl ether that appears to interfere with the quantitation of a furan. The reported concentration is the maximum.
H/h	If the standard recovery is below the method or SOP specified value "H" is assigned. If the obtained value is less than half the specified value "h" is assigned. ¹
J	Indicates that an analyte has a concentration below the reporting limit (lowest point of the calibration curve).
ND	Indicates a non-detect.
NR	Indicates a value that is not reportable.
PR	Due to interference, the associated congener is poorly resolved.
QI	Indicates the presence of a quantitative interference.
SI	Denotes "Single Ion Mode" and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates. ¹
U	The analyte was not detected. The estimated detection limit (EDL) may be reported for this analyte.
V	The labeled standard recovery was found to be outside of the method control limits.
X	Indicates results reported from reinjection, refractionation, or repeat analyses.

APPENDIX B: LAB ID IDENTIFIERS

AR	Indicates use of the archived portion of the sample extract.
CU	Indicates a sample that required additional clean-up prior to MS injection/processing.
D	Indicates a dilution of the sample extract. The number that follows the "D" indicates the dilution factor.
DE	Indicates a dilution performed with the addition of ES (extraction standard) solution.
DUP	Designation for a duplicate sample.
MS	Designation for a matrix spike.
MSD	Designation for a matrix spike duplicate.
RJ	Indicates a reinjection of the sample extract.
S	Indicates a sample split. The number that follows the "S" indicates the split factor.

¹Denotes data qualifiers/attributes whose use will be phased out over time

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 1: Sample and Laboratory Blank Data

Client Sample ID	<u>Method Blank A5408</u>	Date Sampled	<u>n/a</u>
Lab Project ID	<u>A5408</u>	Analysis File	<u>130423P3S#5</u>
Client Project	<u>AR030-WF-0113</u>	Lab Sample ID	<u>MB1_10853_DF_TLX</u>
Date Received	<u>n/a</u>	Matrix	<u>Aqueous</u>
Date Extracted	<u>Apr 19,2013</u>	Sample Size	<u>1.00 L</u>
Date Analyzed	<u>Apr 24,2013</u>	Dilution Factor	<u>1</u>
Analyst	<u>MDC</u>	GC Column	<u>DB5</u>
		Batch ID	<u>10853</u>
		ICAL ID	<u>11012012A</u>
		VER File	<u>130423P3S#1</u>
		OPR File	<u>130423P3S#8</u>
		Blank File	<u>130423P3S#5</u>

Compound	Concentration (ppq)		Flags	Ion Abundance Ratios		Acceptable Retention Time	
	Found	Reporting Limit		Found	QC Limit ¹	Found	QC Limit ²
2,3,7,8-TCDD	ND	10		-	0.65-0.89	-	0.999-1.002
2,3,7,8-TCDF	ND	10		-	0.65-0.89	-	0.999-1.003

(1) QC limits for ratio of areas are from Method Table 9.
(2) QC limits for relative retention times are from Method Table 2.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 1: Sample and Laboratory Blank Data

Client Sample ID <u>AR030-WF-0113-M0A</u>	Date Sampled <u>Mar 21,2013</u>	
Lab Project ID <u>A5408</u>	Analysis File <u>130423P3S#11</u>	
Client Project <u>AR030-WF-0113</u>	Lab Sample ID <u>A5408_10853_DF_001</u>	Batch ID <u>10853</u>
Date Received <u>Apr 18,2013</u>	Matrix <u>Aqueous</u>	ICAL ID <u>11012012A</u>
Date Extracted <u>Apr 19,2013</u>	Sample Size <u>1.00 L</u>	VER File <u>130423P3S#1</u>
Date Analyzed <u>Apr 24,2013</u>	Dilution Factor <u>1</u>	OPR File <u>130423P3S#8</u>
Analyst <u>MDC</u>	GC Column <u>DB5</u>	Blank File <u>130423P3S#5</u>

Compound	Concentration (ppq)		Flags	Ion Abundance Ratios		Acceptable Retention Time	
	Found	Reporting Limit		Found	QC Limit ¹	Found	QC Limit ²
2,3,7,8-TCDD	33.4	10		0.85	0.65-0.89	1.0009	0.999-1.002
2,3,7,8-TCDF	ND	10		-	0.65-0.89	-	0.999-1.003

⁽¹⁾ QC limits for ratio of areas are from Method Table 9.

