

13 octobre 2010

BAPE – Gaz de Schiste

Réponses de l'Association pétrolière et gazière du Québec aux questions de la Commission

Exemple d'une composition chimique des eaux de frac et des eaux usées d'un puits horizontal fracturé dans l'Utica

Nous vous fournissons un exemple de certificat d'analyse des eaux de fracturation usées. Ce dernier fut échantillonné au mois de juillet 2010 et est composé d'approximativement 70% d'eau de fracturation usée et de 30% d'eau fraîche (le surplus d'eau dans l'anneau de rétention d'eau qui n'a pas servi à la fracturation hydraulique). La compagnie qui opère ce puits avait l'intention de réutiliser l'eau lors de la fracturation hydraulique d'un autre puits.

Exemple d'une composition chimique des eaux de frac et des eaux usées d'un puits horizontal fracturé dans l'Utica

	Volumes	pourcentage	
Eau de fracturation	15091 m3	96.576%	
Proppant	1170 T	2.8248%	
la recete des solution d'additives ajoutés a l'eau de fracturation			
les additives dans la solution d'acide* sont:		0.42%	
15% HCL	solution d'acide diluée a 15%		
Ferrotrol 800 (Iron Control)	agent de control de fer		
CI-27 (Corrosion inhibitor)	Agent de control de corrosion		
D-3 (Demulsifier)	agent de réduction d'émulsion		
le pourcentage de solution d'additives ajoutés a l'eau fraiche		0.180%	
FRW-16 A (Friction Reducer)	agent de réducteur de friction		
Breaker (Breaker)	Désinfectant		
WG-15SLR (Guar Gelant)**	agent de gélification (facultatif)		
FAC 3W (Surfactant Gelant)	Surfactant (facultatif)		
		100.0%	

*L'acide est utilisé pour aider à ouvrir la craque dans le réservoir et nettoyer les perforation



Certificate of Analysis

Request number: 10-335038



Date Received: 2010-07-07

Date Certificate Issued: 2010-07-13

Certificate Version: 1

- Official Certificate of Analysis
 Preliminary Certificate of Analysis

Client

[Redacted Client Information]

P.O. Number	Your project ID.	Project Manager
[Redacted]	[Redacted]	[Redacted]

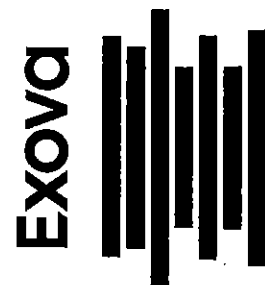
Comments

This version replaces and cancels all earlier version.

NA : Information Not Available

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Certificate of Analysis

Client: [REDACTED]

Request Number: **10-335038**

P.O. Number [REDACTED]	Your Project ID. [REDACTED]	Project Manager [REDACTED]
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Sample(s)

Lab. No. **1485422**

Your Reference [REDACTED]

Matrix Waste water
Sampled by CLIENT

Site sampled [REDACTED]

Date sampled 2010-07-07

Date received 2010-07-07

Parameter(s)

Method

Reference

Ammonia (as N)

QC019-96 / Sodium Salicylate colorimetry
MA. 300 - N 1.1 R2

Ammonia (as N)

Preparation 2010-07-09
Analysis 2010-07-09
Sequential No. 316056
mg/L 2.1

Arsenic (As)

QC091-08 / Acid digestion (if necessary), ICP-MS analysis
MA. 200 - Mét 1.1 R4

Arsenic (As)

Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315935
mg/L 0.002

Barium (Ba)

QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4

Barium (Ba)

Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
mg/L 1.1

BOD5

QC004-92 / Seed : natural wastewater, 20°C incubation, O2 reading
SMS210 B / MA. 315 - DBO 1.1

BOD5

Preparation 2010-07-08
Analysis 2010-07-13
Sequential No. 315987
mg/L O2 230

State of sample at the reception

(1 = Not frozen / 2 = Frozen)

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1

Boron (B)

QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4

Boron (B)

Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
mg/L 2.0

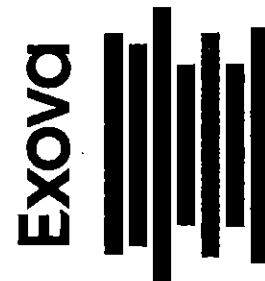
Cadmium (Cd)

QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4

Cadmium (Cd)

Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
mg/L <0.005





Certificate of Analysis

Client: [REDACTED]