⁽²⁾ QC limits for relative retention times are from Method Table 2.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 2: Internal Standard and Cleanup Standard Recoveries

Client Sample ID Method Blank A5408 Lab Sample ID MB1_10853_DF_TLX

Compound	Concentration (ng/ml)		Percent Recovery ¹	
	Spiked	Found	Found	QC Limit
Internal Standards				
¹³ C ₁₂ -2,3,7,8-TCDD	100	74.5	74.5	31-137
¹³ C ₁₂ -2,3,7,8-TCDF	100	72.3	72.3	29-140
Cleanup Standard				
³⁷ Cl ₄ -2,3,7,8-TCDD	40	41.4	104	42.0-164

⁽¹⁾ QC limits from Method Table 7A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 2: Internal Standard and Cleanup Standard Recoveries

Client Sample ID AR030-WF-0113-M0A Lab Sample ID A5408_10853_DF_001

Compound	Concentration (ng/ml)		Percent Recovery ¹	
	Spiked	Found	Found	QC Limit
Internal Standards				
¹³ C ₁₂ -2,3,7,8-TCDD	100	88.1	88.1	31-137
¹³ C ₁₂ -2,3,7,8-TCDF	100	85.3	85.3	29-140
Cleanup Standard				
³⁷ Cl ₄ -2,3,7,8-TCDD	40	41.6	104	42.0-164

⁽¹⁾ QC limits from Method Table 7A (Revised AP)

Ical: MM1_03312010A
Tetra CDD/Fs by Method 1613B/8290B

Form 3: Initial Calibration Relative Responses

Tetras Only

Instrument ID MM1

ICAL Date(s) 13-Feb-13

ICAL ID 11012012A

CS0 Data Filename 130213P1 S#2

CS3 Data Filename 130213P1 S#5

CS6 Data Filename 130213P1 S#8

CS1 Data Filename 130213P1 S#3

CS4 Data Filename 130213P1 S#6

CS2 Data Filename 130213P1 S#4

CS5 Data Filename 130213P1 S#7

Compound	Relative Response (RR) for Labeled or Response Factor (RF) for Internal Standard Calibration							Mean	%RSD ¹
	CS0	CS1	CS2	CS3	CS4	CS5	CS6		
2,3,7,8-TCDD	1.10	1.01	1.00	1.07	1.06	1.12	1.09	1.06	4.1%
2,3,7,8-TCDF	1.15	1.08	1.18	1.09	1.04	1.04	1.09	1.10	4.7%

¹ RSD QC Limit is < 20 % for relative responses of isotopic dilution calibrations

¹ RSD QC Limit is < 35 % for response factors of compounds without labeled analogs

Ical: MM1_03312010A
Tetra CDD/Fs by Method 1613B/8290B

Form 3: Initial Calibration Relative Responses, cont'd

Instrument ID MM1

ICAL Date(s) 13-Feb-13

ICAL ID 11012012A

Compound	Relative Response (RR) for Labeled or Response Factor (RF) for Internal Standard Calibration								Mean	%RSD ¹
	CS0	CS1	CS2	CS3	CS4	CS5	CS6			
¹³ C ₁₂ -2,3,7,8-TCDD	0.98	1.00	1.01	1.00	1.01	1.03	1.04	1.01	2.0%	
¹³ C ₁₂ -2,3,7,8-TCDF	1.04	1.03	1.04	1.04	1.05	1.07	1.11	1.05	2.6%	
Recovery Standards										
¹³ C ₁₂ -1,2,3,4-TCDD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
¹³ C ₁₂ -1,2,3,4-TCDF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Cleanup Standard										
³⁷ Cl ₄ -2,3,7,8-TCDD	*	1.15	1.01	1.07	1.09	1.17	*	1.10	5.9%	

¹ RSD QC Limit is < 20 % for relative responses of isotopic dilution calibrations

¹ RSD QC Limit is < 35 % for response factors of compounds without labeled analogs

**Analytical Perspectives
Tetra CDD/Fs by Method 1613B**

Form 4: Initial Precision & Recovery (IPR)

Analyst Name <u>Jerry Hart</u>	Analysis Date/Time <u>1-AUG-00/03:52:34</u>
IPR1 Data Filename <u>000731P2 S: #10</u>	Analysis Date/Time <u>29-MAR-01/12:01:19</u>
IPR2 Data Filename <u>010329P2 S: #3</u>	Analysis Date/Time <u>1-MAY-01/21:58:45</u>
IPR3 Data Filename <u>010501R3 S: #3</u>	Analysis Date/Time <u>22-JUN-01/18:17:31</u>
IPR4 Data Filename <u>010622R1 S: #2</u>	
Extraction Method <u>1613</u>	Extraction Date <u>n/a</u>
Extraction Matrix <u>n/a</u>	

Compound	Spiked	Concentrations in the extract (ng/ml)					Std Dev	Mean QC Limit ¹	Std Dev QC Limit ¹
		IPR1 Found	IPR2 Found	IPR3 Found	IPR4 Found	Mean			
2,3,7,8-TCDD	10	9.07	11.3	10.8	11.8	10.7	1.2	8.7-12.4	2.7
2,3,7,8-TCDF	10	8.87	11.3	10.8	12.4	10.8	1.5	9.1-13.1	2.0

⁽¹⁾ QC limits are from Method Table 6A

Compound	Spiked	Concentrations in the extract (ng/ml)					Std Dev	Mean QC Limit ¹	Std Dev QC Limit ¹
		IPR1 Found	IPR2 Found	IPR3 Found	IPR4 Found	Mean			
¹³ C ₁₂ -2,3,7,8-TCDD	100	121	94.3	109	91.5	104	14	32-115	35
³⁷ Cl ₄ -2,3,7,8-TCDD	40	36.2	39.7	42.1	38.3	39.1	2.5	18.0-53.6	3.4
¹³ C ₁₂ -2,3,7,8-TCDF	100	121	91.1	112	95.7	105	14	35-99	34

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 5: Calibration Verification

VER Filename 130423P3S#1

Instrument ID MM1

ICAL ID 11012012A

Analysis Date/Time Apr 24,2013 04:36:09

ICAL Date Feb 13,2013

Compound	Concentrations in the extract (ng/ml)		QC Limit ¹
	Spiked	Found	
2,3,7,8-TCDD	10	10.5	7.8-12.9
2,3,7,8-TCDF	10	10.4	8.4-12.0

⁽¹⁾ QC limits are from Method Table 6A

Compound	Concentrations in the extract (ng/ml)		QC Limit ¹
	Spiked	Found	
¹³ C ₁₂ -2,3,7,8-TCDD	100	101	82-121
³⁷ Cl ₄ -2,3,7,8-TCDD	10	10.4	7.9-12.7
¹³ C ₁₂ -2,3,7,8-TCDF	100	96.1	71-140

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 5a: Continuing Calibration Verification

Instrument ID MM1

Analysis Date/Time Apr 24, 2013 04:36:09

GC Column ID DB5

CCS Data Filename 130423P3S#1

ICAL ID 11012012A

Native Analyte	m/z's Forming Ratio ¹	Ion Abundance Ratio Found	QC Limits ²
2,3,7,8-TCDD	M/M+2	0.81	0.65-0.89
2,3,7,8-TCDF	M/M+2	0.79	0.65-0.89

Labeled Compound	m/z's Forming Ratio ¹	Ion Abundance Ratio Found	QC Limits ²
¹³ C ₁₂ -2,3,7,8-TCDD	M/M+2	0.80	0.65-0.89
¹³ C ₁₂ -2,3,7,8-TCDF	M/M+2	0.80	0.65-0.89

¹ See Table 8 in Method 1613B for m/z specifications and ion abundance ratio limits.