Request Number: **10-335038**

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Sample(s)

Lab. No. **1485422**
Your Reference [REDACTED]

Matrix Waste water
Sampled by CLIENT

Site sampled [REDACTED]

Date sampled 2010-07-07
Date received 2010-07-07

Parameter(s)

Method
Reference

Chloride
QC032-95 / Thiocyanate Hg colorimetry
SM4500 Cl E / MA. 303 - Anions 1.0 R1
Preparation 2010-07-12
Analysis 2010-07-12
Sequential No. 316120
Chloride mg/L 450

Chrome (Cr)
QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4
Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
Chromium (Cr) mg/L 0.01

COD
QC005-95 / Closed acid reflux, colorimetry
SM5220 D / MA. 315 - DCO 1.0 R4
Preparation 2010-07-08
Analysis 2010-07-08
Sequential No. 315890
COD mg/L 340

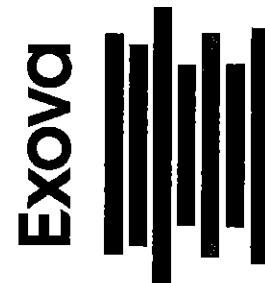
Copper (Cu)
QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4
Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
Copper (Cu) mg/L 0.01

Iron (Fe)
QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4
Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
Iron (Fe) mg/L 5.3

Lead (Pb)
QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4
Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
Lead (Pb) mg/L <0.03

Mercury
QC068-96 / Acid digestion, AA (cold-vapor) analysis
SM3112 B / MA. 200 - Hg 1.0 R4
Preparation 2010-07-11
Analysis 2010-07-11
Sequential No. 316099
Mercury mg/L <0.0001





Certificate of Analysis

Client: [REDACTED]

Request Number: **10-335038**

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Sample(s)

Lab. No. **1485422**

Your Reference [REDACTED]

Matrix Waste water
Sampled by CLIENT

Site sampled [REDACTED]

Date sampled 2010-07-07
Date received 2010-07-07

Parameter(s)

Method
Reference

Nickel (Ni)

QC087-07 / Acid digestion (if necessary), ICP analysis
MA. 200 - Mét 1.1 R4

Preparation 2010-07-08
Analysis 2010-07-09
Sequential No. 315933
mg/L <0.02

Nitrite-Nitrate (as N)

QC028-95 / Cadmium reduction, colorimetry
SM4500NO3F / MA.300-NO3 1.0 R1 / MA.303-NO3 1.0 R4

Preparation 2010-07-08
Analysis 2010-07-08
Sequential No. 315916
mg/L <0.02

Nitrite-Nitrate (as N)

pH
QC021-92 / pH-meter (compensation at 20°C)
SM4500 H + B / MA. 100 - pH 1.1 R1

Preparation 2010-07-07
Analysis 2010-07-07
Sequential No. 315873

pH

Phenols (4AAP)

QC044-97 / Distillation, colorimetry
SM5530 B / MA. 404-I.Phé. 2.2 / MA. 400-Phé 1.0

Preparation 2010-07-09
Analysis 2010-07-09
Sequential No. 315994

Phenols (4AAP)

Sulfates (SO4)

QC090-08 / IC analysis
SM4110 B / MA300-Ions1.2 R2 / MA303-Anions 1.0 R1

Preparation 2010-07-09
Analysis 2010-07-09
Sequential No. 316003
mg/L 30

Sulfates (SO4)

Suspended solids

QC033-95 / Filtration, dried at 105 °C, gravimetry
SM2540 D / MA. 115 - S.S. 1.1 R3

Preparation 2010-07-09
Analysis 2010-07-12
Sequential No. 316060
mg/L 49

Suspended solids

Total cyanide (as CN)

QC015-92 / Distillation with hydroxylamine, colorimetry
SM4500-CN N / MA. 300 - CN 1.1 R4

Preparation 2010-07-08
Analysis 2010-07-08
Sequential No. 315905
mg/L CN 0.011

Total cyanide (as CN)





Certificate of Analysis

Client: [REDACTED] Request Number: **10-335038**

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Sample(s)

Lab. No. 1485422
Your Reference [REDACTED]

Matrix Waste water
Sampled by CLIENT

Site sampled [REDACTED]

Date sampled 2010-07-07
Date received 2010-07-07

Parameter(s)