² See Table 9 in Method 1613B for ion abundance ratio control limits.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5408
TCDD/F by Method 1613

Form 6: Ongoing Precision and Recovery

Matrix <u>Aqueous</u>	Instrument ID <u>MM1</u>
ICAL Date <u>Feb 13,2013</u>	OPR Filename <u>130423P3S#8</u>
Analysis Date/Time <u>Apr 24,2013 10:43:58</u>	Batch ID <u>10853</u>

Compound	Concentrations in the extract (ng/ml)		
	Spiked	Found	QC Limit ¹
2,3,7,8-TCDD	10	9.99	7.3-14.6
2,3,7,8-TCDF	10	11.0	8.0-14.7

⁽¹⁾ QC limits are from Method Table 6

Compound	Concentrations in the extract (ng/ml)		
	Spiked	Found	QC Limit ¹
¹³ C ₁₂ -2,3,7,8-TCDD	100	76.8	25-141
³⁷ Cl ₄ -2,3,7,8-TCDD	40	42.4	14.8-63.2
¹³ C ₁₂ -2,3,7,8-TCDF	100	71.4	26-126

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 1: Sample and Laboratory Blank Data

Client Sample ID <u>Method Blank A5442</u>	Date Sampled <u>n/a</u>	
Lab Project ID <u>A5442</u>	Analysis File <u>130501P1S#6</u>	
Client Project <u>AR030-WF-0313</u>	Lab Sample ID <u>MB1_10883_DF_SPE</u>	Batch ID <u>10883</u>
Date Received <u>n/a</u>	Matrix <u>Aqueous</u>	ICAL ID <u>11012012A</u>
Date Extracted <u>Apr 29,2013</u>	Sample Size <u>1.00 L</u>	VER File <u>130501P1S#2</u>
Date Analyzed <u>May 01,2013</u>	Dilution Factor <u>1</u>	OPR File <u>130501P1S#3</u>
Analyst <u>MDC</u>	GC Column <u>DB5</u>	Blank File <u>130501P1S#6</u>

* Compound	Concentration (ppq)		Flags	Ion Abundance Ratios		Acceptable Retention Time	
	Found	Reporting Limit		Found	QC Limit ¹	Found	QC Limit ²
2,3,7,8-TCDD	ND	10		-	0.65-0.89	-	0.999-1.002
2,3,7,8-TCDF	ND	10		-	0.65-0.89	-	0.999-1.003

(1) QC limits for ratio of areas are from Method Table 9.

(2) QC limits for relative retention times are from Method Table 2.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 1: Sample and Laboratory Blank Data

Client Sample ID <u>AR030-WF-0313-MOA</u>	Date Sampled <u>Mar 21,2013</u>	
Lab Project ID <u>A5442</u>	Analysis File <u>130501P1S#8</u>	
Client Project <u>AR030-WF-0313</u>	Lab Sample ID <u>A5442_10883_DF_001</u>	Batch ID <u>10883</u>
Date Received <u>Apr 26,2013</u>	Matrix <u>Aqueous</u>	ICAL ID <u>11012012A</u>
Date Extracted <u>Apr 29,2013</u>	Sample Size <u>1.00 L</u>	VER File <u>130501P1S#2</u>
Date Analyzed <u>May 01,2013</u>	Dilution Factor <u>1</u>	OPR File <u>130501P1S#3</u>
Analyst <u>MDC</u>	GC Column <u>DB5</u>	Blank File <u>130501P1S#6</u>

Compound	Concentration (ppq)		Flags	Ion Abundance Ratios		Acceptable Retention Time	
	Found	Reporting Limit		Found	QC Limit ¹	Found	QC Limit ²
2,3,7,8-TCDD	ND	10		-	0.65-0.89	-	0.999-1.002
2,3,7,8-TCDF	ND	10		-	0.65-0.89	-	0.999-1.003

⁽¹⁾ QC limits for ratio of areas are from Method Table 9.

⁽²⁾ QC limits for relative retention times are from Method Table 2.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 2: Internal Standard and Cleanup Standard Recoveries

Client Sample ID Method Blank A5442 Lab Sample ID MBI_10883_DF_SPE

Compound	Concentration (ng/ml)		Percent Recovery ¹	
	Spiked	Found	Found	QC Limit
Internal Standards				
¹³ C ₁₂ -2,3,7,8-TCDD	100	37.6	75.3	31-137
¹³ C ₁₂ -2,3,7,8-TCDF	100	33.5	67.0	29-140
Cleanup Standard				
³⁷ Cl ₄ -2,3,7,8-TCDD	40	21.4	107	42.0-164

⁽¹⁾ QC limits from Method Table 7A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 2: Internal Standard and Cleanup Standard Recoveries

Client Sample ID AR030-WF-0313-MOA Lab Sample ID A5442_10883_DF_001

Compound	Concentration (ng/ml)		Percent Recovery ¹	
	Spiked	Found	Found	QC Limit
Internal Standards				
¹³ C ₁₂ -2,3,7,8-TCDD	100	33.5	67.1	31-137
¹³ C ₁₂ -2,3,7,8-TCDF	100	30.6	61.2	29-140
Cleanup Standard				
³⁷ Cl ₄ -2,3,7,8-TCDD	40	20.8	104	42.0-164

⁽¹⁾ QC limits from Method Table 7A (Revised AP)

Ical: MM1_03312010A
Tetra CDD/Fs by Method 1613B/8290B

Form 3: Initial Calibration Relative Responses

Tetras Only

Instrument ID MM1

ICAL Date(s) 13-Feb-13

ICAL ID 11012012A

CS0 Data Filename 130213P1 S#2

CS3 Data Filename 130213P1 S#5

CS6 Data Filename 130213P1 S#8

CS1 Data Filename 130213P1 S#3

CS4 Data Filename 130213P1 S#6

CS2 Data Filename 130213P1 S#4

CS5 Data Filename 130213P1 S#7

Compound	Relative Response (RR) for Labeled or Response Factor (RF) for Internal Standard Calibration							Mean	%RSD ¹
	CS0	CS1	CS2	CS3	CS4	CS5	CS6		
2,3,7,8-TCDD	1.10	1.01	1.00	1.07	1.06	1.12	1.09	1.06	4.1%
2,3,7,8-TCDF	1.15	1.08	1.18	1.09	1.04	1.04	1.09	1.10	4.7%

¹ RSD QC Limit is < 20 % for relative responses of isotopic dilution calibrations

¹ RSD QC Limit is < 35 % for response factors of compounds without labeled analogs

Ical: MM1_03312010A
Tetra CDD/Fs by Method 1613B/8290B

Form 3: Initial Calibration Relative Responses, cont'd

Instrument ID MM1

ICAL Date(s) 13-Feb-13

ICAL ID 11012012A

Compound	Relative Response (RR) for Labeled or Response Factor (RF) for Internal Standard Calibration							Mean	%RSD ¹
	CS0	CS1	CS2	CS3	CS4	CS5	CS6		
¹³ C ₁₂ -2,3,7,8-TCDD	0.98	1.00	1.01	1.00	1.01	1.03	1.04	1.01	2.0%
¹³ C ₁₂ -2,3,7,8-TCDF	1.04	1.03	1.04	1.04	1.05	1.07	1.11	1.05	2.6%
Recovery Standards									
¹³ C ₁₂ -1,2,3,4-TCDD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
¹³ C ₁₂ -1,2,3,4-TCDF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Cleanup Standard									
³⁷ Cl ₄ -2,3,7,8-TCDD	*	1.15	1.01	1.07	1.09	1.17	*	1.10	5.9%

¹ RSD QC Limit is < 20 % for relative responses of isotopic dilution calibrations

¹ RSD QC Limit is < 35 % for response factors of compounds without labeled analogs

**Analytical Perspectives
Tetra CDD/Fs by Method 1613B**

Form 4: Initial Precision & Recovery (IPR)

Analyst Name <u>Jerry Hart</u>	
IPR1 Data Filename <u>000731P2 S: #10</u>	Analysis Date/Time <u>1-AUG-00/03:52:34</u>
IPR2 Data Filename <u>010329P2 S: #3</u>	Analysis Date/Time <u>29-MAR-01/12:01:19</u>
IPR3 Data Filename <u>010501R3 S: #3</u>	Analysis Date/Time <u>1-MAY-01/21:58:45</u>
IPR4 Data Filename <u>010622R1 S: #2</u>	Analysis Date/Time <u>22-JUN-01/18:17:31</u>
Extraction Method <u>1613</u>	Extraction Date <u>n/a</u>
Extraction Matrix <u>n/a</u>	