Method		
Reference		
Total phosphorus (as P)	Preparation	2010-07-13
QC017-97 / Persulfate autoclave digestion, colorimetry acid	Analysis	2010-07-13
SM4500-P F / MA. 315 - P 1.0 R4	Sequential No.	316226
Total phosphorus (as P)	mg/L	0.11
Total Sulfide	Preparation	2010-07-08
QC016-92 / Distillation (if necessary), methylene blue colorimetry	Analysis	2010-07-09
MA. 300 - S 1.1 R3 / SM4500-S2 D	Sequential No.	315906
Sulfides (as H2S)	mg/L H2S	1.7
Sulfides (as S2-)	mg/L S	1.6
Zinc (Zn)	Preparation	2010-07-08
QC087-07 / Acid digestion (if necessary), ICP analysis	Analysis	2010-07-09
MA. 200 - Me1 1.1 R4	Sequential No.	315933
Zinc (Zn)	mg/L	0.17





Certificate of Analysis

Client: [REDACTED] Request Number: 10-335038

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Sample(s)

Lab. No. 1485422

Your Reference [REDACTED]

Matrix Waste water
 Sampled by CLIENT

Site sampled [REDACTED]

Date sampled 2010-07-07

Date received 2010-07-07

Parameter(s)

Method

Reference

Petroleum hydrocarbons (C10-C50)

QC063-97 / Hexane extraction, GC-FID analysis
 MA. 400 - Hyd. 1.1

Preparation 2010-07-08

Analysis 2010-07-09

Sequential No. 315950

Petroleum hydrocarbons (C10-C50)

µg/L 12000

Total Oil and Grease

QC061-97 / Hexane extraction, gravimetry
 EPA1664 / MA. 400 - HGT 1.1

Preparation 2010-07-09

Analysis 2010-07-10

Sequential No. 316054

Total Oil and Grease

mg/L 15

Comments:

1485422 [REDACTED]

The sample intended for BOD5 analysis has been received unfrozen and was analysed without freezing.

Note: Results pertain only to the samples submitted for analysis.

Alain Perron
 Alain Perron, chemist





Certificat d'analyses

Client: [REDACTED] Request Number: **10-335038**

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Quality Control Results (CQ)

Parameters (Sequential ID No.)	Units	RDL	Blank	Certified Control	
				Result	Expected Range
Chloride					
Sequential ID No.: 316120					
Chloride	mg/L	< 0.5	<0.5	22	21.2 - 28.8
Total cyanide (as CN)					
Sequential ID No.: 315905					
Total cyanide (as CN)	mg/L CN	< 0.005	<0.005	0.18	0.16 - 0.24
BOD5					
Sequential ID No.: 315987					
BOD5	mg/L O2	< 2	<2	200	160 - 240
State of sample at the reception (1 = Not frozen / 2 = Frozen)		<	-	NA	NA
		<	1	NA	NA
COD					
Sequential ID No.: 315890					
COD	mg/L	< 5	<5	110	80 - 120
Total Sulfide					
Sequential ID No.: 315906					
Sulfides (as H2S)	mg/L H2S	< 0.02	<0.04	1.5	1.26 - 1.9
Sulfides (as S2-)	mg/L S	< 0.02	<0.04	NA	NA
Mercury					
Sequential ID No.: 316099					
Mercury	mg/L	< 0.0001	<0.0001	0.0047	0.004 - 0.006
Petroleum hydrocarbons (C10-C50)					
Sequential ID No.: 315950					
Petroleum hydrocarbons (C10-C50)	µg/L	< 100	<100	1600	1400 - 3400
Total Oil and Grease					
Sequential ID No.: 316054					
Total Oil and Grease	mg/L	< 1	< 1	46	35 - 65
Sulfates (SO4)					
Sequential ID No.: 316003					
Sulfates (SO4)	mg/L	< 0.5	<0.5	10	8 - 12

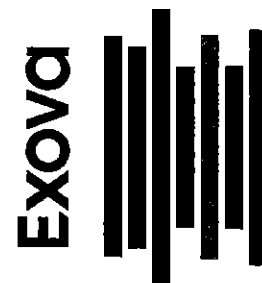
Comments

Sequential ID no. 315933 : Fe : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result
 Sequential ID no. 316056 : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result

RDL : Reported Detection Limit

Appendix 1 of Certificate no.334995 - Page 1 of 3

This certificate must not be reproduced, except in its entirety, without written consent from the laboratory. The official version of this certificate is protected and cannot be modified.
 The above-mentioned samples will be retained for a period of 30 days following the issue of this certificate with the exception of microbiology samples or as instructed by the client.
 Results pertain only to the samples submitted for analysis.