Compound	Spiked	Concentrations in the extract (ng/ml)					Std Dev	Mean QC Limit ¹	Std Dev QC Limit ¹
		IPR1 Found	IPR2 Found	IPR3 Found	IPR4 Found	Mean			
2,3,7,8-TCDD	10	9.07	11.3	10.8	11.8	10.7	1.2	8.7-12.4	2.7
2,3,7,8-TCDF	10	8.87	11.3	10.8	12.4	10.8	1.5	9.1-13.1	2.0

⁽¹⁾ QC limits are from Method Table 6A

Compound	Spiked	Concentrations in the extract (ng/ml)					Std Dev	Mean QC Limit ¹	Std Dev QC Limit ¹
		IPR1 Found	IPR2 Found	IPR3 Found	IPR4 Found	Mean			
¹³ C ₁₂ -2,3,7,8-TCDD	100	121	94.3	109	91.5	104	14	32-115	35
³⁷ Cl ₄ -2,3,7,8-TCDD	40	36.2	39.7	42.1	38.3	39.1	2.5	18.0-53.6	3.4
¹³ C ₁₂ -2,3,7,8-TCDF	100	121	91.1	112	95.7	105	14	35-99	34

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 5: Calibration Verification

VER Filename 130501P1S#2

Instrument ID MM1

ICAL ID 11012012A

Analysis Date/Time May 01,2013 13:28:25

ICAL Date Feb 13,2013

Compound	Concentrations in the extract (ng/ml)		QC Limit ¹
	Spiked	Found	
2,3,7,8-TCDD	10	10.5	7.8-12.9
2,3,7,8-TCDF	10	10.6	8.4-12.0

⁽¹⁾ QC limits are from Method Table 6A

Compound	Concentrations in the extract (ng/ml)		QC Limit ¹
	Spiked	Found	
¹³ C ₁₂ -2,3,7,8-TCDD	100	50.2	82-121
³⁷ Cl ₄ -2,3,7,8-TCDD	10	4.97	7.9-12.7
¹³ C ₁₂ -2,3,7,8-TCDF	100	47.4	71-140

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 5a: Continuing Calibration Verification

Instrument ID MM1

Analysis Date/Time May 01,2013 13:28:25

GC Column ID DB5

CCS Data Filename 130501P1S#2

ICAL ID 11012012A

Native Analyte	m/z's Forming Ratio ¹	Ion Abundance Ratio Found	QC Limits ²
2,3,7,8-TCDD	M/M+2	0.80	0.65-0.89
2,3,7,8-TCDF	M/M+2	0.81	0.65-0.89

Labeled Compound	m/z's Forming Ratio ¹	Ion Abundance Ratio Found	QC Limits ²
¹³ C ₁₂ -2,3,7,8-TCDD	M/M+2	0.80	0.65-0.89
¹³ C ₁₂ -2,3,7,8-TCDF	M/M+2	0.81	0.65-0.89

¹ See Table 8 in Method 1613B for m/z specifications and ion abundance ratio limits.

² See Table 9 in Method 1613B for ion abundance ratio control limits.

Georgia-Pacific Crossett Paper Operations
Crossett Paper Operations A5442
TCDD/F by Method 1613

Form 6: Ongoing Precision and Recovery

Matrix <u>Aqueous</u>	Instrument ID <u>MM1</u>
ICAL Date <u>Feb 13,2013</u>	OPR Filename <u>130501P1S#3</u>
Analysis Date/Time <u>May 01,2013 14:20:56</u>	Batch ID <u>10883</u>

Compound	Concentrations in the extract (ng/ml)		
	Spiked	Found	QC Limit ¹
2,3,7,8-TCDD	10	10.2	7.3-14.6
2,3,7,8-TCDF	10	10.8	8.0-14.7

⁽¹⁾ QC limits are from Method Table 6

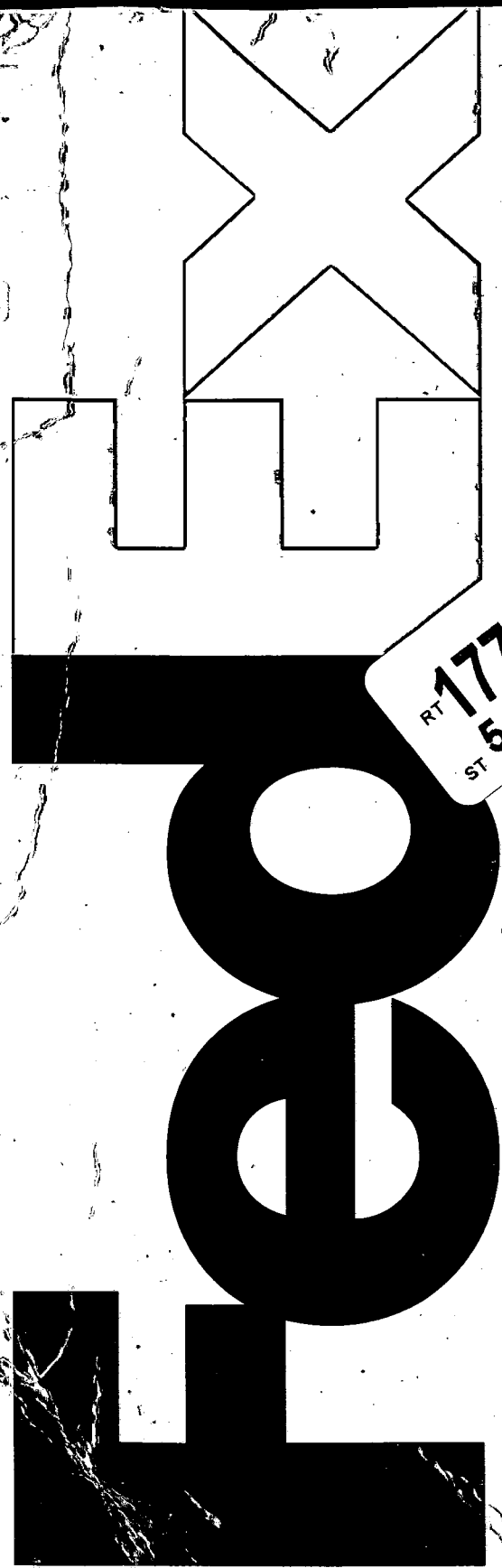
Compound	Concentrations in the extract (ng/ml)		
	Spiked	Found	QC Limit ¹
¹³ C ₁₂ -2,3,7,8-TCDD	100	38.3	25-141
³⁷ Cl ₄ -2,3,7,8-TCDD	40	20.5	14.8-63.2
¹³ C ₁₂ -2,3,7,8-TCDF	100	34.5	26-126

⁽¹⁾ QC limits are from Method Table 6A (Revised AP)



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Delivery Address Bar Code



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Invoice #
PO #
Dept #

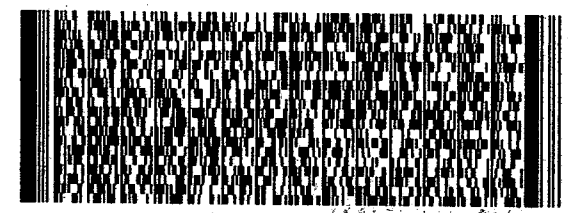
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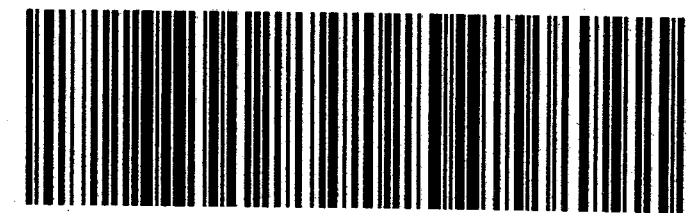
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