Certificat d'analyses

Client: [REDACTED]

Request Number: **10-335038**

P.O. Number [REDACTED]	Your Project ID. [REDACTED]	Project Manager [REDACTED]
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Quality Control Results (CQ)

Parameters (Sequential ID No.)	Units	RDL	Blank	Certified Control	
				Result	Expected Range
Barium (Ba)					
Sequential ID No.: 315933					
Barium (Ba)	mg/L	< 0.01	<0.01	1.0	0.8 - 1.2
Boron (B)					
Sequential ID No.: 315933					
Boron (B)	mg/L	< 0.02	<0.02	1.0	0.9 - 1.1
Cadmium (Cd)					
Sequential ID No.: 315933					
Cadmium (Cd)	mg/L	< 0.005	<0.005	0.97	0.8 - 1.2
Chrome (Cr)					
Sequential ID No.: 315933					
Chromium (Cr)	mg/L	< 0.01	<0.01	1.0	0.8 - 1.2
Copper (Cu)					
Sequential ID No.: 315933					
Copper (Cu)	mg/L	< 0.01	<0.01	1.0	0.8 - 1.2
Iron (Fe)					
Sequential ID No.: 315933					
Iron (Fe)	mg/L	< 0.05	0.07	5.1	4.5 - 5.5
Arsenic (As)					
Sequential ID No.: 315935					
Arsenic (As)	mg/L	< 0.001	<0.001	0.020	0.016 - 0.024
Nickel (Ni)					
Sequential ID No.: 315933					
Nickel (Ni)	mg/L	< 0.02	<0.02	1.0	0.8 - 1.2
Lead (Pb)					
Sequential ID No.: 315933					
Lead (Pb)	mg/L	< 0.03	<0.03	1.1	0.8 - 1.2
Zinc (Zn)					
Sequential ID No.: 315933					
Zinc (Zn)	mg/L	< 0.02	<0.02	1.0	0.8 - 1.2

Comments

Sequential ID no. 315933 : Fe : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result
 Sequential ID no. 316056 : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result

RDL : Reported Detection Limit

Appendix 1 of Certificate no.334995 - Page 2 of 3

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 Results pertain only to the samples submitted for analysis.



Certificat d'analyses

Client: [REDACTED] Request Number: **10-335038**

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Quality Control Results (CQ)

Parameters (Sequential ID No.)	Units	RDL	Blank	Certified Control	
				Result	Expected Range
Ammonia (as N)					
Sequential ID No.: 316056					
Ammonia (as N)	mg/L	< 0.02	0.04	0.84	0.66 - 0.98
Nitrite-Nitrate (as N)					
Sequential ID No.: 315916					
Nitrite-Nitrate (as N)	mg/L	< 0.02	<0.02	1.0	0.8 - 1.2
Phenols (4AAP)					
Sequential ID No.: 315994					
Phenols (4AAP)	mg/L	< 0.002	<0.002	0.028	0.026 - 0.038
pH					
Sequential ID No.: 315873					
pH		NA	NA	7.0	6.8 - 7.2
Total phosphorus (as P)					
Sequential ID No.: 316226					
Total phosphorus (as P)	mg/L	< 0.01	<0.01	1.9	1.49 - 2.23
Suspended solids					
Sequential ID No.: 316060					
Suspended solids	mg/L	< 4	<4	130	88 - 132

Comments

Sequential ID no. 315933 : Fe : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result
 Sequential ID no. 316056 : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result

RDL : Reported Detection Limit



Certificat d'analyses

Client: [REDACTED]

Request Number:

10-335038

P.O. Number	Your Project ID.	Project Manager
[REDACTED]	[REDACTED]	[REDACTED]

Quality Control Results - Part 2

Parameters (Sequential ID No.)	Units	Duplicate		
		Value 1	Value 2	Difference (%)
Chloride				
Sequential ID No: 316120	(Sample no)		(1485422)	
Chloride	mg/L	450	450	0.0
Total phosphorus (as P)				
Sequential ID No: 316226	(Sample no)		(1485422)	
Total phosphorus (as P)	mg/L	0.11	0.11	0.0

Comments

Sequential ID no. 315933 : Fe : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result
Sequential ID no. 316056 : Blanc positif non soustrait des échantillons / Positive result for blank not subtracted from sample result